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A Model-Based Mass Law
and a Table of Binding Energies

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A MODEL-BASED MASS LAW
AND A TABLE OF BINDING ENERGIES

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Philip A. Seeger and Robert C. Perisho

ABSTRACT

A mass law is presented, based on the liquid-drop model with shell and deformation corrections given by the Nilsson model and pairing energy by the Bardeen-Cooper-Schrieffer model. The resulting mass law has 10 parameters, including all model parameters, and gives a standard deviation of 0.78 MeV when adjusted to the binding energies of 1127 known nuclei above mass 40.

A table of binding energy, deformation, particle separation energies of protons, neutrons, and alpha particles, and Q-value for negaton decay for over 9000 nuclides from $Z = 22$ to ~~120~~ 120 and $N = 22$ to ~~200~~ 200 is given in an appendix.

I. LEAST-SQUARES ANALYSIS

Considerable discussion of the applicability of the least-squares approach to the mass law problem was presented at the Second International Conference on Nuclidic Masses in 1963.¹ Its use can be defended on the ground that it provides a straightforward way to achieve results, especially when a computer is used, and that it is probably the least biased approach. The errors calculated from it, however, represent uncertainties only in the determination of the coefficients, under the assumptions that all significant terms are included in the formula, and that the uncertainties of the input data are uncorrelated.

The present work was started with the hope that the missing terms in the formula, for example those resulting from local irregularities in the nuclear potential, could be reduced to the order of 300 keV.

This estimated uncertainty of 300 keV, based on our estimate of the error intrinsic in our model due to its imperfections, was combined quadratically with the quoted errors of the binding energies.² The problem was thus to find a smooth binding energy surface as a function of Z and N lying as close as possible to the atomic binding energies, which were assumed to be normally distributed about such a surface with a standard deviation of 300 keV.

After being combined with the 300 keV, all errors are assumed (obviously falsely) to be uncorrelated, and the data are weighted inversely as the increased error or weighting error. By following the least-squares procedures, we are able to calculate errors and correlations among the calculated values of the coefficients. Errors are presented in the form of the error matrix and the matrix of correlation coefficients;

since both matrices are symmetric and the correlation matrix is unity on the diagonal, both can be displayed in a single array. (Correlation coefficients are written in the upper portion, and the error matrix on the diagonal and below.) It must be remembered that the error and correlation matrices refer only to uncertainties in the statistical determination of coefficients and have no physical significance.

Several statistical tests may be applied. The sum of the residuals, X^2 , is a sample from a χ^2 -distribution of order $(n-p)$, where n is the number of data points and p the number of parameters. Application of the χ^2 -test in this manner, however, relates only to the choice of 300 keV error combined with the quoted experimental errors. We therefore renormalize all errors by multiplying by the "least-squares test number," $\sqrt{X^2/(n-p)}$, so that the recalculated value of X^2 will be exactly the expectation value of χ^2 . One may then perform a true χ^2 -test on the frequency distribution of the residuals, comparing them to a unit normal distribution.

The variance-ratio test or F-distribution may be applied either by comparing subsets of the data or by comparing subsets of the parameters against the total. In the former case the group of data may be random (to test interpolation) or may be taken all on one side of β -stability (to test extrapolation).³ Numerical examples are given in Sec. VII; the basic procedure is to relate portions of the sum X^2 to the corresponding numbers of degrees of freedom and to test the hypothesis that the differences are due purely to chance. This is a strong test of the significance of parameters.¹

If one wishes, for example, to know the value of the coefficient α for comparison with theory, he may test to see how its value as determined by least squares varies with changes in the minor terms in the formula, or how it varies when determined by subsets of the data.

The final test of any mass law is the pragmatic one that it must be usable for the problem the author wishes to solve. In this case the mass law was developed to carry out calculations concerning nucleosynthesis by rapid neutron capture⁴ (r-process); i.e., it was designed to extrapolate into the extreme neutron rich area of the N-Z plane. In this application the mass law was successful.⁵

II. LIQUID-DROP TERMS

The starting point for this mass law is the formula of Weizsäcker^{6,7} with six adjustable parameters: volume term α with surface correction γ , isotopic asymmetry term β with surface correction η , the Coulomb energy radius constant R_0 , and the phenomenological pairing term δ . The formula is

$$B(N, Z) = \alpha A - \beta I^2/A - \gamma A^{2/3} + \eta I^2/A^{4/3} + \delta/A^{1/2} \cdot (0, \pm 1) \\ - 0.864 \frac{Z^2}{R_0 A^{1/3}} \left\{ 1 - \frac{0.76361}{Z^{2/3}} - \frac{2.453}{R_0^2 A^{2/3}} \right\} \\ + 7 \exp(-6 |I|/A) + 14.33 \times 10^{-6} Z^{2.39}, \quad (1)$$

where $A = N + Z$ and $I = N - Z$. The pairing term is zero for odd A , positive for even-even nuclides, and negative for odd-odd nuclides. The Coulomb energy includes two correction terms without arbitrary multipliers: an exchange term,⁷ and a correction for the diffuseness of the nuclear surface. The numerical constant for the latter is taken from the Stanford electron scattering experiments.^{8,9} The two terms on the last line of Eq. (1) represent the "Wigner" asymmetry term as estimated phenomenologically by Myers and Swiatecki⁹ and the binding of the atomic electrons.¹⁰ These two terms are not strong enough to be determined by least-squares; their values have therefore been taken from the references. Their values have little effect on the goodness of fit of the binding energies,

Fig. 1. Errors of the calculated binding energies using Eq. (1). The symbols E, N, Z, and O refer to even-even, odd N, odd Z, and odd-odd nuclides, respectively.

and they are not counted as parameters.

They are included in the formula to prevent falsification of other terms.¹

Figure 1 displays the errors of the calculated binding energies resulting from least-squares adjustment of Eq. (1) to 1127 binding energies.² The coefficients are:

$$\begin{aligned}
 \alpha &= 15.645 \text{ MeV} \\
 \beta &= 30.586 \text{ MeV} \\
 \gamma &= 19.655 \text{ MeV} \\
 \eta &= 53.767 \text{ MeV} \\
 \delta &= 10.609 \text{ MeV} \\
 R_0 &= 1.2025 \text{ fm}
 \end{aligned}
 \quad (2)$$

The surface thus defined has a standard deviation of 2.55 MeV from the measured binding energies; the least-squares test number is 7.474. All errors have been multiplied by 7.474 before computing the error matrix. (Quantities in parentheses in the following array are correlation coefficients.)

	α	β	γ	η	δ	R_0
α	.0036	(-.62)	(+.99)	(-.75)	(+.08)	(-.98)
β	-.0179	.2324	(-.52)	(+.98)	(-.05)	(+.74)
γ	.0108	-.0455	.0327	(-.67)	(+.07)	(-.95)
η	-.1474	1.531	-.3945	10.57	(-.01)	(+.84)
δ	.0052	-.0286	.0155	.2356	1.305	(-.07)
R_0	-.0005	.0030	-.0015	.0232	-.0007	.0001

It is seen that every function except the pairing term is strongly correlated with at least one other function. The Coulomb energy is correlated with all others; thus although the variance of R_0 is very small, changes in other terms will greatly affect its determination. The coefficient η is not at all well determined. Note that if the correlations are taken with respect to $1/R_0$, then all of the largest correlation coefficients are positive: all terms will rise or fall together.

III. NILSSON MODEL

It is now desired to find correction terms for the mass law to take into account the discrete nature of nuclear states, and in particular the grouping of states into shells. Also, we must account for increased

binding energy due to deformation of the nucleus. The Nilsson model^{11,12} has been very successful in describing level orderings in deformed nuclei, and the potential used in that model has two advantages which make it the most feasible model for the

Fig. 2. Proton levels, $\kappa_0 = 0.180$, $\mu = 0.620$. Energy in harmonic oscillator units plotted as a function of deformation. Quantum numbers N , l , and j are indicated at zero deformation, and the asymptotic quantum numbers $\Omega^\pi(Nn_z\Lambda)$ in the right margin. Note that this level diagram is a function of only two parameters.

Fig. 3. Neutron levels, $\kappa_0 = 0.210$, $\mu = 0.308$. See Fig. 2.

extended calculations attempted here. First, since it is an infinite potential, it has no continuum states. Second, the harmonic oscillator strength scales in a simple manner with A , so that it is not necessary to repeat the calculations for each individual value of A . The version used is from the more recent Nilsson paper,¹² with the correction term to the harmonic oscillator potential defined as

$$V_{\text{corr}} = -\kappa_N \hbar \omega_0 (2\vec{l} \cdot \vec{s} + \mu_N \vec{l}^2 - \mu_N \frac{N(N+3)}{2}), \quad (3)$$

where N is the principal quantum number of the harmonic oscillator shell, and the last term has been introduced to preserve the center of gravity of each shell. We have used the co-ordinate system defined in the appendix of Ref. 11, with deformation parameter ϵ .

The quantities κ_N and μ_N are allowed to vary freely from shell to shell in most treatments using the Nilsson model, but this introduces an unnecessarily large number of parameters. We discovered that the most suitable set of values followed a regular pattern, and that the number of free parameters can be reduced to two by setting μ constant and letting κ vary inversely as the cube root of the degeneracy of the N th harmonic oscillator shell. That is

$$\begin{aligned} \mu_N &= \mu = \text{constant} \\ \kappa_N &= \kappa_0 \left[\frac{(N+1)(N+2)}{2} \right]^{-1/3} \end{aligned} \quad (4)$$

For protons, $\kappa_0 = 0.180$ and $\mu = 0.620$; the resulting level diagram is shown in Fig. 2. The level ordering is found to be in excellent agreement with the assignments made by Mottleson and Nilsson.¹³ For neutrons, $\kappa_0 = 0.210$ and $\mu = 0.308$; these levels are shown in Fig. 3. The energy scales are in harmonic oscillator units, and the center of gravity of each harmonic oscillator shell is indicated along the left edge. Note that the levels are plotted in terms of $\hbar \omega_0$, which does not vary with deformation but is proportional to $A^{-1/3}$. The quantum

numbers N , l , and j are indicated for spherical levels, and the asymptotic Nilsson level designations $\Omega^\pi(Nn_z\Lambda)$ are listed along the right edge. Each level designation has been placed as close as possible to the height of the end of the level; ambiguous cases can be resolved by tracing levels back to zero deformation. (N and π are constant, and Ω can be found from the position of the level in the multiplet.)

The size of the harmonic oscillator unit is determined by the requirement that the mean square radius of the levels at the Fermi energy must be the same for neutrons and for protons, and must also be equal to the mean square radius of the charge distribution as found in the mass law. We force this relation to hold for zero deformation along the line of β -stability given by

$$A(Z) = (8Z - 50)/3, \quad (5)$$

$$A(N) = 1.6N + 10. \quad (6)$$

These relations associate a value of the radius $R = R_0 A^{1/3}$ with each level. The Nilsson model gives the mean square radius of the level in terms of the potential strength; averaging over all levels in Figs. 2 and 3 respectively, we find

$$(\hbar \omega_0)_p = 46.61 / (R_0^2 A^{1/3}) \text{ MeV.} \quad (7)$$

$$(\hbar \omega_0)_n = 51.24 / (R_0^2 A^{1/3}) \text{ MeV.} \quad (8)$$

Since R_0 is already one of the parameters of the mass law, only four new parameters have been added. None of these can be determined by least-squares fit to the binding energies; they can only be adjusted by trial and error to reproduce the observed level ordering.

IV. STRUTINSKY CALCULATION

To use the Nilsson model as a small correction to the liquid drop, one must subtract from the sum of the Nilsson level energies a quantity which represents that portion of the energy already included in the liquid-drop calculation. Strutinsky¹⁴

has shown how to do this by smoothing the Nilsson levels into a uniform distribution of states which is then completely compatible with the Nilsson model. The difference between the Nilsson level energies and the uniform level energies is taken to be the correction to the liquid-drop energy.

The uniform level scheme is generated by a Gaussian smearing of the Nilsson levels with a width γ which is large enough that many states will overlap. The uniform level density $g_0(E)$ is then a sum over all Nilsson energy levels E_v :

$$g_0(E) = \frac{1}{\gamma\sqrt{\pi}} \sum_v \exp\left\{-\left[(E - E_v)/\gamma\right]^2\right\}. \quad (9)$$

Strutinsky has shown that $\gamma = 0.7 \hbar\omega_0$ is adequate. The disadvantage of smoothing is that if real variations of the function occur over the smoothing interval, the result will be distorted. For a classical harmonic oscillator, the energy level density is a parabola:

$$g_{h.o.}(E) = \frac{1}{2}(E^2 - \frac{1}{4}), \quad (10)$$

so the smoothing function must be corrected so as not to distort a parabola. This is achieved by adding a correction term proportional to the second derivative of Eq. (9). The uniform level density then is:

$$g(E) = \frac{1}{\gamma\sqrt{\pi}} \sum_v \left\{\frac{3}{2} - X_v(E)^2\right\} \exp\left\{-X_v(E)^2\right\}, \quad (11)$$

where

$$X_v(E) = (E - E_v)/\gamma. \quad (12)$$

Again, the sum is over all levels of the Nilsson diagram. In this uniform model the number of particles with energy less than any value λ is

$$\begin{aligned} n(\lambda) &= 2 \int_{-\infty}^{\lambda} g(E) dE \\ &= \sum_v \left\{1 + \Phi(X_v(\lambda))\right\} + \frac{1}{\sqrt{\pi}} \sum_v X_v(\lambda) \exp(-X_v(\lambda)^2), \end{aligned} \quad (13)$$

where the error function

$$\Phi(x) = \frac{2}{\sqrt{\pi}} \int_0^x \exp(-t^2) dt. \quad (14)$$

The uniform model energy $\mathcal{E}(n)$ of these n particles is

$$\begin{aligned} \mathcal{E}(n(\lambda)) &= 2 \int_{-\infty}^{\lambda} E g(E) dE \\ &= \sum_v E_v [1 + \Phi(X_v(\lambda))] \\ &+ \frac{1}{\sqrt{\pi}} \sum_v \left\{ \gamma X_v(\lambda)^2 + E_v X_v(\lambda) - \frac{\gamma}{2} \right\} \exp(-X_v(\lambda)^2). \end{aligned} \quad (15)$$

Equations (13) and (15) were evaluated at 81 equally spaced values of λ , and $\mathcal{E}(n)$ was then found at all integer values of n by 4-point interpolation. The correction term to the mass law is then the difference between $\mathcal{E}(n)$ and the sum of the energies of the first n particles (remembering that each E_v occurs twice in the sum if there are two particles in the state) in the Nilsson diagram.

$$\delta U(n, \epsilon) = \mathcal{E}(n) - \sum_{i=1}^n E_i \quad (16)$$

The sign of δU is taken to be positive in the binding energy. The dependence of δU on ϵ stems from the ϵ dependence of the level diagram. Figure 4 shows the results of calculations of δU for both protons and neutrons at five different deformations ϵ . Note that the strong influence of the "magic numbers" for spherical nuclei diminishes and changes with increased deformation. Thus, 152 neutrons are near mid-shell for spherical nuclei, but become magic at a deformation of $\epsilon = 0.2$. This effect is due to alternate rarefactions and condensations in the level density as a function of deformation, and can be seen clearly in Fig. 2 at $Z = 100$ and in Fig. 3 at $N = 152$.

V. PAIRING CORRELATIONS

Pairing correlations are not included in the liquid-drop model, nor in the Nilsson model. A correction term will now be calculated by finding a ground-state wave function of the Bardeen-Cooper-Schrieffer (BCS) type,¹⁵ and comparing its

Fig. 4. Shell correction functions vs number of particles for various deformations.

energy to the sum of the Nilsson levels. The effect is greatest when the density of levels at the Fermi energy is high; i.e., in mid-shell. The presence of an odd nucleon makes the level nearest the Fermi energy unavailable for occupation by a pair, and thus decreases the effective level density. Therefore the odd nucleon always leads to decreased binding energy; this is a quantitative theory for the even-odd mass differences, previously included only as a phenomenological term. The Bardeen equations are

$$n_e = \sum_i' \left\{ 1 - \frac{E_i - \lambda}{\sqrt{(E_i - \lambda)^2 + \Delta^2}} \right\} \quad (17)$$

$$\frac{2}{G} = \sum_i' \frac{1}{\sqrt{(E_i - \lambda)^2 + \Delta^2}} \quad (18)$$

where the sums are carried out over a restricted number of levels E_i of the Nilsson diagram, excluding the level occupied by the odd nucleon if n is odd; and n_e is the even number of particles equal to or one less than the number n being considered. The equations are solved simultaneously for the Fermi energy λ and for the energy gap Δ . The only parameter is G , the average strength of the pairing force matrix elements. G is taken to vary as $1/A$, with the same value for neutrons and protons. The G thus given is in MeV, and must be converted to harmonic oscillator units by using Eqs. (7) and (8).

Then for protons and neutrons respectively

$$G_p(Z) = G_0 R_0^2 / (46.61 A(Z)^{2/3}) \quad (19)$$

$$G_n(N) = G_0 R_0^2 / (51.24 A(N)^{2/3}). \quad (20)$$

Fig. 5. Pairing correlation energy for even and odd numbers of nucleons, plotted vs nucleon number for various deformations.

The new parameter G_0 replaces δ in the mass law, so the number of parameters is not increased.

The energy of the BCS ground state is

$$E = E_{\text{odd}} + \sum_i \left\{ 1 - \frac{E_i - \lambda}{\sqrt{(E_i - \lambda)^2 + \Delta^2}} \right\} E_i - \frac{\Delta^2}{G}, \quad (21)$$

where E_{odd} is the energy of the odd nucleon, if any; again, the sum specifically excludes the odd particle level. Note that Eq. (21) includes the sum of all occupied Nilsson levels.

The binding energy of a pair is G , so the pairing energy also includes a term $n_e G/2$. We assume that this term, except for a small even-odd mass difference $(n - n_e)G/2$, is included in the volume term of the liquid-drop mass law.

If we now restrict the sum in Eq. (21) to an equal number of levels above and below the Fermi level (again excluding the odd particle level), and use Eqs. (17) and

(18), we get

$$E = \frac{\Delta^2}{G} - \sum_i \sqrt{(E_i - \lambda)^2 + \Delta^2} + \sum_{\text{all } i} E_i. \quad (22)$$

Wahlborn¹⁶ has shown this to be a generating function of Eqs. (17) and (18); i.e., Eq. (22) has a stationary point at those values of λ and Δ which solve Eqs. (17) and (18). This stationary point can be found efficiently by using a two-dimensional Newton's method and requiring the convergence of E rather than λ and Δ .

If we subtract the BCS n -particle ground state energy from the corresponding Nilsson model energy, and include the correction to the liquid drop two-body energy, we get the pairing correction to the Nilsson binding energy:

$$P(n, \epsilon) =$$

$$2 \sum_{< \lambda} E_i - \sum_i \left\{ E_i - \sqrt{(E_i - \lambda)^2 + \Delta^2} \right\} - \frac{\Delta^2}{G} - \frac{G}{2} (n - n_e), \quad (23)$$

where the first sum is over all levels which would be occupied by pairs if there were no pairing force, and the second sum includes all levels considered above and below the Fermi energy except the odd-particle level. The pairing correlation energy is plotted in Fig. 5 for the choice of parameter $G_0 R_0^2 = 27.378$.

VI. DEFORMATIONS AND DEFORMATION ENERGY

In addition to δU and P , two other terms in the liquid-drop formula vary with deformation: the surface energy and leading term of the Coulomb energy.⁹ The ex-

pression for energy as a function of deformation is

$$E_{\text{def}}(\epsilon) = P(N, \epsilon) - P(N, 0) + P(Z, \epsilon) - P(Z, 0) \\ + \delta U(N, \epsilon) - \delta U(N, 0) + \delta U(Z, \epsilon) - \delta U(Z, 0) \\ - (\gamma A^{2/3} - \eta I^2/A^{4/3}) \cdot (8/45 \epsilon^2 - 32/2835 \epsilon^3) \\ + 0.864 Z^2/(R_0 A^{1/3}) \cdot (4/45 \epsilon^2 + 32/2835 \epsilon^3). \quad (24)$$

The equilibrium deformation is that value of ϵ which makes E_{def} maximum. The values thus found for ϵ and E_{def} are plotted in Fig. 6 for the known masses; parameters are from the first column of Table I. The anomalously large deformations for many of the lighter nuclei indicate that the model

Fig. 6. Deformation and deformation energy. Equilibrium deformation ϵ is found by maximizing Eq. (24). Points for even values of Z are connected by lines; some values of Z are labeled.

is slightly unstable; however, there is very little energy associated with those deformations and, therefore, little error in the mass law as applied near β -stability. There are, however, difficulties in the r-process,⁵ since some of the nuclei involved in that calculation near $A = 102$ fall within a region of strong calculated deformations.

VII. THE NEW MASS LAW

The complete mass law is formed by combining Eqs. (1), (16), (23), and (24) as follows:

$$\begin{aligned}
 B(N, Z) = & \alpha A - \beta I^2/A - \gamma A^{2/3} + \eta I^2/A^{4/3} \\
 & - 0.864 \frac{Z^2}{R_0 A^{1/3}} \left\{ 1 - \frac{0.76361}{Z^{2/3}} - \frac{2.453}{R_0^2 A^{2/3}} \right\} \\
 & + 7 \exp(-6|I|/A) + 14.33 \times 10^{-6} Z^{2.39} \\
 & + \delta U(N, 0) + \delta U(Z, 0) + P(N, 0) + P(Z, 0) + E_{\text{def}}(\epsilon).
 \end{aligned} \tag{25}$$

The last line of Eq. (25) can be regrouped and written as

$$E_{\text{corr}} = E_{\text{shell}} + E_{\text{e-o}} + E_{\text{def}}, \tag{26}$$

Fig. 7. Shell correction energy E_{shell} and even-odd differences $E_{\text{e-o}}$ plotted vs A . Even values of Z on the E_{shell} plot are connected by lines, and some values of Z are labeled. The symbols N , Z , and O on the lower plot refer to odd N , odd Z , and odd-odd nuclei, respectively.

Fig. 8. Errors of binding energies calculated with the new mass law, Eq. (25). Compare to Fig. 1.

where E_{def} is defined in Eq. (24) and plotted in Fig. 6. E_{e-o} is a measure of the even-odd mass difference found by subtracting the average of the two even-mass neighbors from $P(n,0)$ for each odd value of N or Z , and E_{shell} is the sum of the δU 's and the even number part of the P 's. The latter two functions are plotted in Fig. 7.

The errors in the calculated values of the binding energies are plotted in Fig. 8, for which the coefficients α , β , γ , and η are determined by least-squares analysis. The five model parameters are

$$\begin{aligned} \kappa_{0p} &= 0.180 & \mu_p &= 0.620 \\ \kappa_{0n} &= 0.210 & \mu_n &= 0.308 \\ G_0 R_0^2 &= 27.378 \end{aligned} \quad (27)$$

These five quantities are the only new parameters in the mass law; along with R_0 , γ , and η , used for normalization and for determination of E_{def} , these completely define the correction functions without any arbitrary normalizations. The mass law has been iterated on R_0 , γ , and η with the final results given in the first column of Table I. The standard deviation of the fit is 0.783 MeV, and the least-squares test number is 2.294. The figure still shows systematic deviations which could probably be removed by further adjustment of the Nilsson levels, but not within the limitations we have imposed by restricting the number of free parameters. That the distribution of errors is not normal is borne out by the χ^2 -test,

Table I

Mass-Law Coefficients and Statistics

	All Data	Grp I	Grp II	Low N	Hi N	Low G
α	15.762 MeV	15.783	15.751	15.888	15.819	15.738
β	30.088 MeV	29.854	30.331	28.260	30.028	30.049
γ	20.067 MeV	20.127	20.039	20.392	20.239	19.947
η	47.883 MeV	46.473	49.217	37.476	46.683	47.751
R_0	1.1927 fm	1.1892	1.1951	1.1705	1.1856	1.1941
σ	0.783 MeV	0.737	0.823	0.733	0.765	0.796
χ^2	5912	2715	3112	2488	2905	6103
d.f.	1117	580	527	576	531	1117
F		1.12	0.90	1.20	0.97	

which indicates a probability of only 1% that the distribution is normal. The following error matrix includes the factor of 2.294 multiplied by the experimental errors (see Sec. I). The matrix has also been scaled by a factor of 100 (errors multiplied by 10) for convenience.

	α	β	γ	η	R_0
α	.0342	(-.62)	(+.99)	(-.75)	(-.98)
β	-.1683	2.186	(-.52)	(+.98)	(+.74)
γ	.1015	-.4259	.3064	(-.67)	(-.95)
η	-1.384	14.39	-3.696	99.46	(+.84)
R_0	-.0046	.0280	-.0135	.2142	.0007

Strong correlations are seen between all coefficients. Again η is the least precisely determined coefficient.

Let us now use the variance-ratio test to study the significance of the four additional parameters. The sum of residuals for Eq. (1) with the solution given in Eq. (2) is $\chi^2 = 62764$ for 1121 degrees of freedom. For the first column of Table I, $\chi^2 = 5912$ for 1117 degrees of freedom. We wish to test the hypothesis that this improvement could be due to chance. That is, given the value 62764 from a χ^2 -distribution of 1121 degrees of freedom, what is the pure chance probability of obtaining a contribution of $62764 - 5912 = 56852$ from a χ^2 -distribution for a group of 4 degrees of freedom? The definition of the F-distribution is

$$F(m,n) = \frac{\chi^2(m)/m}{\chi^2(n)/n} \quad (28)$$

The quantity

$$F = \frac{56852/4}{62764/1121} = 254$$

is a sample from the distribution $F(4,1121)$. To find this in tables, note that

$$F(4,1121) \approx F(4,\infty) = \frac{\chi^2(4)}{4}.$$

From tables it can be seen that the probability of obtaining $F = 254$ is very small; the calculated probability of obtaining a value of F this large or larger is only

10^{-53} . Thus the new terms are undoubtedly significant.

A trial run was also made with arbitrary multipliers to be determined by least squares placed in front of each of the three functions in Eq. (26). The changes in the major coefficients were very small (the greatest being 0.3% in η), and the best fit multipliers were:

$$\begin{aligned} E_{\text{shell}}, & \quad 0.9942 \\ E_{e-o}, & \quad 0.9933 \\ E_{\text{def}}, & \quad 0.9200 \end{aligned} \quad (29)$$

In this case the standard deviation was reduced only slightly to 0.769 MeV; the sum of residuals was $\chi^2 = 5693$ and the number of degrees of freedom was 1114. Comparing to column 1 of Table I,

$$F = \frac{219/3}{5912/1117} = 13.8$$

which is to be compared to $F(3,1117)$ or $F(3,\infty)$. This indicates that the three parameters Eq. (29) are significant, a larger value of F having a probability of only about 10^{-8} . Nonetheless the three arbitrary multipliers, being remarkably close to unity, have been omitted from the mass law.

The variance-ratio test implies that the addition of one parameter to Eq. (25) or the deletion of one datum will be significant at the 1% level if it reduces the sum of residuals by 35. There are 19 data points which make contributions greater than 35 to χ^2 .

To test interpolation the input data were divided into two random groups, the first (Grp I) containing 590 data and the second (Grp II) containing 537 data. To test extrapolation, the isotopes of each element having lower neutron numbers were placed in the Low N group (which then contained 586 data), and the others in the Hi N group (541 data). The coefficients found by independent least-squares adjustments to

these four subsets of data are shown in Table I. Each solution is compared to the solution for all data using the F-test.

For example, for Grp I,

$$F = \frac{(5912-2715)/(1117-580)}{5912/1117} = 1.12.$$

For numbers of degrees of freedom this large, the F-distribution is not tabulated, but one can compute the expectation value and the variance of F:

$$E[F(m,n)] = \frac{n}{n-2} \rightarrow 1 \quad (30)$$

$$V[F(m,n)] = \frac{2}{m} \left(\frac{n}{n-2} \right)^2 \frac{(m+n-2)}{(n-4)} \rightarrow \frac{6}{n}, \quad (31)$$

where the limits are $m = n/2$ and $n \rightarrow \infty$. The values of F for the two random groups are 1.6 and 1.4 standard deviations away from the mean; it therefore does seem possible that the value for the Low N group, which is 2.7 standard deviations from the mean, could be due to chance. Note that this conclusion is considerably different from that in Ref. 5, in which the variance-ratio test was applied incorrectly.

Another run was made with $G_0 R_0^2$ reduced to 26.420; the results, shown in the last column of Table I, are not greatly different.

VIII. CONCLUSIONS

This mass law is suitable for use in the r-process, and thus has some indication of extrapolating into the extreme neutron-rich region. It has correction terms for shell and deformation effects based on the Nilsson model, and pairing energy based on BCS theory. These model-based corrections have been applied without the necessity of arbitrary multipliers. Four parameters completely describe the Nilsson model for neutrons and protons, and one parameter is used to calculate pairing correlation energy. The total number of parameters involved in this new mass law is ten.

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APPENDIX

The following table includes calculated atomic binding energies for over 9000 nuclidic species. The Nilsson deformation parameter ϵ is calculated by maximizing Eq. (24), and the total binding energy then calculated by Eq. (25), using coefficients from Eq. (27) and the first column of Table I. The proton, neutron, and α separation energies are defined as follows:

$$S_p(N, Z) = B(N, Z) - B(N, Z-1)$$

$$S_n(N, Z) = B(N, Z) - B(N-1, Z)$$

$$S_\alpha(N, Z) = B(N, Z) - B(N-2, Z-2) - 28.2950.$$

The energy available for negaton decay (column headed BETA-) is

$$Q_\beta(N, Z) = B(N-1, Z+1) - B(N, Z) + 0.78245.$$

All energies are given in MeV.

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 22, TI.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	44	0.010	375.674	9.062	15.676	7.276	-13.464	55	77	0.025	520.324	28.148	-2.466	21.048	26.311
23	45	0.042	385.257	9.653	9.582	8.068	-6.721	56	78	0.011	520.181	28.577	-0.143	21.737	24.474
24	46	0.016	398.070	10.364	12.813	8.498	-7.350	57	79	0.093	517.165	28.895	-3.016	22.130	27.799
25	47	0.047	406.990	10.942	8.920	9.280	-2.810	58	80	0.163	516.943	29.282	-0.222	22.949	25.516
26	48	0.007	418.986	11.766	11.996	9.829	-5.106	59	81	0.251	514.377	29.632	-2.565	24.332	28.317
27	49	0.070	427.388	12.323	8.402	10.747	-0.929	60	82	0.271	514.172	29.992	-0.206	25.175	26.278
28	50	0.003	438.129	13.168	10.741	10.852	-2.522	61	83	0.290	511.674	30.316	-2.498	25.922	28.945
29	51	0.044	444.180	13.716	6.052	9.945	2.778	62	84	0.292	511.080	30.752	-0.594	26.284	27.388
30	52	0.006	452.385	14.457	8.205	8.727	1.350	63	85	0.301	508.260	31.107	-2.820	26.676	30.028
31	53	0.011	457.078	15.118	4.692	8.783	5.502	64	86	0.294	507.201	31.541	-1.059	27.076	28.679
32	54	0.007	464.797	15.733	7.719	9.628	3.159	65	87	0.292	503.998	31.943	-3.203	27.446	31.230
33	55	0.073	468.322	16.253	3.525	9.832	8.004	66	88	0.284	502.546	32.341	-1.452	27.904	29.885
34	56	0.012	475.478	16.952	7.156	10.576	5.093	67	89	0.279	498.970	32.743	-3.576	28.343	32.401
35	57	0.033	478.349	17.545	2.871	11.292	9.965	68	90	0.268	497.272	33.136	-1.698	28.892	30.931
36	58	0.031	484.824	18.132	6.475	11.848	7.026	69	91	0.260	493.460	33.532	-3.812	29.460	33.490
37	59	0.032	487.148	18.765	2.324	12.603	11.796	70	92	0.248	491.510	33.916	-1.950	29.990	32.039
38	60	0.048	493.061	19.292	5.913	13.267	8.826	71	93	0.245	487.444	34.283	-4.066	30.527	34.569
39	61	0.105	494.906	19.840	1.845	14.044	13.516	72	94	0.221	485.285	34.692	-2.159	31.091	33.030
40	62	0.057	500.318	20.430	5.412	14.735	10.600	73	95	0.197	481.009	35.065	-4.276	31.617	35.576
41	63	0.091	501.814	20.967	1.497	15.583	15.057	74	96	0.179	478.647	35.391	-2.362	32.196	34.062
42	64	0.062	506.712	21.549	4.898	16.238	12.282	75	97	0.158	474.358	35.730	-4.288	32.958	36.358
43	65	0.042	507.925	22.076	1.213	17.139	16.489	76	98	0.123	472.005	36.074	-2.353	33.683	34.786
44	66	0.038	512.374	22.667	4.449	17.788	13.842	77	99	0.100	467.847	36.428	-4.158	34.534	36.933
45	67	0.001	513.387	23.256	1.013	18.712	17.780	78	100	0.035	465.736	36.838	-2.111	35.473	35.224
46	68	0.008	517.411	23.797	4.024	19.358	15.293	79	101	0.	461.810	37.230	-3.926	36.385	37.345
47	69	0.032	518.236	24.280	0.825	20.254	19.015	80	102	0.004	459.814	37.594	-1.996	37.144	35.730
48	70	0.004	521.840	24.874	3.603	20.871	16.783	81	103	0.017	456.023	37.876	-3.791	37.926	37.843
49	71	0.048	522.601	25.260	0.761	21.865	20.114	82	104	0.001	453.779	38.230	-2.244	38.304	36.627
50	72	0.002	525.621	25.882	3.020	22.279	18.398	83	105	0.023	447.850	38.471	-5.929	36.798	40.618
51	73	0.034	524.256	26.264	-1.365	21.179	23.246	84	106	0.004	443.144	38.817	-4.706	34.945	39.728
52	74	0.004	524.660	26.816	0.404	19.524	22.003	85	107	0.021	437.046	39.054	-6.098	35.407	41.424
53	75	0.011	522.692	27.246	-1.968	19.927	24.845	86	108	0.007	432.282	39.368	-4.765	35.956	40.414
54	76	0.007	522.790	27.709	0.099	20.577	23.275	87	109	0.030	426.011	39.599	-6.271	36.397	42.219

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 23, V .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	45	0.024	377.754	2.079	16.326	7.573	-10.800	56	79	0.024	544.182	24.001	0.309	20.806	26.406
23	46	0.068	389.938	4.681	12.184	8.003	-5.944	57	80	0.096	541.676	24.511	-2.506	21.204	29.677
24	47	0.039	403.398	5.328	13.460	8.490	-6.591	58	81	0.157	541.912	24.970	0.236	22.014	27.304
25	48	0.135	413.097	6.107	9.700	9.198	-0.383	59	82	0.233	539.667	25.290	-2.245	23.102	30.186
26	49	0.020	425.676	6.690	12.579	9.675	-2.692	60	83	0.244	539.837	25.665	0.170	23.881	28.150
27	50	0.077	434.825	7.437	9.149	10.482	1.464	61	84	0.285	537.686	26.012	-2.151	24.645	30.884
28	51	0.008	446.176	8.047	11.351	10.662	-0.152	62	85	0.290	537.505	26.426	-0.180	25.030	29.333
29	52	0.050	452.953	8.773	6.777	9.593	5.122	63	86	0.298	535.097	26.837	-2.408	25.444	31.939
30	53	0.015	461.798	9.412	8.845	8.542	3.664	64	87	0.292	534.446	27.245	-0.652	25.823	30.567
31	54	0.018	467.174	10.096	5.376	8.415	7.805	65	88	0.291	531.649	27.651	-2.796	26.202	33.109
32	55	0.020	475.544	10.747	8.370	9.320	5.452	66	89	0.275	530.588	28.042	-1.061	26.633	31.767
33	56	0.083	479.788	11.466	4.244	9.534	10.198	67	90	0.267	527.421	28.451	-3.167	27.071	34.306
34	57	0.035	487.531	12.054	7.743	10.173	7.265	68	91	0.253	526.167	28.895	-1.254	27.667	32.780
35	58	0.058	491.068	12.719	3.537	10.705	12.135	69	92	0.247	522.766	29.306	-3.401	28.244	35.284
36	59	0.065	498.162	13.337	7.093	11.341	9.171	70	93	0.235	521.231	29.721	-1.535	28.799	33.792
37	60	0.045	501.105	13.957	2.944	12.007	13.907	71	94	0.232	517.532	30.088	-3.699	29.310	36.319
38	61	0.089	507.640	14.578	6.534	12.652	10.923	72	95	0.213	515.802	30.517	-1.730	29.913	34.715
39	62	0.152	510.135	15.229	2.495	13.457	15.505	73	96	0.193	511.927	30.918	-3.876	30.471	37.221
40	63	0.108	516.089	15.771	5.954	14.025	12.580	74	97	0.175	509.934	31.287	-1.993	31.046	35.704
41	64	0.148	518.212	16.397	2.122	14.851	17.006	75	98	0.156	506.009	31.651	-3.925	31.771	37.992
42	65	0.096	523.632	16.919	5.420	15.449	14.231	76	99	0.124	503.998	31.993	-2.010	32.447	36.436
43	66	0.119	525.433	17.508	1.802	16.291	18.430	77	100	0.102	500.177	32.330	-3.821	33.254	38.609
44	67	0.066	530.384	18.010	4.951	16.926	15.812	78	101	0.044	498.372	32.636	-1.805	34.146	36.947
45	68	0.032	531.921	18.534	1.537	17.776	19.792	79	102	0.	494.761	32.951	-3.611	35.047	39.137
46	69	0.022	536.469	19.058	4.548	18.467	17.342	80	103	0.007	493.084	33.270	-1.677	35.891	37.553
47	70	0.041	537.840	19.603	1.370	19.414	21.029	81	104	0.019	489.624	33.601	-3.460	36.749	39.658
48	71	0.009	541.933	20.093	4.093	20.025	18.796	82	105	0.003	487.686	33.906	-1.938	37.171	38.440
49	72	0.051	543.236	20.635	1.303	20.985	22.106	83	106	0.024	482.090	34.240	-5.596	35.647	42.419
50	73	0.004	546.720	21.099	3.484	21.459	20.377	84	107	0.007	477.688	34.544	-4.402	33.844	41.519
51	74	0.037	545.881	21.625	-0.839	20.245	25.223	85	108	0.025	471.913	34.867	-5.775	34.239	43.215
52	75	0.008	546.755	22.095	0.874	18.721	23.966	86	109	0.014	467.448	35.166	-4.466	34.826	42.197
53	76	0.018	545.283	22.591	-1.472	18.996	26.814	87	110	0.040	461.503	35.492	-5.945	35.215	43.986
54	77	0.016	545.853	23.062	0.570	19.714	25.239	88	111	0.016	456.941	35.770	-4.562	35.732	42.875
55	78	0.029	543.872	23.548	-1.981	20.132	28.251	89	112	0.032	450.772	36.079	-6.169	36.065	44.799

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 24, CR.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	46	0.004	383.211	5.457	17.040	7.236	-16.156	57	81	0.092	568.434	26.758	-2.137	19.815	25.015
23	47	0.040	396.024	6.086	12.813	7.730	-11.267	58	82	0.	569.071	27.159	0.637	20.595	22.744
24	48	0.006	411.932	8.534	15.908	7.962	-13.632	59	83	0.232	567.204	27.537	-1.867	21.744	25.735
25	49	0.120	422.202	9.105	10.270	8.650	-7.362	60	84	0.244	567.787	27.951	0.583	22.550	23.795
26	50	0.	435.506	9.830	13.304	9.141	-7.855	61	85	0.272	566.056	28.370	-1.732	23.383	26.532
27	51	0.071	445.241	10.417	9.735	9.956	-3.815	62	86	0.272	566.254	28.749	0.198	23.787	24.991
28	52	0.000	457.293	11.117	12.052	10.012	-5.427	63	87	0.281	564.230	29.133	-2.024	24.261	27.628
29	53	0.043	464.679	11.726	7.386	8.996	-0.166	64	88	0.277	563.976	29.530	-0.254	24.601	26.250
30	54	0.001	474.196	12.398	9.517	7.773	-1.612	65	89	0.278	561.573	29.924	-2.403	25.019	28.817
31	55	0.007	480.213	13.040	6.017	7.738	2.512	66	90	0.268	560.944	30.356	-0.629	25.448	27.443
32	56	0.	489.204	13.660	8.991	8.524	0.198	67	91	0.265	558.165	30.744	-2.780	25.872	30.008
33	57	0.073	494.014	14.226	4.810	8.641	5.007	68	92	0.253	557.267	31.100	-0.897	26.426	28.526
34	58	0.	502.421	14.889	8.406	9.329	2.101	69	93	0.247	554.240	31.474	-3.027	26.975	31.062
35	59	0.022	506.550	15.482	4.129	9.933	6.951	70	94	0.234	553.069	31.838	-1.171	27.502	29.597
36	60	0.013	514.230	16.068	7.680	10.457	4.043	71	95	0.230	549.735	32.203	-3.334	27.980	32.142
37	61	0.027	517.780	16.675	3.550	11.136	8.772	72	96	0.211	548.365	32.563	-1.370	28.560	30.555
38	62	0.032	524.858	17.218	7.078	11.739	5.858	73	97	0.191	544.855	32.928	-3.510	29.116	33.058
39	63	0.106	527.887	17.751	3.028	12.443	10.510	74	98	0.172	543.218	33.284	-1.637	29.638	31.543
40	64	0.045	534.436	18.346	6.549	13.079	7.691	75	99	0.153	539.652	33.643	-3.566	30.349	33.812
41	65	0.086	537.080	18.868	2.644	13.879	12.081	76	100	0.119	538.004	34.005	-1.649	31.062	32.234
42	66	0.047	543.081	19.449	6.001	14.468	9.378	77	101	0.097	534.537	34.359	-3.467	31.883	34.370
43	67	0.034	545.413	19.980	2.333	15.304	13.509	78	102	0.022	533.116	34.744	-1.421	32.816	32.655
44	68	0.021	550.930	20.546	5.516	15.923	10.908	79	103	0.	529.855	35.094	-3.261	33.712	34.802
45	69	0.	553.029	21.108	2.099	16.808	14.815	80	104	0.002	528.499	35.415	-1.356	34.468	33.229
46	70	0.	558.087	21.617	5.058	17.417	12.391	81	105	0.016	525.343	35.719	-3.156	35.238	35.352
47	71	0.027	559.947	22.107	1.860	18.265	16.106	82	106	0.000	523.726	36.041	-1.617	35.617	34.144
48	72	0.000	564.560	22.627	4.613	18.854	13.889	83	107	0.021	518.425	36.335	-5.301	34.107	38.142
49	73	0.047	566.314	23.078	1.754	19.782	17.242	84	108	0.003	514.346	36.658	-4.079	32.271	37.252
50	74	0.000	570.321	23.602	4.008	20.187	15.516	85	109	0.017	508.862	36.949	-5.483	32.717	38.968
51	75	0.032	569.938	24.058	-0.383	19.042	20.379	86	110	0.003	504.707	37.259	-4.156	33.268	37.962
52	76	0.001	571.315	24.560	1.376	17.399	19.133	87	111	0.016	499.034	37.531	-5.673	33.692	39.785
53	77	0.006	570.310	25.027	-1.005	17.759	21.989	88	112	0.002	494.789	37.848	-4.245	34.212	38.671
54	78	0.002	571.341	25.488	1.031	18.386	20.444	89	113	0.029	488.892	38.120	-5.897	34.586	40.620
55	79	0.022	569.805	25.933	-1.536	18.819	23.481	90	114	0.	484.506	38.426	-4.386	35.041	39.419
56	80	0.003	570.571	26.389	0.765	19.485	21.661	91	115	0.163	478.198	38.559	-6.308	35.210	41.628

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 25, MN.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	47	0.013	383.974	0.763	17.702	7.366	-13.816	58	83	0.166	592.157	23.086	1.124	19.680	24.251
23	48	0.075	397.518	1.494	13.543	7.795	-8.930	59	84	0.230	590.800	23.596	-1.357	20.829	27.219
24	49	0.023	414.057	2.125	16.539	8.008	-11.286	60	85	0.239	591.806	24.018	1.006	21.598	24.712
25	50	0.166	426.868	4.666	12.811	8.635	-6.891	61	86	0.264	590.463	24.407	-1.343	22.501	27.446
26	51	0.008	440.644	5.138	13.776	8.951	-7.387	62	87	0.263	591.076	24.822	0.613	22.944	25.790
27	52	0.078	451.084	5.843	10.440	9.692	-1.628	63	88	0.273	589.444	25.214	-1.632	23.463	28.447
28	53	0.003	463.731	6.438	12.647	9.760	-3.303	64	89	0.268	589.608	25.632	0.164	23.808	27.033
29	54	0.048	471.802	7.123	8.071	8.683	1.965	65	90	0.270	587.605	26.032	-2.003	24.213	29.607
30	55	0.007	481.943	7.747	10.141	7.472	0.487	66	91	0.261	587.390	26.446	-0.215	24.649	28.213
31	56	0.011	488.619	8.406	6.676	7.371	4.596	67	92	0.259	585.011	26.846	-2.379	25.066	30.794
32	57	0.007	498.239	9.035	9.620	8.146	2.275	68	93	0.248	584.519	27.252	-0.491	25.636	29.298
33	58	0.085	503.740	9.725	5.501	8.271	6.996	69	94	0.244	581.883	27.643	-2.636	26.167	31.856
34	59	0.014	512.719	10.298	8.979	8.880	4.043	70	95	0.232	581.094	28.025	-0.789	26.632	30.404
35	60	0.045	517.491	10.940	4.772	9.407	8.927	71	96	0.228	578.138	28.403	-2.957	27.077	32.991
36	61	0.048	525.770	11.539	8.279	9.943	6.008	72	97	0.212	577.131	28.766	-1.007	27.605	31.456
37	62	0.152	529.934	12.153	4.164	10.570	10.702	73	98	0.193	573.979	29.124	-3.152	28.152	34.008
38	63	0.098	537.615	12.756	7.681	11.158	7.769	74	99	0.175	572.682	29.464	-1.297	28.585	32.587
39	64	0.199	541.344	13.457	3.729	11.943	12.264	75	100	0.157	569.455	29.803	-3.227	29.234	34.956
40	65	0.145	548.379	13.943	7.035	12.444	9.421	76	101	0.123	568.124	30.120	-1.331	29.895	33.490
41	66	0.190	551.677	14.597	3.298	13.246	13.787	77	102	0.100	564.989	30.452	-3.135	30.685	35.760
42	67	0.109	558.140	15.059	6.463	13.756	11.072	78	103	0.031	563.874	30.758	-1.115	31.581	34.142
43	68	0.125	561.055	15.642	2.915	14.549	15.271	79	104	0.	560.945	31.090	-2.929	32.473	36.416
44	69	0.047	567.061	16.131	6.006	15.134	12.701	80	105	0.004	559.913	31.414	-1.032	33.246	34.856
45	70	0.	569.695	16.666	2.634	15.966	16.641	81	106	0.017	557.088	31.745	-2.825	34.032	36.969
46	71	0.007	575.270	17.184	5.575	16.591	14.234	82	107	0.001	555.785	32.059	-1.303	34.406	35.761
47	72	0.033	577.666	17.719	2.396	17.450	17.918	83	108	0.022	550.815	32.390	-4.970	32.896	39.745
48	73	0.003	582.774	18.214	5.108	18.009	15.699	84	109	0.004	547.048	32.702	-3.767	31.067	38.850
49	74	0.049	585.054	18.741	2.281	18.920	19.029	85	110	0.019	541.886	33.024	-5.162	31.501	40.565
50	75	0.002	589.535	19.214	4.480	19.307	17.282	86	111	0.006	538.036	33.329	-3.850	32.053	39.557
51	76	0.034	589.666	19.727	0.131	18.135	22.147	87	112	0.025	532.677	33.644	-5.359	32.469	41.375
52	77	0.003	591.517	20.202	1.851	16.502	20.891	88	113	0.007	528.729	33.941	-3.948	32.987	40.261
53	78	0.010	591.002	20.692	-0.514	16.827	23.748	89	114	0.030	523.142	34.250	-5.587	33.344	42.201
54	79	0.007	592.504	21.163	1.502	17.454	22.203	90	115	0.004	519.043	34.537	-4.099	33.808	40.994
55	80	0.024	591.450	21.644	-1.054	17.872	25.218	91	116	0.172	513.108	34.910	-5.936	34.041	43.135
56	81	0.010	592.666	22.096	1.217	18.519	23.396	92	117	0.209	509.504	35.213	-3.604	35.129	40.811
57	82	0.095	591.032	22.599	-1.634	18.865	26.701								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 26, FE.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	48	0.004	387.805	3.831	18.429	7.113	-18.586	59	85	0.196	615.735	24.935	-1.501	19.006	23.632
23	49	0.026	401.989	4.471	14.183	7.522	-13.782	60	86	0.205	617.126	25.321	1.391	19.760	21.253
24	50	0.005	419.195	5.138	17.207	7.689	-15.993	61	87	0.252	616.084	25.621	-1.042	20.585	24.041
25	51	0.012	432.475	5.607	13.280	8.156	-11.474	62	88	0.250	617.108	26.032	1.024	21.026	22.020
26	52	0.000	448.673	8.029	16.199	8.446	-13.642	63	89	0.267	615.858	26.415	-1.250	21.508	24.735
27	53	0.063	459.646	8.562	10.973	9.149	-7.948	64	90	0.258	616.430	26.822	0.572	21.881	23.103
28	54	0.001	472.984	9.253	13.338	9.183	-7.926	65	91	0.264	614.820	27.215	-1.610	22.295	25.811
29	55	0.037	481.647	9.845	8.663	8.111	-2.920	66	92	0.251	615.022	27.632	0.201	22.751	24.305
30	56	0.002	492.433	10.490	10.786	6.845	-4.218	67	93	0.250	613.035	28.024	-1.987	23.167	27.031
31	57	0.006	499.732	11.112	7.298	6.758	-0.236	68	94	0.236	612.957	28.437	-0.078	23.718	25.503
32	58	0.000	509.953	11.714	10.222	7.462	-2.524	69	95	0.232	610.716	28.832	-2.241	24.256	28.170
33	59	0.059	515.979	12.240	6.026	7.471	2.308	70	96	0.218	610.346	29.252	-0.370	24.783	26.699
34	60	0.001	525.635	12.916	9.656	8.136	-0.521	71	97	0.208	607.804	29.667	-2.542	25.269	29.350
35	61	0.012	530.996	13.505	5.361	8.686	4.241	72	98	0.195	607.204	30.073	-0.600	25.840	27.839
36	62	0.006	539.853	14.083	8.857	9.137	1.398	73	99	0.179	604.486	30.507	-2.718	26.456	30.399
37	63	0.019	544.601	14.667	4.748	9.756	6.093	74	100	0.157	603.629	30.947	-0.857	26.969	28.972
38	64	0.013	552.825	15.211	8.224	10.300	3.191	75	101	0.141	600.832	31.376	-2.798	27.682	31.355
39	65	0.009	557.017	15.674	4.192	10.942	7.840	76	102	0.103	599.966	31.843	-0.865	28.453	29.806
40	66	0.017	564.681	16.302	7.664	11.528	4.967	77	103	0.083	597.234	32.245	-2.733	29.286	32.057
41	67	0.052	568.429	16.753	3.748	12.248	9.431	78	104	0.013	596.579	32.705	-0.655	30.280	30.321
42	68	0.018	575.544	17.404	7.115	12.813	6.673	79	105	0.	593.986	33.041	-2.592	31.154	32.449
43	69	0.021	578.979	17.924	3.436	13.605	10.851	80	106	0.002	593.275	33.362	-0.712	31.863	30.812
44	70	0.010	585.553	18.492	6.574	14.178	8.248	81	107	0.015	590.763	33.675	-2.511	32.613	32.895
45	71	0.	588.722	19.027	3.168	15.013	12.161	82	108	0.000	589.778	33.993	-0.985	32.984	31.740
46	72	0.000	594.801	19.531	6.080	15.577	9.734	83	109	0.020	585.115	34.300	-4.662	31.477	35.651
47	73	0.021	597.690	20.024	2.888	16.366	13.406	84	110	0.002	581.668	34.621	-3.447	29.647	34.875
48	74	0.001	603.301	20.528	5.611	16.920	11.248	85	111	0.014	576.810	34.924	-4.858	30.091	36.540
49	75	0.043	606.035	20.980	2.733	17.793	14.500	86	112	0.003	573.269	35.233	-3.541	30.629	35.631
50	76	0.001	611.030	21.495	4.995	18.175	12.900	87	113	0.010	568.208	35.530	-5.062	31.050	37.435
51	77	0.029	611.625	21.960	0.595	17.016	17.566	88	114	0.002	564.561	35.832	-3.647	31.559	36.401
52	78	0.001	613.968	22.452	2.343	15.352	16.479	89	115	0.026	559.255	36.113	-5.306	31.926	38.309
53	79	0.005	613.925	22.923	-0.043	15.692	19.236	90	116	0.000	555.460	36.417	-3.795	32.376	37.137
54	80	0.002	615.885	23.381	1.960	16.276	17.775	91	117	0.070	549.533	36.425	-5.927	32.346	39.512
55	81	0.019	615.280	23.831	-0.605	16.676	20.801	92	118	0.177	545.958	36.455	-3.574	33.157	37.656
56	82	0.003	616.951	24.284	1.671	17.315	19.030	93	119	0.222	540.948	36.577	-5.011	34.455	39.317
57	83	0.078	615.625	24.593	-1.326	17.525	22.483	94	120	0.237	537.593	36.803	-3.355	35.008	37.705
58	84	0.000	617.236	25.079	1.611	18.370	20.207								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 27$, CO.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	49	0.065	387.424	-0.382	18.986	7.412	-17.046	60	87	0.141	639.343	22.216	1.746	18.891	22.099
23	50	0.083	402.420	0.431	14.996	7.853	-12.201	61	88	0.196	638.346	22.262	-0.997	19.251	25.253
24	51	0.075	420.218	1.023	17.798	7.949	-14.454	62	89	0.195	639.811	22.703	1.465	19.710	22.700
25	52	0.096	434.249	1.775	14.031	8.436	-9.976	63	90	0.229	638.751	22.892	-1.060	19.993	25.586
26	53	0.063	450.915	2.242	16.666	8.563	-12.059	64	91	0.215	639.849	23.419	1.099	20.479	23.960
27	54	0.080	464.276	4.630	13.361	9.113	-7.992	65	92	0.232	638.545	23.724	-1.305	20.806	26.688
28	55	0.038	477.945	4.960	13.668	9.006	-7.963	66	93	0.215	639.283	24.261	0.738	21.380	25.114
29	56	0.064	487.433	5.786	9.489	8.055	-1.297	67	94	0.220	637.677	24.642	-1.606	21.777	27.771
30	57	0.052	498.713	6.280	11.280	6.687	-2.710	68	95	0.206	638.104	25.147	0.427	22.419	26.141
31	58	0.051	506.647	6.915	7.934	6.550	1.381	69	96	0.208	636.263	25.547	-1.841	22.957	28.752
32	59	0.062	517.504	7.551	10.857	7.266	-0.943	70	97	0.194	636.372	26.026	0.109	23.557	27.183
33	60	0.083	524.331	8.352	6.827	7.417	3.641	71	98	0.189	634.260	26.456	-2.111	24.082	29.760
34	61	0.070	534.454	8.819	10.123	7.920	0.697	72	99	0.175	634.102	26.898	-0.158	24.713	28.176
35	62	0.074	540.468	9.473	6.014	8.433	5.578	73	100	0.166	631.819	27.333	-2.283	25.386	30.696
36	63	0.077	549.911	10.058	9.443	8.897	2.694	74	101	0.144	631.404	27.775	-0.415	25.978	29.211
37	64	0.066	555.233	10.633	5.322	9.448	7.377	75	102	0.134	628.990	28.159	-2.414	26.717	31.684
38	65	0.082	564.074	11.249	8.841	10.010	4.451	76	103	0.104	628.508	28.542	-0.482	27.531	30.163
39	66	0.097	568.866	11.849	4.792	10.637	9.010	77	104	0.091	626.117	28.884	-2.391	28.367	32.663
40	67	0.083	577.077	12.396	8.211	11.168	6.137	78	105	0.058	625.653	29.075	-0.464	29.234	31.168
41	68	0.088	581.434	13.005	4.357	11.796	10.535	79	106	0.052	623.305	29.318	-2.349	30.020	33.666
42	69	0.082	589.048	13.504	7.614	12.374	7.735	80	107	0.027	622.876	29.601	-0.429	30.707	32.176
43	70	0.092	593.019	14.039	3.971	13.047	11.994	81	108	0.029	620.736	29.972	-2.140	31.495	34.255
44	71	0.075	600.101	14.547	7.082	13.666	9.429	82	109	0.014	619.984	30.206	-0.752	31.776	33.143
45	72	0.067	603.753	15.031	3.652	14.403	13.395	83	110	0.033	615.761	30.646	-4.223	30.378	37.022
46	73	0.060	610.314	15.512	6.561	14.957	11.057	84	111	0.026	612.568	30.899	-3.193	28.488	36.191
47	74	0.062	613.767	16.077	3.454	15.778	14.693	85	112	0.043	608.118	31.308	-4.450	29.008	37.839
48	75	0.039	619.753	16.451	5.985	16.187	12.611	86	113	0.041	604.860	31.591	-3.258	29.517	36.869
49	76	0.058	623.148	17.113	3.395	17.186	15.820	87	114	0.052	600.179	31.971	-4.681	29.998	38.632
50	77	0.023	628.409	17.379	5.262	17.340	14.232	88	115	0.045	596.781	32.220	-3.398	30.451	37.587
51	78	0.047	629.665	18.040	1.256	16.316	18.982	89	116	0.041	591.815	32.560	-4.966	30.843	39.512
52	79	0.036	632.379	18.411	2.714	14.549	17.821	90	117	0.045	588.263	32.803	-3.552	31.238	38.346
53	80	0.048	632.878	18.953	0.499	14.917	20.639	91	118	0.080	582.832	33.299	-5.431	31.395	40.590
54	81	0.048	635.299	19.414	2.421	15.488	19.130	92	119	0.143	579.483	33.524	-3.349	32.144	38.495
55	82	0.046	635.198	19.918	-0.101	15.901	22.116	93	120	0.189	574.516	33.568	-4.967	33.113	40.534
56	83	0.058	637.326	20.375	2.128	16.527	20.305	94	121	0.205	571.336	33.742	-3.181	33.537	38.292
57	84	0.090	636.660	21.035	-0.666	16.916	23.549	95	122	0.229	566.591	33.867	-4.745	33.925	40.132
58	85	0.083	638.584	21.348	1.924	17.623	21.085	96	123	0.234	563.298	34.096	-3.293	34.213	39.020
59	86	0.128	637.596	21.862	-0.988	18.269	24.678								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 28$, NI.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	50	0.002	389.436	2.012	19.841	6.972	-22.931	60	88	0.002	662.816	23.473	2.157	17.285	17.433
23	51	0.011	404.982	2.562	15.545	7.311	-18.120	61	89	0.	661.729	23.383	-1.087	17.699	21.100
24	52	0.002	423.491	3.272	18.509	7.390	-20.280	62	90	0.199	663.554	23.743	1.825	18.133	19.049
25	53	0.003	438.073	3.824	14.583	7.790	-15.759	63	91	0.253	663.027	24.276	-0.527	18.648	21.868
26	54	0.000	455.502	4.587	17.429	8.012	-17.865	64	92	0.237	664.450	24.601	1.424	19.047	20.185
27	55	0.043	469.200	4.923	13.698	8.430	-13.625	65	93	0.250	663.614	25.070	-0.836	19.461	22.927
28	56	0.000	485.354	7.409	16.154	8.386	-15.196	66	94	0.229	664.665	25.382	1.051	19.940	21.379
29	57	0.025	495.220	7.787	9.867	7.280	-8.618	67	95	0.233	663.462	25.785	-1.203	20.347	24.109
30	58	0.001	507.246	8.533	12.026	5.967	-8.505	68	96	0.213	664.233	26.129	0.771	20.916	22.523
31	59	0.003	515.779	9.132	8.533	5.836	-4.549	69	97	0.213	662.772	26.509	-1.461	21.442	25.187
32	60	0.	527.190	9.686	11.412	6.462	-6.805	70	98	0.193	663.238	26.866	0.466	21.986	23.648
33	61	0.032	534.369	10.037	7.178	6.342	-1.966	71	99	0.187	661.496	27.236	-1.742	22.485	26.266
34	62	0.000	545.264	10.809	10.895	7.016	-4.854	72	100	0.165	661.733	27.631	0.237	23.092	24.673
35	63	0.005	551.822	11.354	6.559	7.548	-0.116	73	101	0.156	659.832	28.013	-1.900	23.733	27.177
36	64	0.002	561.828	11.917	10.006	7.898	-2.922	74	102	0.119	659.892	28.487	0.059	24.393	25.576
37	65	0.010	567.743	12.510	5.915	8.452	1.741	75	103	0.109	657.889	28.898	-2.003	25.108	27.920
38	66	0.004	577.093	13.019	9.350	8.945	-1.110	76	104	0.048	657.998	29.490	0.109	26.074	26.127
39	67	0.004	582.431	13.565	5.338	9.536	3.490	77	105	0.052	656.039	29.922	-1.959	26.912	28.337
40	68	0.006	591.187	14.110	8.755	10.067	0.647	78	106	0.006	656.188	30.535	0.149	27.926	26.502
41	69	0.027	596.001	14.566	4.814	10.689	5.150	79	107	0.	654.269	30.965	-1.919	28.741	28.691
42	70	0.006	604.231	15.183	8.230	11.254	2.382	80	108	0.002	654.208	31.332	-0.061	29.335	27.103
43	71	0.009	608.747	15.729	4.517	12.023	6.549	81	109	0.013	652.344	31.608	-1.865	30.063	29.226
44	72	0.004	616.365	16.264	7.618	12.526	3.978	82	110	0.000	652.001	32.017	-0.343	30.431	28.082
45	73	0.	620.588	16.835	4.223	13.314	7.887	83	111	0.017	647.977	32.216	-4.024	28.918	32.024
46	74	0.	627.678	17.365	7.090	13.830	5.509	84	112	0.002	645.175	32.607	-2.801	27.102	31.222
47	75	0.012	631.581	17.814	3.903	14.564	9.191	85	113	0.010	640.947	32.829	-4.228	27.537	32.913
48	76	0.000	638.185	18.433	6.604	15.089	7.058	86	114	0.002	638.029	33.169	-2.918	28.066	31.988
49	77	0.034	641.859	18.711	3.674	15.874	10.391	87	115	0.005	633.586	33.407	-4.443	28.480	33.801
50	78	0.000	647.865	19.456	6.006	16.269	8.737	88	116	0.001	630.544	33.763	-3.041	28.980	32.772
51	79	0.023	649.417	19.752	1.552	15.088	13.471	89	117	0.021	625.826	34.011	-4.719	29.323	34.714
52	80	0.001	652.735	20.356	3.317	13.410	12.343	90	118	0.000	622.639	34.377	-3.186	29.783	33.549
53	81	0.003	653.646	20.769	0.912	13.726	15.122	91	119	0.040	617.195	34.363	-5.445	29.645	36.045
54	82	0.001	656.532	21.232	2.885	14.268	13.672	92	120	0.	614.268	34.785	-2.927	30.513	34.076
55	83	0.014	656.849	21.651	0.317	14.629	16.702	93	121	0.181	608.845	34.329	-5.423	31.017	36.662
56	84	0.001	659.427	22.101	2.578	15.247	14.958	94	122	0.210	605.941	34.605	-2.904	31.687	35.070
57	85	0.043	658.887	22.227	-0.540	15.311	18.510	95	123	0.239	601.536	34.945	-4.405	32.293	36.824
58	86	0.000	661.492	22.907	2.605	16.246	16.086	96	124	0.245	598.536	35.237	-3.000	32.647	35.616
59	87	0.025	660.659	23.063	-0.833	16.739	19.750	97	125	0.259	594.084	35.562	-4.452	33.065	37.324

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 29$, CU.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	51	0.055	386.079	-3.357	20.356	5.490	-20.916	61	90	0.179	681.821	20.092	-0.225	15.930	21.781
23	52	0.076	402.428	-2.554	16.349	5.696	-16.127	62	91	0.181	684.113	20.558	2.292	16.475	19.839
24	53	0.067	421.532	-1.959	19.104	5.813	-18.305	63	92	0.228	683.853	20.826	-0.260	17.212	22.789
25	54	0.089	436.855	-1.219	15.323	6.140	-13.829	64	93	0.211	685.759	21.309	1.907	17.653	21.194
26	55	0.052	454.792	-0.710	17.937	6.279	-15.870	65	94	0.231	685.262	21.647	-0.497	18.216	23.923
27	56	0.076	469.375	0.175	14.583	6.831	-11.782	66	95	0.212	686.789	22.124	1.527	18.645	22.367
28	57	0.029	485.820	0.466	16.445	6.610	-13.192	67	96	0.218	685.973	22.511	-0.816	19.133	25.021
29	58	0.058	497.959	2.738	12.138	5.388	-8.069	68	97	0.202	687.176	22.944	1.203	19.598	23.405
30	59	0.042	510.447	3.201	12.489	4.208	-7.972	69	98	0.205	686.104	23.332	-1.073	20.132	26.005
31	60	0.041	519.603	3.824	9.155	3.874	-2.536	70	99	0.188	686.979	23.741	0.876	20.581	24.439
32	61	0.050	531.620	4.430	12.018	4.612	-4.818	71	100	0.184	685.624	24.128	-1.356	21.066	26.985
33	62	0.077	539.628	5.259	8.007	4.686	-0.253	72	101	0.169	686.227	24.494	0.603	21.560	25.386
34	63	0.060	550.923	5.660	11.296	5.124	-3.119	73	102	0.162	684.686	24.853	-1.541	22.130	27.843
35	64	0.065	558.124	6.301	7.200	5.497	1.667	74	103	0.139	685.026	25.134	0.341	22.629	26.312
36	65	0.067	568.702	6.874	10.578	5.952	-1.173	75	104	0.128	683.342	25.453	-1.684	23.228	28.656
37	66	0.057	575.201	7.458	6.500	6.438	3.460	76	105	0.098	683.594	25.596	0.251	23.894	27.077
38	67	0.071	585.139	8.046	9.938	6.933	0.599	77	106	0.085	681.908	25.869	-1.686	24.622	29.398
39	68	0.092	591.052	8.620	5.913	7.523	5.140	78	107	0.048	682.178	25.990	0.270	25.375	27.825
40	69	0.072	600.369	9.182	9.317	7.999	2.292	79	108	0.030	680.529	26.259	-1.649	26.116	30.229
41	70	0.078	605.831	9.830	5.462	8.670	6.670	80	109	0.020	680.788	26.579	0.259	26.840	28.732
42	71	0.071	614.514	10.283	8.683	9.141	3.942	81	110	0.024	679.300	26.956	-1.488	27.701	30.820
43	72	0.061	619.561	10.814	5.048	9.832	8.147	82	111	0.010	679.218	27.218	-0.082	28.047	29.706
44	73	0.064	627.693	11.328	8.132	10.350	5.612	83	112	0.029	675.615	27.639	-3.603	26.585	33.609
45	74	0.055	632.405	11.816	4.712	11.091	9.547	84	113	0.019	673.078	27.903	-2.537	24.799	32.791
46	75	0.047	639.989	12.311	7.584	11.593	7.234	85	114	0.035	669.235	28.288	-3.843	25.179	34.470
47	76	0.052	644.461	12.880	4.472	12.413	10.859	86	115	0.031	666.605	28.576	-2.630	25.742	33.521
48	77	0.030	651.467	13.282	7.006	12.859	8.783	87	116	0.044	662.534	28.948	-4.071	26.121	35.300
49	78	0.053	655.820	13.961	4.352	13.757	12.010	88	117	0.035	659.757	29.213	-2.777	26.602	34.266
50	79	0.017	662.106	14.241	6.286	14.059	10.429	89	118	0.036	655.406	29.581	-4.351	26.932	36.190
51	80	0.042	664.296	14.878	2.190	12.853	15.165	90	119	0.031	652.457	29.818	-2.949	27.381	35.049
52	81	0.027	667.986	15.251	3.690	11.282	14.026	91	120	0.074	647.561	30.367	-4.896	27.451	37.349
53	82	0.038	669.421	15.775	1.435	11.461	16.843	92	121	0.056	644.724	30.456	-2.837	28.166	35.398
54	83	0.037	672.768	16.237	3.347	12.095	15.366	93	122	0.179	640.228	31.383	-4.496	29.101	37.503
55	84	0.039	673.602	16.753	0.833	12.429	18.344	94	123	0.198	637.578	31.637	-2.650	29.800	35.771
56	85	0.045	676.614	17.188	3.013	13.020	16.589	95	124	0.227	633.369	31.833	-4.209	30.558	37.673
57	86	0.085	676.796	17.909	0.181	13.303	19.882	96	125	0.232	630.625	32.090	-2.744	30.995	36.570
58	87	0.064	679.627	18.135	2.831	14.006	17.497	97	126	0.249	626.394	32.310	-4.231	31.508	38.358
59	88	0.114	679.466	18.807	-0.161	14.511	21.066	98	127	0.247	623.433	32.595	-2.961	31.840	37.407
60	89	0.124	682.046	19.230	2.580	15.167	18.577	99	128	0.255	619.044	32.836	-4.390	32.227	39.100

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 30, ZN.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	52	0.004	385.518	-0.560	21.139	4.217	-25.982	62	92	0.221	705.859	21.747	2.640	14.749	15.777
23	53	0.024	402.444	0.016	16.926	4.554	-21.165	63	93	0.251	706.171	22.318	0.311	16.147	18.575
24	54	0.005	422.243	0.711	19.799	4.512	-23.305	64	94	0.237	708.402	22.643	2.232	16.553	17.054
25	55	0.011	438.140	1.285	15.897	4.863	-18.787	65	95	0.248	708.374	23.112	-0.029	17.052	19.736
26	56	0.001	456.810	2.018	18.670	5.024	-20.833	66	96	0.231	710.212	23.423	1.838	17.466	18.261
27	57	0.060	471.846	2.471	15.035	5.477	-16.643	67	97	0.234	709.799	23.826	-0.412	17.890	20.932
28	58	0.001	489.107	3.287	17.261	5.310	-18.138	68	98	0.218	711.327	24.150	1.527	18.366	19.391
29	59	0.036	501.693	3.734	12.586	4.198	-12.956	69	99	0.217	710.636	24.533	-0.690	18.879	22.005
30	60	0.002	516.284	5.837	14.592	2.636	-14.299	70	100	0.201	711.827	24.847	1.190	19.299	20.516
31	61	0.006	526.020	6.417	9.735	2.504	-8.896	71	101	0.194	710.830	25.206	-0.996	19.763	23.082
32	62	0.001	538.592	6.972	12.572	3.051	-9.758	72	102	0.178	711.746	25.519	0.916	20.213	21.548
33	63	0.052	547.022	7.394	8.430	2.948	-5.044	73	103	0.167	710.555	25.870	-1.191	20.764	24.014
34	64	0.002	559.008	8.084	11.986	3.522	-7.923	74	104	0.140	711.216	26.190	0.660	21.188	22.523
35	65	0.010	566.746	8.623	7.738	4.082	-3.188	75	105	0.127	709.888	26.546	-1.327	21.761	24.836
36	66	0.006	577.879	9.178	11.133	4.320	-5.986	76	106	0.088	710.523	26.930	0.635	22.337	23.213
37	67	0.017	584.955	9.754	7.076	4.838	-1.371	77	107	0.067	709.220	27.312	-1.304	22.036	25.433
38	68	0.011	595.409	10.270	10.454	5.286	-4.166	78	108	0.010	709.975	27.797	0.755	23.682	23.696
39	69	0.008	601.878	10.827	6.470	5.841	0.370	79	109	0.	708.737	28.209	-1.238	24.404	25.958
40	70	0.013	611.718	11.350	9.840	6.330	-2.445	80	110	0.002	709.338	28.550	0.601	24.855	24.464
41	71	0.044	617.673	11.842	5.954	6.946	1.995	81	111	0.014	708.143	28.842	-1.196	25.578	26.592
42	72	0.013	626.926	12.412	9.253	7.444	-0.714	82	112	0.000	708.442	29.223	0.299	25.938	25.444
43	73	0.017	632.522	12.961	5.596	8.226	3.434	83	113	0.019	705.086	29.471	-3.356	24.447	29.419
44	74	0.008	641.169	13.476	8.647	8.643	0.921	84	114	0.002	702.923	29.845	-2.163	22.627	28.576
45	75	0.	646.440	14.036	5.271	9.398	4.806	85	115	0.013	699.343	30.108	-3.580	23.071	30.309
46	76	0.001	654.538	14.549	8.097	9.878	2.497	86	116	0.002	697.052	30.447	-2.291	23.582	29.357
47	77	0.019	659.468	15.007	4.930	10.585	6.169	87	117	0.007	693.241	30.706	-3.811	23.999	31.192
48	78	0.001	667.047	15.580	7.580	11.074	4.048	88	118	0.002	690.814	31.057	-2.427	24.490	30.133
49	79	0.041	671.753	15.933	4.705	11.877	7.399	89	119	0.024	686.724	31.318	-4.090	24.843	32.106
50	80	0.001	678.679	16.573	6.926	12.199	5.720	90	120	0.001	684.127	31.670	-2.596	25.288	30.943
51	81	0.027	681.230	16.934	2.551	11.076	10.534	91	121	0.059	679.339	31.778	-4.788	25.218	33.425
52	82	0.001	685.482	17.496	4.252	9.322	9.352	92	122	0.000	676.949	32.225	-2.390	26.014	31.409
53	83	0.005	687.352	17.931	1.870	9.639	12.189	93	123	0.193	672.566	32.338	-4.383	27.076	33.628
54	84	0.002	691.164	18.395	3.812	10.134	10.732	94	124	0.213	670.260	32.682	-2.306	27.697	32.099
55	85	0.017	692.422	18.820	1.258	10.480	13.753	95	125	0.237	666.413	33.044	-3.847	29.273	33.927
56	86	0.003	695.895	19.281	3.474	11.069	12.020	96	126	0.242	663.969	33.344	-2.444	29.734	32.802
57	87	0.065	696.341	19.546	0.446	11.197	15.492	97	127	0.256	660.058	33.664	-3.911	30.227	34.534
58	88	0.001	699.750	20.123	3.408	12.028	13.079	98	128	0.253	657.361	33.927	-2.697	30.530	33.607
59	89	0.059	699.841	20.375	0.091	12.659	16.751	99	129	0.260	653.260	34.216	-4.101	30.881	35.286
60	90	0.027	702.819	20.773	2.978	13.032	14.480	100	130	0.258	650.252	34.476	-3.008	31.118	34.492
61	91	0.225	703.169	21.348	0.350	14.215	17.599	101	131	0.262	645.954	34.751	-4.297	31.452	36.040

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 31, GA.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	53	0.020	380.497	-5.021	21.743	4.024	-23.448	63	94	0.261	724.674	18.503	0.710	14.558	20.435
23	54	0.069	398.156	-4.289	17.659	4.138	-18.723	64	95	0.232	727.327	18.925	2.653	14.920	18.974
24	55	0.033	418.571	-3.672	20.415	4.197	-20.806	65	96	0.252	727.690	19.316	0.363	15.543	21.625
25	56	0.118	435.195	-2.945	16.624	4.471	-16.411	66	97	0.228	729.949	19.737	2.259	15.895	20.161
26	57	0.014	454.420	-2.390	19.225	4.593	-18.268	67	98	0.230	729.936	20.136	-0.013	16.379	22.768
27	58	0.074	470.186	-1.659	15.767	5.036	-14.309	68	99	0.217	731.859	20.533	1.924	16.775	21.226
28	59	0.006	487.955	-1.152	17.768	4.867	-15.696	69	100	0.216	731.560	20.924	-0.299	17.292	23.776
29	60	0.047	501.203	-0.490	13.248	3.533	-10.594	70	101	0.202	733.129	21.303	1.569	17.658	22.284
30	61	0.011	516.341	0.057	15.138	2.226	-11.900	71	102	0.195	732.512	21.682	-0.617	18.113	24.800
31	62	0.014	528.052	2.032	11.711	1.798	-7.895	72	103	0.182	733.786	22.041	1.275	18.512	23.260
32	63	0.012	541.196	2.604	13.144	2.453	-8.757	73	104	0.170	732.957	22.401	-0.830	19.038	25.700
33	64	0.074	550.302	3.281	9.107	2.405	-2.839	74	105	0.147	733.942	22.726	0.985	19.420	24.218
34	65	0.019	562.775	3.768	12.473	2.860	-5.641	75	106	0.135	732.954	23.066	-0.988	19.974	26.507
35	66	0.037	571.111	4.365	8.336	3.188	-0.967	76	107	0.099	733.871	23.347	0.917	20.550	24.949
36	67	0.034	582.802	4.922	11.691	3.583	-3.772	77	108	0.082	732.888	23.668	-0.982	21.251	27.154
37	68	0.033	590.461	5.505	7.659	4.042	0.796	78	109	0.020	733.913	23.938	1.025	22.024	25.487
38	69	0.042	601.466	6.057	11.005	4.469	-2.001	79	110	0.	733.019	24.282	-0.894	22.817	27.744
39	70	0.024	608.491	6.612	7.025	4.994	2.508	80	111	0.005	733.952	24.614	0.933	23.479	26.257
40	71	0.046	618.885	7.167	10.395	5.451	-0.302	81	112	0.016	733.103	24.960	-0.849	24.279	28.374
41	72	0.067	625.429	7.756	6.543	6.082	4.049	82	113	0.002	733.723	25.281	0.620	24.640	27.228
42	73	0.045	635.174	8.248	9.745	6.511	1.384	83	114	0.021	730.716	25.630	-3.006	23.121	31.185
43	74	0.037	641.308	8.786	6.134	7.183	5.497	84	115	0.005	728.870	25.947	-1.847	21.356	30.342
44	75	0.030	650.464	9.295	9.156	7.656	2.992	85	116	0.017	725.626	26.284	-3.243	21.716	32.069
45	76	0.009	656.252	9.812	5.788	8.396	6.860	86	117	0.007	723.650	26.598	-1.976	22.277	31.116
46	77	0.011	664.854	10.316	8.602	8.866	4.559	87	118	0.017	720.165	26.924	-3.485	22.635	32.945
47	78	0.029	670.313	10.845	5.459	9.613	8.191	88	119	0.008	718.047	27.233	-2.118	23.147	31.886
48	79	0.005	678.369	11.321	8.056	10.085	6.079	89	120	0.027	714.288	27.564	-3.759	23.458	33.840
49	80	0.046	683.616	11.863	5.247	10.860	9.376	90	121	0.005	711.981	27.854	-2.306	23.929	32.683
50	81	0.003	690.981	12.302	7.365	11.219	7.727	91	122	0.068	707.576	28.237	-4.405	23.874	35.093
51	82	0.032	694.051	12.821	3.070	9.936	12.502	92	123	0.009	705.412	28.463	-2.164	24.660	33.140
52	83	0.005	698.758	13.277	4.708	8.357	11.327	93	124	0.195	701.576	29.011	-3.835	25.720	35.116
53	84	0.011	701.114	13.762	2.355	8.523	14.156	94	125	0.212	699.557	29.297	-2.020	26.538	33.716
54	85	0.009	705.392	14.228	4.278	9.111	12.697	95	126	0.233	695.988	29.575	-3.569	27.465	35.589
55	86	0.023	707.132	14.711	1.741	9.417	15.689	96	127	0.239	693.809	29.840	-2.179	27.937	34.540
56	87	0.011	711.051	15.156	3.918	9.987	13.958	97	128	0.259	690.186	30.128	-3.624	28.521	36.283
57	88	0.082	712.047	15.705	0.996	10.150	17.330	98	129	0.255	687.764	30.403	-2.422	28.843	35.371
58	89	0.017	715.809	16.060	3.763	10.900	15.005	99	130	0.263	683.961	30.702	-3.802	29.272	37.024
59	90	0.143	716.517	16.676	0.707	11.426	18.491	100	131	0.262	681.212	30.961	-2.749	29.484	36.228
60	91	0.163	719.985	17.166	3.469	12.064	16.248	101	132	0.265	677.204	31.250	-4.008	29.866	37.767
61	92	0.222	720.854	17.685	0.869	13.093	19.307	102	133	0.263	674.199	31.513	-3.005	30.129	37.021
62	93	0.219	723.964	18.104	3.110	13.623	17.644								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 32, GE.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	54	0.002	378.650	-1.847	22.384	4.048	-28.533	64	96	0.248	748.533	21.206	3.014	14.378	14.665
23	55	0.099	396.982	-1.174	18.332	4.307	-23.866	65	97	0.256	749.328	21.638	0.795	14.862	17.267
24	56	0.012	418.001	-0.570	21.019	4.187	-25.700	66	98	0.242	751.921	21.972	2.543	15.224	15.890
25	57	0.162	435.369	0.174	17.368	4.630	-21.478	67	99	0.242	752.302	22.367	0.381	15.634	18.468
26	58	0.	455.095	0.676	19.726	4.557	-22.990	68	100	0.228	754.554	22.695	2.252	16.047	16.996
27	59	0.079	471.477	1.290	16.381	5.042	-19.328	69	101	0.225	754.631	23.070	0.077	16.536	19.519
28	60	0.	489.827	1.872	18.350	4.721	-20.641	70	102	0.211	756.529	23.400	1.899	16.908	18.060
29	61	0.048	503.658	2.455	13.832	3.518	-15.552	71	103	0.202	756.264	23.753	-0.265	17.333	20.569
30	62	0.	519.375	3.034	15.716	1.973	-16.846	72	104	0.190	757.874	24.087	1.609	17.752	19.065
31	63	0.006	531.656	3.604	12.281	1.668	-12.803	73	105	0.176	757.378	24.421	-0.496	18.252	21.521
32	64	0.	546.681	5.485	15.025	2.101	-14.955	74	106	0.153	758.679	24.737	1.302	18.638	20.072
33	65	0.080	556.352	6.049	9.671	2.037	-9.037	75	107	0.140	758.037	25.083	-0.642	19.187	22.340
34	66	0.	569.361	6.586	13.009	2.474	-10.466	76	108	0.103	759.260	25.389	1.223	19.749	20.811
35	67	0.035	578.247	7.136	8.886	2.930	-5.838	77	109	0.084	758.617	25.729	-0.642	20.434	22.967
36	68	0.013	590.474	7.673	12.227	3.172	-8.617	78	110	0.012	759.981	26.068	1.363	21.162	21.277
37	69	0.030	598.683	8.222	8.209	3.642	-4.027	79	111	0.	759.426	26.407	-0.554	21.911	23.525
38	70	0.046	610.217	8.751	11.534	4.042	-6.721	80	112	0.001	760.695	26.743	1.269	22.425	22.051
39	71	0.104	617.801	9.310	7.584	4.550	-2.253	81	113	0.015	760.168	27.065	-0.527	23.136	24.183
40	72	0.050	628.696	9.810	10.895	4.992	-4.910	82	114	0.	761.118	27.396	0.950	23.485	23.045
41	73	0.081	635.775	10.347	7.080	5.602	-0.649	83	115	0.020	758.429	27.713	-2.689	21.992	27.016
42	74	0.048	646.023	10.848	10.247	6.009	-3.226	84	116	0.002	756.913	28.043	-1.516	20.176	26.179
43	75	0.035	652.674	11.366	6.651	6.706	0.793	85	117	0.014	753.984	28.357	-2.929	20.603	27.924
44	76	0.016	662.330	11.866	9.656	7.109	-1.666	86	118	0.001	752.327	28.677	-1.656	21.110	26.981
45	77	0.	668.631	12.378	6.300	7.814	2.127	87	119	0.008	749.151	28.986	-3.176	21.513	28.824
46	78	0.	677.722	12.868	9.091	8.258	-0.145	88	120	0.000	747.345	29.298	-1.806	21.998	27.777
47	79	0.026	683.666	13.353	5.944	8.930	3.499	89	121	0.026	743.882	29.595	-3.463	22.347	29.749
48	80	0.	692.209	13.840	8.543	9.377	1.400	90	122	0.	741.886	29.905	-1.996	22.777	28.594
49	81	0.046	697.925	14.310	5.716	10.163	4.718	91	123	0.069	737.770	30.194	-4.116	22.751	31.029
50	82	0.	705.770	14.789	7.845	10.428	3.060	92	124	0.	735.910	30.498	-1.860	23.487	29.095
51	83	0.031	709.303	15.252	3.533	9.256	7.869	93	125	0.207	732.490	30.914	-3.420	24.856	31.058
52	84	0.	714.488	15.729	5.184	7.514	6.698	94	126	0.221	730.795	31.238	-1.695	25.552	29.731
53	85	0.004	717.306	16.192	2.818	7.782	9.544	95	127	0.241	727.567	31.578	-3.229	26.706	31.578
54	86	0.000	722.039	16.647	4.732	8.262	8.107	96	128	0.246	725.686	31.877	-1.880	27.132	30.580
55	87	0.020	724.226	17.094	2.187	8.579	11.115	97	129	0.258	722.352	32.167	-3.334	27.644	32.332
56	88	0.001	728.594	17.543	4.368	9.135	9.399	98	130	0.255	720.203	32.439	-2.149	27.939	31.454
57	89	0.087	730.032	17.986	1.439	9.316	12.781	99	131	0.261	716.658	32.697	-3.545	28.305	33.126
58	90	0.	734.225	18.416	4.193	10.035	10.513	100	132	0.260	714.189	32.976	-2.469	28.533	32.341
59	91	0.189	735.451	18.934	1.226	10.815	13.892	101	133	0.263	710.438	33.234	-3.751	28.883	33.893
60	92	0.194	739.379	19.393	3.928	11.334	11.889	102	134	0.261	707.694	33.495	-2.744	29.147	33.162
61	93	0.243	740.825	19.971	1.446	12.689	14.803	103	135	0.265	703.776	33.754	-3.918	29.527	34.607
62	94	0.240	744.327	20.363	3.502	13.213	13.310	104	136	0.258	700.680	34.025	-3.095	29.699	34.056
63	95	0.259	745.519	20.845	1.192	14.055	16.029								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 33, AS.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	55	0.004	372.334	-6.316	22.999	4.151	-25.974	65	98	0.262	767.028	17.700	1.216	14.059	18.795
23	56	0.157	391.518	-5.464	19.184	4.470	-21.576	66	99	0.251	769.988	18.067	2.960	14.366	17.458
24	57	0.149	413.109	-4.892	21.591	4.317	-23.261	67	100	0.250	770.767	18.465	0.779	14.782	20.011
25	58	0.184	431.323	-4.046	18.214	4.872	-19.283	68	101	0.240	773.367	18.813	2.600	15.123	18.579
26	59	0.	451.366	-3.729	20.043	4.500	-20.442	69	102	0.236	773.807	19.176	0.440	15.577	21.119
27	60	0.102	468.403	-3.074	17.037	4.913	-17.003	70	103	0.218	776.051	19.521	2.243	15.896	19.710
28	61	0.000	487.324	-2.503	18.921	4.609	-18.198	71	104	0.207	776.156	19.892	0.106	16.301	22.217
29	62	0.044	501.746	-1.912	14.423	3.265	-13.215	72	105	0.195	778.116	20.243	1.960	16.692	20.716
30	63	0.001	518.070	-1.304	16.324	1.821	-14.456	73	106	0.181	777.969	20.591	-0.148	17.162	23.173
31	64	0.006	530.943	-0.713	12.873	1.445	-10.510	74	107	0.162	779.594	20.915	1.625	17.513	21.751
32	65	0.	546.532	-0.149	15.589	1.896	-12.654	75	108	0.147	779.288	21.251	-0.306	18.036	24.031
33	66	0.114	558.113	1.761	11.581	1.766	-8.104	76	109	0.116	780.802	21.542	1.514	18.565	22.560
34	67	0.	571.627	2.266	13.514	2.136	-9.404	77	110	0.097	780.476	21.858	-0.326	19.226	24.754
35	68	0.015	581.075	2.828	9.448	2.477	-3.610	78	111	0.010	782.169	22.188	1.693	20.003	23.095
36	69	0.125	593.873	3.399	12.799	2.803	-6.375	79	112	0.	781.964	22.538	-0.205	20.781	25.275
37	70	0.157	602.713	4.030	8.840	3.307	-1.895	80	113	0.002	783.569	22.874	1.605	21.362	23.800
38	71	0.147	614.765	4.549	12.052	3.669	-4.567	81	114	0.015	783.381	23.213	-0.188	22.067	25.923
39	72	0.181	623.003	5.202	8.238	4.247	-0.237	82	115	0.000	784.663	23.545	1.282	22.416	24.789
40	73	0.156	634.344	5.648	11.341	4.583	-2.743	83	116	0.019	782.309	23.880	-2.354	20.911	28.742
41	74	0.167	642.014	6.239	7.671	5.229	1.369	84	117	0.002	781.125	24.212	-1.184	19.108	27.910
42	75	0.137	652.684	6.662	10.670	5.504	-1.088	85	118	0.013	778.525	24.542	-2.600	19.514	29.641
43	76	0.133	659.881	7.207	7.197	6.157	2.842	86	119	0.002	777.192	24.865	-1.333	20.028	28.701
44	77	0.010	669.975	7.645	10.094	6.506	0.448	87	120	0.007	774.339	25.188	-2.853	20.418	30.531
45	78	0.	676.794	8.163	6.818	7.191	4.186	88	121	0.001	772.849	25.504	-1.491	20.904	29.487
46	79	0.	686.383	8.661	9.589	7.623	1.870	89	122	0.025	769.698	25.816	-3.151	21.238	31.453
47	80	0.021	692.826	9.161	6.443	8.279	5.494	90	123	0.	768.016	26.130	-1.682	21.674	30.306
48	81	0.000	701.861	9.652	9.035	8.712	3.409	91	124	0.145	764.223	26.453	-3.793	21.640	32.707
49	82	0.044	708.048	10.123	6.187	9.440	6.706	92	125	0.173	762.766	26.856	-1.457	22.489	30.704
50	83	0.000	716.390	10.619	8.341	9.726	5.078	93	126	0.214	759.743	27.253	-3.022	23.873	32.568
51	84	0.029	720.403	11.100	4.013	8.492	9.815	94	127	0.232	758.362	27.566	-1.382	24.655	31.256
52	85	0.001	726.068	11.581	5.665	6.792	8.657	95	128	0.246	755.484	27.917	-2.878	25.612	33.040
53	86	0.004	729.363	12.057	3.295	7.017	11.463	96	129	0.251	753.901	28.215	-1.582	26.049	32.011
54	87	0.002	734.558	12.520	5.195	7.505	10.025	97	130	0.261	750.874	28.522	-3.027	26.591	33.735
55	88	0.018	737.210	12.984	2.652	7.801	13.016	98	131	0.259	749.001	28.799	-1.873	26.897	32.863
56	89	0.002	742.031	13.437	4.821	8.344	11.308	99	132	0.263	745.747	29.089	-3.254	27.267	34.519
57	90	0.097	743.956	13.923	1.925	8.528	14.632	100	133	0.262	743.549	29.360	-2.198	27.490	33.744
58	91	0.	748.560	14.335	4.604	9.214	12.464	101	134	0.265	740.074	29.636	-3.475	27.818	35.291
59	92	0.208	750.485	15.034	1.925	10.143	15.535	102	135	0.263	737.601	29.907	-2.473	28.093	34.560
60	93	0.214	754.845	15.466	4.360	10.741	13.614	103	136	0.267	733.954	30.178	-3.647	28.455	35.997
61	94	0.255	756.854	16.029	2.009	12.042	16.386	104	137	0.260	731.118	30.438	-2.836	28.624	35.453
62	95	0.253	760.766	16.439	3.911	12.485	14.891	105	138	0.251	727.032	30.687	-4.086	28.715	36.956
63	96	0.265	762.416	16.897	1.650	13.266	17.555	106	139	0.252	723.924	30.946	-3.108	28.974	36.237
64	97	0.258	765.812	17.279	3.397	13.553	16.232								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 34, SE.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	56	0.123	369.160	-3.174	23.583	4.146	-30.646	65	99	0.265	786.664	19.635	1.623	12.850	14.913
23	57	0.172	389.065	-2.453	19.905	4.504	-26.244	66	100	0.252	789.996	20.008	3.332	13.168	13.613
24	58	0.165	411.258	-1.851	22.192	4.312	-27.823	67	101	0.251	791.164	20.397	1.168	13.541	16.143
25	59	0.196	430.142	-1.181	18.884	4.865	-23.904	68	102	0.238	794.144	20.776	2.980	13.927	14.717
26	60	0.057	450.618	-0.748	20.476	4.322	-24.808	69	103	0.234	794.978	21.171	0.834	14.381	17.213
27	61	0.099	468.344	-0.059	17.726	4.680	-21.744	70	104	0.221	797.590	21.540	2.612	14.741	15.810
28	62	0.001	487.749	0.426	19.405	4.359	-22.852	71	105	0.211	798.050	21.894	0.460	15.124	18.299
29	63	0.063	502.832	1.085	15.082	3.060	-18.033	72	106	0.199	800.360	22.243	2.310	15.536	16.795
30	64	0.004	519.650	1.580	16.819	1.529	-19.090	73	107	0.183	800.563	22.594	0.203	16.003	19.258
31	65	0.014	533.096	2.153	13.445	1.143	-15.187	74	108	0.163	802.536	22.942	1.974	16.368	17.820
32	66	0.	549.227	2.695	16.131	1.557	-17.285	75	109	0.147	802.580	23.292	0.043	16.907	20.051
33	67	0.112	561.440	3.327	12.213	1.489	-12.775	76	110	0.114	804.447	23.645	1.867	17.473	18.526
34	68	0.090	576.682	5.055	15.242	1.706	-15.188	77	111	0.093	804.481	24.006	0.034	18.149	20.660
35	69	0.098	586.716	5.641	10.034	2.069	-9.428	78	112	0.022	806.456	24.288	1.975	18.902	19.093
36	70	0.127	600.035	6.162	13.319	2.379	-10.787	79	113	0.	806.586	24.623	0.130	19.674	21.252
37	71	0.169	609.416	6.703	9.381	2.874	-6.354	80	114	0.002	808.522	24.952	1.935	20.246	19.770
38	72	0.164	621.983	7.218	12.567	3.214	-8.791	81	115	0.016	808.669	25.288	0.148	20.948	21.888
39	73	0.221	630.818	7.815	8.835	3.840	-4.622	82	116	0.000	810.269	25.606	1.600	21.279	20.788
40	74	0.174	642.600	8.257	11.782	4.089	-6.923	83	117	0.021	808.253	25.944	-2.016	19.790	24.719
41	75	0.197	650.814	8.800	8.214	4.719	-2.968	84	118	0.003	807.384	26.258	-0.870	17.970	23.932
42	76	0.141	661.940	9.256	11.126	4.950	-5.316	85	119	0.017	805.110	26.585	-2.273	18.386	25.649
43	77	0.135	669.641	9.760	7.701	5.571	-1.533	86	120	0.003	804.088	26.896	-1.022	18.880	24.744
44	78	0.088	680.197	10.222	10.556	5.880	-3.888	87	121	0.015	801.553	27.214	-2.535	19.274	26.569
45	79	0.	687.470	10.676	7.273	6.501	-0.252	88	122	0.002	800.369	27.520	-1.184	19.747	25.560
46	80	0.	697.538	11.155	10.068	6.913	-2.564	89	123	0.028	797.540	27.842	-2.829	20.094	27.504
47	81	0.040	704.487	11.661	6.949	7.562	1.009	90	124	0.	796.147	28.131	-1.393	20.507	26.405
48	82	0.000	713.972	12.111	9.484	7.955	-1.009	91	125	0.074	792.687	28.464	-3.460	20.510	28.760
49	83	0.051	720.685	12.637	6.713	8.724	2.194	92	126	0.176	791.529	28.763	-1.158	21.348	26.863
50	84	0.000	729.435	13.046	8.750	8.931	0.690	93	127	0.217	788.836	29.092	-2.693	22.771	28.807
51	85	0.035	733.943	13.540	4.507	7.722	5.349	94	128	0.230	787.742	29.380	-1.094	23.537	27.580
52	86	0.001	740.044	13.975	6.101	5.978	4.276	95	129	0.245	785.130	29.646	-2.612	24.344	29.428
53	87	0.008	743.801	14.438	3.757	6.203	7.051	96	130	0.251	783.826	29.925	-1.303	24.736	28.443
54	88	0.003	749.443	14.885	5.642	6.661	5.648	97	131	0.262	781.082	30.208	-2.744	25.221	30.183
55	89	0.025	752.556	15.346	3.113	6.955	8.630	98	132	0.259	779.483	30.482	-1.599	25.502	29.362
56	90	0.005	757.805	15.774	5.249	7.472	6.972	99	133	0.264	776.510	30.763	-2.973	25.863	31.007
57	91	0.094	760.241	16.286	2.436	7.720	10.223	100	134	0.263	774.583	31.034	-1.927	26.085	30.248
58	92	0.138	765.238	16.678	4.996	8.349	8.171	101	135	0.266	771.378	31.304	-3.205	26.425	31.801
59	93	0.218	767.676	17.191	2.439	9.349	11.274	102	136	0.264	769.168	31.568	-2.209	26.684	31.087
60	94	0.224	772.458	17.613	4.781	9.938	9.559	103	137	0.268	765.789	31.835	-3.380	27.056	32.526
61	95	0.258	774.874	18.020	2.416	11.128	12.370	104	138	0.261	763.206	32.088	-2.583	27.217	32.007
62	96	0.256	779.188	18.423	4.314	11.515	10.987	105	139	0.251	759.379	32.347	-3.827	27.308	33.505
63	97	0.269	781.261	18.846	2.073	12.141	13.636	106	140	0.251	756.526	32.602	-2.853	27.551	32.775
64	98	0.261	785.041	19.229	3.779	12.419	12.367	107	141	0.238	752.425	32.864	-4.101	27.785	34.289

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 35, BR.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	57	0.234	362.039	-7.121	24.307	4.696	-28.215	66	101	0.263	806.524	16.528	3.698	12.417	15.077
23	58	0.210	382.652	-6.414	20.613	5.022	-24.004	67	102	0.260	808.078	16.915	1.554	12.755	17.602
24	59	0.210	405.455	-5.803	22.803	4.826	-25.633	68	103	0.248	811.408	17.265	3.330	13.125	16.212
25	60	0.218	425.027	-5.115	19.572	5.214	-21.803	69	104	0.243	812.618	17.640	1.210	13.556	18.704
26	61	0.177	445.817	-4.801	20.790	4.413	-22.409	70	105	0.230	815.567	17.977	2.949	13.905	17.343
27	62	0.099	464.115	-4.229	18.297	4.497	-19.373	71	106	0.222	816.373	18.323	0.806	14.271	19.853
28	63	0.016	484.017	-3.733	19.902	4.356	-20.391	72	107	0.207	819.039	18.679	2.666	14.693	18.361
29	64	0.072	499.778	-3.054	15.761	3.080	-15.711	73	108	0.191	819.574	19.011	0.535	15.123	20.839
30	65	0.045	517.126	-2.524	17.348	1.507	-16.739	74	109	0.176	821.849	19.312	2.275	15.437	19.465
31	66	0.041	531.159	-1.936	14.033	1.118	-12.864	75	110	0.159	822.191	19.611	0.342	15.927	21.767
32	67	0.074	547.883	-1.344	16.724	1.518	-14.989	76	111	0.108	824.359	19.911	2.168	16.469	20.332
33	68	0.164	560.712	-0.729	12.828	1.474	-10.546	77	112	0.092	824.767	20.286	0.408	17.184	22.454
34	69	0.175	576.506	-0.176	15.794	1.679	-12.914	78	113	0.042	827.056	20.599	2.289	17.959	20.887
35	70	0.206	588.466	1.749	11.960	2.058	-8.580	79	114	0.	827.510	20.923	0.454	18.739	23.054
36	71	0.201	602.279	2.244	13.814	2.357	-9.913	80	115	0.008	829.775	21.253	2.265	19.311	21.601
37	72	0.250	612.410	2.994	10.131	3.040	-4.542	81	116	0.019	830.275	21.606	0.500	20.016	23.703
38	73	0.241	625.413	3.430	13.003	3.245	-6.849	82	117	0.003	832.190	21.921	1.915	20.326	22.610
39	74	0.251	634.895	4.077	9.482	3.887	-2.840	83	118	0.024	830.534	22.280	-1.657	18.857	26.517
40	75	0.226	647.064	4.464	12.169	4.003	-5.012	84	119	0.008	829.977	22.593	-0.557	17.019	25.731
41	76	0.232	655.842	5.028	8.779	4.544	-1.145	85	120	0.024	828.050	22.940	-1.927	17.446	27.437
42	77	0.194	667.326	5.385	11.484	4.687	-3.344	86	121	0.015	827.340	23.252	-0.710	17.919	26.531
43	78	0.192	675.527	5.886	8.201	5.218	0.377	87	122	0.037	825.146	23.593	-2.194	18.325	28.339
44	79	0.091	686.435	6.238	10.908	5.456	-1.836	88	123	0.017	824.262	23.893	-0.884	18.774	27.332
45	80	0.072	694.192	6.722	7.757	6.016	1.821	89	124	0.031	821.769	24.230	-2.492	19.135	29.262
46	81	0.050	704.714	7.176	10.522	6.443	-0.486	90	125	0.013	820.664	24.517	-1.105	19.521	28.172
47	82	0.058	712.180	7.693	7.466	7.091	3.033	91	126	0.164	817.609	24.922	-3.055	19.616	30.440
48	83	0.014	722.097	8.125	9.917	7.419	1.056	92	127	0.194	816.860	25.331	-0.749	20.549	28.426
49	84	0.055	729.343	8.658	7.246	8.222	4.213	93	128	0.226	814.539	25.704	-2.321	22.021	30.241
50	85	0.006	738.509	9.073	9.166	8.353	2.735	94	129	0.239	813.776	26.034	-0.764	22.715	28.985
51	86	0.040	743.537	9.594	5.028	7.194	7.355	95	130	0.251	811.486	26.357	-2.289	23.448	30.797
52	87	0.012	750.069	10.025	6.532	5.384	6.291	96	131	0.257	810.483	26.657	-1.003	23.826	29.799
53	88	0.026	754.309	10.508	4.240	5.611	9.055	97	132	0.266	808.063	26.981	-2.420	24.284	31.497
54	89	0.023	760.404	10.961	6.095	6.041	7.645	98	133	0.264	806.735	27.251	-1.329	24.538	30.689
55	90	0.033	763.995	11.439	3.591	6.337	10.595	99	134	0.268	804.048	27.538	-2.686	24.879	32.323
56	91	0.035	769.682	11.877	5.687	6.829	8.935	100	135	0.267	802.396	27.813	-1.652	25.100	31.566
57	92	0.093	772.627	12.385	2.945	7.122	12.112	101	136	0.269	799.473	28.095	-2.923	25.431	33.109
58	93	0.185	778.168	12.930	5.541	7.842	9.955	102	137	0.268	797.532	28.364	-1.941	25.688	32.398
59	94	0.238	781.234	13.558	3.066	8.983	12.834	103	138	0.271	794.430	28.642	-3.102	26.062	33.826
60	95	0.246	786.461	14.004	5.227	9.606	11.116	104	139	0.266	792.101	28.895	-2.329	26.205	33.320
61	96	0.269	789.393	14.519	2.932	10.613	13.825	105	140	0.255	788.519	29.140	-3.583	26.270	34.835
62	97	0.268	794.114	14.926	4.721	10.974	12.460	106	141	0.258	785.931	29.405	-2.587	26.518	34.103
63	98	0.276	796.626	15.365	2.511	11.476	15.071	107	142	0.248	782.068	29.643	-3.864	26.741	35.637
64	99	0.271	800.795	15.754	4.169	11.734	13.820	108	143	0.239	779.303	29.867	-2.765	27.084	34.797
65	100	0.273	802.826	16.163	2.032	12.116	16.348	109	144	0.226	775.256	30.112	-4.047	27.400	36.334

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 36, KR.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	58	0.264	357.865	-4.174	24.824	5.040	-32.164	67	103	0.261	826.838	18.759	1.940	11.879	13.893
23	59	0.225	379.039	-3.613	21.174	5.167	-28.123	68	104	0.249	830.540	19.132	3.702	12.249	12.524
24	60	0.229	402.441	-3.014	23.402	4.986	-29.786	69	105	0.244	832.127	19.509	1.587	12.668	14.995
25	61	0.228	422.625	-2.402	20.184	5.265	-26.036	70	106	0.231	835.443	19.876	3.316	13.005	13.640
26	62	0.166	443.959	-1.858	21.334	4.407	-26.600	71	107	0.225	836.618	20.245	1.174	13.345	16.131
27	63	0.117	462.843	-1.272	18.884	4.406	-23.729	72	108	0.208	839.631	20.592	3.014	13.746	14.672
28	64	0.005	483.285	-0.732	20.442	4.372	-24.901	73	109	0.190	840.531	20.957	0.900	14.186	17.098
29	65	0.077	499.605	-0.173	16.320	2.966	-20.306	74	110	0.171	843.175	21.327	2.644	14.520	15.672
30	66	0.030	517.513	0.387	17.908	1.468	-21.305	75	111	0.152	843.908	21.718	0.733	15.051	17.899
31	67	0.030	532.111	0.952	14.599	0.985	-17.414	76	112	0.118	846.438	22.080	2.530	15.607	16.416
32	68	0.107	549.383	1.500	17.272	1.438	-19.510	77	113	0.097	847.161	22.394	0.722	16.286	18.540
33	69	0.143	562.809	2.097	13.425	1.418	-14.990	78	114	0.033	849.782	22.726	2.621	17.040	16.944
34	70	0.156	579.103	2.597	16.294	1.581	-17.233	79	115	0.	850.594	23.084	0.812	17.818	19.105
35	71	0.214	591.583	3.118	12.481	1.848	-12.803	80	116	0.003	853.196	23.421	2.602	18.444	17.661
36	72	0.218	607.085	4.806	15.502	2.108	-15.129	81	117	0.017	854.018	23.742	0.822	19.136	19.774
37	73	0.258	617.782	5.372	10.697	2.771	-9.789	82	118	0.001	856.269	24.078	2.251	19.452	18.689
38	74	0.252	631.273	5.860	13.491	2.943	-10.836	83	119	0.022	854.926	24.392	-1.343	17.961	22.608
39	75	0.257	641.270	6.374	9.996	3.559	-6.848	84	120	0.004	854.705	24.728	-0.221	16.140	21.831
40	76	0.239	653.915	6.851	12.646	3.637	-8.986	85	121	0.019	853.089	25.038	-1.616	16.540	23.551
41	77	0.239	663.199	7.357	9.284	4.086	-5.170	86	122	0.006	852.702	25.363	-0.386	17.024	22.657
42	78	0.195	675.121	7.796	11.922	4.226	-7.309	87	123	0.023	850.811	25.665	-1.891	17.406	24.482
43	79	0.193	683.817	8.290	8.696	4.708	-3.700	88	124	0.006	850.249	25.987	-0.562	17.865	23.482
44	80	0.128	695.231	8.795	11.414	4.995	-5.948	89	125	0.029	848.054	26.284	-2.195	18.206	25.427
45	81	0.143	703.446	9.254	8.215	5.509	-2.428	90	126	0.003	847.267	26.603	-0.787	18.603	24.341
46	82	0.027	714.430	9.717	10.985	5.938	-4.699	91	127	0.152	844.504	26.895	-2.763	18.669	26.622
47	83	0.055	722.370	10.190	7.940	6.605	-1.299	92	128	0.190	843.997	27.137	-0.506	19.555	24.757
48	84	0.004	732.774	10.677	10.404	6.941	-3.281	93	129	0.227	841.978	27.439	-2.019	20.996	26.665
49	85	0.054	740.462	11.118	7.688	7.679	-0.099	94	130	0.239	841.501	27.725	-0.477	21.677	25.497
50	86	0.002	750.110	11.601	9.648	7.843	-1.582	95	131	0.251	839.500	28.013	-2.001	22.369	27.339
51	87	0.038	755.577	12.040	5.467	6.597	3.056	96	132	0.257	838.778	28.295	-0.721	22.742	26.372
52	88	0.004	762.582	12.513	7.005	4.851	1.998	97	133	0.266	836.641	28.577	-2.138	23.216	28.085
53	89	0.014	767.267	12.958	4.685	5.030	4.772	98	134	0.264	835.589	28.854	-1.052	23.467	27.301
54	90	0.009	773.807	13.403	6.540	5.469	3.384	99	135	0.268	833.180	29.131	-2.409	23.802	28.939
55	91	0.028	777.835	13.840	4.027	5.739	6.347	100	136	0.267	831.799	29.403	-1.381	24.020	28.199
56	92	0.016	783.956	14.274	6.122	6.218	4.710	101	137	0.269	829.147	29.675	-2.651	24.342	29.747
57	93	0.098	787.341	14.714	3.384	6.489	7.887	102	138	0.268	827.474	29.941	-1.674	24.596	29.049
58	94	0.176	793.286	15.118	5.945	7.186	5.898	103	139	0.271	824.638	30.208	-2.835	24.966	30.483
59	95	0.239	796.795	15.561	3.509	8.259	8.853	104	140	0.265	822.572	30.470	-2.067	25.108	29.990
60	96	0.249	802.436	15.975	5.641	8.904	7.292	105	141	0.254	819.252	30.734	-3.319	25.169	31.506
61	97	0.270	805.792	16.399	3.355	9.820	10.019	106	142	0.257	816.923	30.991	-2.330	25.422	30.770
62	98	0.270	810.914	16.799	5.122	10.161	8.708	107	143	0.247	813.318	31.250	-3.604	25.644	32.313
63	99	0.278	813.833	17.207	2.919	10.663	11.319	108	144	0.238	810.808	31.505	-2.510	25.987	31.471
64	100	0.273	818.392	17.597	4.559	10.908	10.098	109	145	0.226	807.017	31.761	-3.791	26.297	33.000
65	101	0.274	820.819	17.993	2.428	11.263	12.624	110	146	0.219	804.400	32.009	-2.617	26.669	32.059
66	102	0.264	824.898	18.373	4.079	11.562	11.376	111	147	0.207	800.466	32.251	-3.934	27.026	33.621

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 37, RB.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
22	59	0.320	350.134	-7.731	25.216	5.920	-30.298	68	105	0.256	846.340	15.800	4.059	11.520	13.883
23	60	0.317	371.873	-7.166	21.739	5.846	-26.209	69	106	0.250	848.301	16.174	1.961	11.928	16.350
24	61	0.260	395.807	-6.634	23.934	5.473	-27.805	70	107	0.239	851.966	16.523	3.665	12.263	15.021
25	62	0.249	416.576	-6.049	20.769	5.629	-24.155	71	108	0.238	853.521	16.903	1.555	12.608	17.500
26	63	0.219	438.331	-5.628	21.755	4.581	-24.580	72	109	0.218	856.846	17.215	3.325	12.984	16.088
27	64	0.135	457.601	-5.242	19.270	4.279	-21.545	73	110	0.197	858.065	17.534	1.219	13.397	18.577
28	65	0.011	478.516	-4.769	20.914	4.403	-22.578	74	111	0.181	861.025	17.850	2.960	13.691	17.219
29	66	0.087	495.425	-4.180	16.909	3.015	-18.023	75	112	0.161	862.072	18.164	1.047	14.203	19.508
30	67	0.034	513.915	-3.598	18.490	1.603	-18.983	76	113	0.126	864.918	18.480	2.846	14.775	18.096
31	68	0.032	529.091	-3.021	15.176	1.018	-15.158	77	114	0.108	865.943	18.783	1.025	15.458	20.277
32	69	0.177	547.037	-2.347	17.946	1.615	-17.382	78	115	0.032	868.916	19.135	2.973	16.263	18.717
33	70	0.190	561.088	-1.721	14.051	1.633	-12.967	79	116	0.	870.074	19.481	1.158	17.013	20.847
34	71	0.219	577.998	-1.104	16.911	1.820	-15.304	80	117	0.006	873.010	19.814	2.935	17.659	19.407
35	72	0.255	591.174	-0.409	13.176	2.168	-11.073	81	118	0.018	874.175	20.158	1.166	18.371	21.509
36	73	0.259	607.211	0.126	16.037	2.411	-13.384	82	119	0.002	876.751	20.483	2.576	18.682	20.428
37	74	0.273	619.655	1.873	12.444	2.894	-9.292	83	120	0.022	875.753	20.828	-0.998	17.183	24.329
38	75	0.273	633.639	2.366	13.985	3.065	-10.313	84	121	0.006	875.857	21.153	0.104	15.372	23.552
39	76	0.280	644.147	2.877	10.507	3.442	-5.230	85	122	0.020	874.577	21.488	-1.280	15.749	25.262
40	77	0.262	657.247	3.332	13.101	3.539	-7.303	86	123	0.010	874.511	21.809	-0.066	16.239	24.369
41	78	0.256	667.030	3.831	9.783	3.840	-3.555	87	124	0.025	872.948	22.137	-1.563	16.603	26.183
42	79	0.229	679.334	4.213	12.304	3.976	-5.603	88	125	0.011	872.698	22.450	-0.249	17.063	25.184
43	80	0.215	688.500	4.683	9.166	4.363	-2.003	89	126	0.029	870.825	22.771	-1.873	17.384	27.119
44	81	0.173	700.235	5.005	11.735	4.615	-4.087	90	127	0.008	870.343	23.077	-0.482	17.787	26.037
45	82	0.166	708.949	5.503	8.714	5.127	-0.554	91	128	0.167	867.972	23.468	-2.372	17.907	28.232
46	83	0.031	720.288	5.858	11.340	5.558	-2.700	92	129	0.205	867.860	23.863	-0.112	18.901	26.234
47	84	0.048	728.710	6.340	8.422	6.223	0.708	93	130	0.235	866.215	24.237	-1.645	20.311	27.999
48	85	0.010	739.580	6.806	10.870	6.571	-1.265	94	131	0.245	866.056	24.555	-0.160	20.901	26.779
49	86	0.052	747.745	7.284	8.165	7.270	1.876	95	132	0.255	864.368	24.869	-1.688	21.534	28.591
50	87	0.004	757.851	7.741	10.105	7.458	0.405	96	133	0.260	863.943	25.165	-0.425	21.873	27.615
51	88	0.038	763.798	8.221	5.947	6.160	4.999	97	134	0.268	862.108	25.467	-1.836	22.326	29.310
52	89	0.008	771.256	8.675	7.459	4.453	3.944	98	135	0.266	861.336	25.748	-0.771	22.558	28.530
53	90	0.019	776.409	9.142	5.153	4.577	6.694	99	136	0.269	859.215	26.035	-2.122	22.857	30.158
54	91	0.016	783.399	9.591	6.990	5.035	5.304	100	137	0.269	858.112	26.313	-1.103	23.082	29.420
55	92	0.029	787.884	10.049	4.485	5.280	8.245	101	138	0.271	855.740	26.593	-2.371	23.397	30.961
56	93	0.023	794.445	10.489	6.561	5.746	6.609	102	139	0.270	854.339	26.865	-1.402	23.648	30.265
57	94	0.198	798.401	11.061	3.956	6.111	9.641	103	140	0.272	851.779	27.140	-2.560	24.011	31.691
58	95	0.208	804.866	11.580	6.464	6.889	7.493	104	141	0.268	849.976	27.404	-1.803	24.149	31.204
59	96	0.250	808.946	12.151	4.080	8.024	10.286	105	142	0.257	846.910	27.658	-3.065	24.185	32.728
60	97	0.261	815.028	12.592	6.082	8.565	8.686	106	143	0.261	844.849	27.926	-2.061	24.453	31.988
61	98	0.275	818.839	13.047	3.811	9.310	11.375	107	144	0.253	841.496	28.178	-3.353	24.683	33.539
62	99	0.276	824.369	13.455	5.530	9.613	10.072	108	145	0.248	839.234	28.426	-2.262	25.008	32.709
63	100	0.281	827.708	13.875	3.339	10.019	12.663	109	146	0.232	835.677	28.660	-3.557	25.314	34.260
64	101	0.277	832.661	14.269	4.953	10.251	11.456	110	147	0.227	833.304	28.904	-2.372	25.706	33.340
65	102	0.278	835.492	14.672	2.831	10.571	13.962	111	148	0.211	829.596	29.130	-3.708	26.045	34.931
66	103	0.269	839.948	15.050	4.456	10.858	12.730	112	149	0.207	827.085	29.370	-2.511	26.398	34.001
67	104	0.266	842.281	15.444	2.333	11.160	15.226								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 38, SR.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
23	61	0.316	367.220	-4.653	22.338	5.884	-29.860	69	107	0.251	866.205	17.904	2.337	11.072	12.887
24	62	0.273	391.639	-4.168	24.419	5.479	-31.384	70	108	0.238	870.238	18.272	4.033	11.403	11.545
25	63	0.256	412.969	-3.607	21.330	5.635	-27.910	71	109	0.236	872.152	18.631	1.914	11.730	13.997
26	64	0.220	435.274	-3.058	22.305	4.537	-28.413	72	110	0.215	875.860	19.013	3.708	12.121	12.582
27	65	0.136	455.155	-2.446	19.881	4.234	-25.538	73	111	0.194	877.462	19.397	1.602	12.549	14.973
28	66	0.009	476.619	-1.897	21.464	4.365	-26.860	74	112	0.175	880.798	19.772	3.336	12.872	13.574
29	67	0.091	494.150	-1.275	17.531	3.012	-22.574	75	113	0.155	882.232	20.159	1.434	13.406	15.814
30	68	0.073	513.150	-0.765	19.000	1.570	-23.330	76	114	0.121	885.438	20.519	3.206	13.967	14.369
31	69	0.047	528.872	-0.218	15.723	0.973	-19.489	77	115	0.099	886.851	20.908	1.413	14.648	16.474
32	70	0.158	547.338	0.301	18.466	1.530	-21.591	78	116	0.036	890.139	21.223	3.288	15.406	14.934
33	71	0.178	561.911	0.824	14.573	1.505	-17.075	79	117	0.	891.634	21.560	1.495	16.179	17.018
34	72	0.217	579.319	1.321	17.407	1.641	-19.210	80	118	0.005	894.902	21.892	3.268	16.825	15.512
35	73	0.267	593.045	1.870	13.726	1.941	-14.911	81	119	0.017	896.397	22.221	1.495	17.508	17.612
36	74	0.271	609.580	2.369	16.535	2.182	-17.028	82	120	0.001	899.299	22.548	2.903	17.809	16.567
37	75	0.284	622.544	2.889	12.964	2.666	-12.929	83	121	0.022	898.627	22.874	-0.672	16.315	20.432
38	76	0.287	638.134	4.494	15.589	2.753	-14.969	84	122	0.005	899.057	23.199	0.429	14.493	19.719
39	77	0.300	649.162	5.016	11.028	3.085	-9.932	85	123	0.020	898.097	23.520	-0.560	14.877	21.403
40	78	0.270	662.692	5.445	13.530	3.124	-10.778	86	124	0.008	898.348	23.837	0.251	15.349	20.571
41	79	0.263	672.949	5.919	10.257	3.385	-7.176	87	125	0.026	897.100	24.153	-1.248	15.717	22.370
42	80	0.229	685.714	6.380	12.765	3.504	-9.216	88	126	0.009	897.162	24.463	0.061	16.164	21.436
43	81	0.213	695.366	6.866	9.651	3.871	-5.772	89	127	0.029	895.598	24.773	-1.564	16.492	23.338
44	82	0.156	707.612	7.377	12.247	4.196	-7.982	90	128	0.005	895.421	25.078	-0.177	16.878	22.288
45	83	0.156	716.806	7.857	9.193	4.694	-4.572	91	129	0.155	893.312	25.340	-2.109	16.963	24.498
46	84	0.069	728.635	8.347	11.830	5.110	-6.740	92	130	0.197	893.432	25.572	0.120	17.870	22.744
47	85	0.069	737.532	8.822	8.897	5.792	-3.458	93	131	0.232	892.053	25.837	-1.379	19.254	24.603
48	86	0.007	748.839	9.259	11.306	6.113	-5.397	94	132	0.244	892.176	26.121	0.124	19.884	23.476
49	87	0.056	757.473	9.728	8.635	6.808	-2.378	95	133	0.255	890.776	26.408	-1.400	20.503	25.322
50	88	0.003	768.015	10.164	10.541	6.946	-3.732	96	134	0.260	890.635	26.692	-0.141	20.839	24.388
51	89	0.039	774.418	10.620	6.403	5.662	0.732	97	135	0.269	889.084	26.977	-1.551	21.290	26.109
52	90	0.006	782.321	11.065	7.903	3.916	-0.210	98	136	0.267	888.591	27.254	-0.494	21.518	25.359
53	91	0.018	787.921	11.511	5.600	4.048	2.481	99	137	0.270	886.749	27.534	-1.842	21.813	26.986
54	92	0.014	795.347	11.948	7.426	4.470	1.161	100	138	0.269	885.918	27.807	-0.830	22.035	26.268
55	93	0.030	800.272	12.388	4.925	4.710	4.101	101	139	0.271	883.821	28.081	-2.097	22.347	27.813
56	94	0.025	807.260	12.815	6.988	5.158	2.493	102	140	0.270	882.688	28.349	-1.134	22.594	27.133
57	95	0.193	811.577	13.175	4.317	5.447	5.641	103	141	0.272	880.397	28.618	-2.291	22.955	28.562
58	96	0.199	818.449	13.584	6.872	6.198	3.710	104	142	0.268	878.856	28.881	-1.541	23.088	28.091
59	97	0.252	822.932	13.986	4.483	7.296	6.545	105	143	0.256	876.055	29.145	-2.801	23.121	29.610
60	98	0.265	829.432	14.403	6.500	7.851	5.123	106	144	0.261	874.252	29.404	-1.802	23.386	28.892
61	99	0.279	833.659	14.820	4.228	8.569	7.853	107	145	0.252	871.160	29.664	-3.092	23.613	30.413
62	100	0.280	839.588	15.219	5.929	8.857	6.610	108	146	0.245	869.155	29.921	-2.006	23.937	29.570
63	101	0.285	843.334	15.626	3.746	9.247	9.213	109	147	0.229	865.862	30.186	-3.292	24.249	31.107
64	102	0.281	848.672	16.011	5.338	9.463	8.035	110	148	0.224	863.744	30.440	-2.118	24.642	30.124
65	103	0.281	851.895	16.403	3.224	9.768	10.539	111	149	0.208	860.303	30.707	-3.441	24.991	31.706
66	104	0.272	856.725	16.777	4.830	10.038	9.327	112	150	0.203	858.044	30.959	-2.259	25.348	30.756
67	105	0.268	859.440	17.159	2.715	10.326	11.789	113	151	0.189	854.430	31.221	-3.613	25.670	32.355
68	106	0.257	863.868	17.529	4.428	10.675	10.450	114	152	0.177	852.095	31.481	-2.335	26.085	31.316

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 39, Y$.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
25	64	0.287	406.078	-6.891	21.801	5.910	-26.755	71	110	0.248	887.659	15.507	2.293	11.063	15.133
26	65	0.272	428.834	-6.440	22.756	4.732	-27.024	72	111	0.224	891.652	15.792	3.993	11.390	13.801
27	66	0.165	448.977	-6.178	20.143	4.106	-23.749	73	112	0.198	893.589	16.127	1.937	11.773	16.313
28	67	0.047	470.793	-5.826	21.816	4.167	-24.624	74	113	0.182	897.263	16.465	3.674	12.122	14.985
29	68	0.109	489.037	-5.113	18.244	3.141	-20.385	75	114	0.163	899.024	16.793	1.762	12.664	17.278
30	69	0.122	508.601	-4.549	19.564	1.790	-21.235	76	115	0.125	902.543	17.105	3.518	13.222	15.913
31	70	0.190	524.964	-3.908	16.363	1.244	-17.502	77	116	0.104	904.291	17.440	1.748	13.924	18.070
32	71	0.205	544.054	-3.284	19.089	1.844	-19.758	78	117	0.060	907.870	17.731	3.580	14.657	16.603
33	72	0.273	559.326	-2.585	15.272	1.941	-15.427	79	118	0.039	909.632	17.997	1.761	15.394	18.811
34	73	0.284	577.351	-1.967	18.025	2.020	-17.785	80	119	0.018	913.227	18.325	3.595	16.015	17.388
35	74	0.306	591.770	-1.275	14.419	2.387	-13.740	81	120	0.024	915.083	18.687	1.857	16.714	19.465
36	75	0.306	608.832	-0.748	17.062	2.539	-16.022	82	121	0.008	918.277	18.978	3.193	16.972	18.437
37	76	0.322	622.382	-0.162	13.550	2.913	-12.038	83	122	0.029	917.994	19.366	-0.283	15.523	22.275
38	77	0.313	638.448	0.314	16.066	2.942	-14.130	84	123	0.017	918.718	19.661	0.724	13.671	21.546
39	78	0.323	651.132	1.970	12.684	3.182	-10.256	85	124	0.038	918.136	20.039	-0.581	14.088	23.208
40	79	0.300	664.990	2.298	13.858	3.056	-11.019	86	125	0.033	918.688	20.340	0.552	14.536	22.351
41	80	0.295	675.716	2.767	10.726	3.275	-6.192	87	126	0.049	917.816	20.715	-0.872	14.944	24.113
42	81	0.267	688.812	3.097	13.095	3.269	-8.057	88	127	0.039	918.153	20.992	0.338	15.347	23.169
43	82	0.239	698.848	3.482	10.036	3.523	-4.384	89	128	0.038	916.927	21.329	-1.226	15.684	25.082
44	83	0.184	711.451	3.839	12.603	3.822	-6.378	90	129	0.033	917.027	21.606	0.100	16.034	24.048
45	84	0.174	721.112	4.307	9.661	4.317	-2.877	91	130	0.169	915.393	22.081	-1.634	16.273	26.118
46	85	0.096	733.292	4.657	12.180	4.762	-4.920	92	131	0.206	915.874	22.442	0.480	17.235	24.134
47	86	0.088	742.660	5.127	9.368	5.416	-1.581	93	132	0.244	914.870	22.817	-1.004	18.603	25.833
48	87	0.039	754.313	5.474	11.654	5.730	-3.405	94	133	0.254	915.316	23.140	0.447	19.161	24.567
49	88	0.064	763.501	6.027	9.187	6.496	-0.400	95	134	0.262	914.241	23.464	-1.076	19.730	26.334
50	89	0.016	774.368	6.353	10.867	6.493	-1.703	96	135	0.268	914.411	23.776	0.170	20.060	25.332
51	90	0.050	781.329	6.910	6.961	5.288	2.755	97	136	0.274	913.168	24.083	-1.243	20.505	26.998
52	91	0.032	789.619	7.298	8.291	3.474	1.788	98	137	0.273	912.953	24.362	-0.215	20.714	26.219
53	92	0.053	795.725	7.804	6.106	3.632	4.467	99	138	0.275	911.404	24.655	-1.549	21.002	27.842
54	93	0.054	803.590	8.243	7.865	4.039	3.101	100	139	0.275	910.852	24.933	-0.552	21.220	27.110
55	94	0.047	808.970	8.698	5.380	4.266	6.019	101	140	0.276	909.038	25.217	-1.813	21.529	28.648
56	95	0.083	816.435	9.175	7.465	4.741	4.364	102	141	0.276	908.176	25.489	-0.862	21.770	27.963
57	96	0.202	821.377	9.800	4.942	5.198	7.266	103	142	0.277	906.164	25.768	-2.012	22.129	29.388
58	97	0.228	828.694	10.245	7.317	5.954	5.164	104	143	0.274	904.882	26.026	-1.282	22.249	28.918
59	98	0.269	833.772	10.840	5.078	7.075	7.792	105	144	0.292	902.362	26.307	-2.521	22.288	30.444
60	99	0.284	840.730	11.299	6.958	7.569	6.128	106	145	0.275	900.790	26.538	-1.571	22.520	29.772
61	100	0.295	845.415	11.756	4.685	8.174	8.741	107	146	0.268	897.942	26.782	-2.848	22.737	31.338
62	101	0.293	851.764	12.176	6.349	8.441	7.427	108	147	0.265	896.187	27.033	-1.755	23.044	30.546
63	102	0.298	855.924	12.590	4.160	8.790	9.994	109	148	0.245	893.086	27.224	-3.101	23.295	32.187
64	103	0.293	861.652	12.980	5.728	8.988	8.809	110	149	0.235	891.227	27.483	-1.859	23.698	31.280
65	104	0.291	865.270	13.374	3.617	9.267	11.319	111	150	0.211	888.017	27.714	-3.210	24.045	32.889
66	105	0.284	870.446	13.722	5.177	9.491	10.154	112	151	0.206	886.003	27.960	-2.014	24.404	31.988
67	106	0.279	873.536	14.095	3.089	9.749	12.677	113	152	0.193	882.629	28.198	-3.375	24.737	33.610
68	107	0.270	878.310	14.441	4.774	10.067	11.396	114	153	0.181	880.531	28.436	-2.098	25.151	32.623
69	108	0.262	881.000	14.795	2.691	10.424	13.903	115	154	0.409	877.101	28.666	-3.430	25.597	34.204
70	109	0.251	885.366	15.128	4.366	10.731	12.640	116	155	0.148	874.927	28.878	-2.174	26.018	33.221

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 40, ZR.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
26	66	0.230	424.446	-4.388	23.418	4.512	-30.673	72	112	0.212	909.120	17.468	4.450	10.587	10.422
27	67	0.147	445.386	-3.591	20.940	4.122	-27.651	73	113	0.192	911.465	17.876	2.345	11.018	12.882
28	68	0.012	467.869	-2.924	22.483	4.301	-28.741	74	114	0.174	915.520	18.257	4.055	11.365	11.531
29	69	0.102	486.584	-2.453	18.714	3.134	-24.586	75	115	0.155	917.673	18.648	2.153	11.916	13.787
30	70	0.106	506.679	-1.921	20.096	1.765	-25.316	76	116	0.121	921.578	19.036	3.905	12.486	12.383
31	71	0.177	523.513	-1.451	16.834	1.068	-21.463	77	117	0.099	923.691	19.400	2.113	13.165	14.488
32	72	0.176	543.117	-0.937	19.604	1.672	-23.608	78	118	0.039	927.660	19.790	3.969	13.927	12.946
33	73	0.189	558.784	-0.542	15.667	1.617	-19.140	79	119	0.	929.833	20.201	2.173	14.686	15.077
34	74	0.225	577.247	-0.104	18.463	1.614	-21.386	80	120	0.005	933.767	20.540	3.934	15.333	13.639
35	75	0.267	592.027	0.257	14.780	1.821	-17.134	81	121	0.018	935.931	20.847	2.164	16.002	15.740
36	76	0.270	609.562	0.730	17.535	1.948	-19.345	82	122	0.002	939.486	21.210	3.556	16.290	14.695
37	77	0.282	623.535	1.153	13.973	2.196	-15.284	83	123	0.023	939.481	21.488	-0.005	14.790	18.572
38	78	0.285	640.093	1.645	16.558	2.218	-17.368	84	124	0.005	940.562	21.845	1.081	12.968	17.838
39	79	0.298	653.189	2.057	13.095	2.350	-13.420	85	125	0.021	940.257	22.120	-0.306	13.334	19.542
40	80	0.268	668.742	3.752	15.553	2.313	-15.403	86	126	0.008	941.147	22.458	0.890	13.795	18.688
41	81	0.260	679.972	4.256	11.230	2.515	-10.577	87	127	0.029	940.540	22.724	-0.606	14.148	20.499
42	82	0.229	693.681	4.870	13.709	2.694	-11.538	88	128	0.009	941.227	23.073	0.687	14.583	19.552
43	83	0.213	704.291	5.443	10.610	3.047	-7.986	89	129	0.030	940.293	23.365	-0.934	14.897	21.467
44	84	0.164	717.453	6.002	13.162	3.444	-10.090	90	130	0.006	940.729	23.701	0.436	15.272	20.425
45	85	0.161	727.590	6.478	10.137	3.929	-6.639	91	131	0.153	939.225	23.832	-1.503	15.332	22.661
46	86	0.081	740.297	7.004	12.707	4.389	-8.741	92	132	0.191	939.920	24.046	0.695	16.204	20.868
47	87	0.076	750.125	7.466	9.829	5.025	-5.508	93	133	0.227	939.101	24.231	-0.819	17.494	22.694
48	88	0.008	762.318	8.005	12.193	5.388	-7.420	94	134	0.239	939.792	24.476	0.691	18.065	21.492
49	89	0.058	771.882	8.381	9.563	6.054	-4.380	95	135	0.250	938.960	24.719	-0.832	18.612	23.318
50	90	0.003	783.301	8.933	11.419	6.167	-5.747	96	136	0.256	939.383	24.972	0.423	18.911	22.358
51	91	0.041	790.624	9.296	7.323	4.856	-1.247	97	137	0.265	938.389	25.222	-0.994	19.318	24.063
52	92	0.007	799.410	9.791	8.786	3.100	-2.224	98	138	0.263	938.464	25.511	0.074	19.534	23.278
53	93	0.022	805.908	10.183	6.498	3.195	0.483	99	139	0.267	937.179	25.775	-1.285	19.800	24.918
54	94	0.017	814.207	10.617	8.299	3.591	-0.852	100	140	0.266	936.904	26.052	-0.275	20.018	24.196
55	95	0.032	820.016	11.046	5.809	3.801	2.068	101	141	0.268	935.357	26.319	-1.547	20.313	25.748
56	96	0.035	827.860	11.425	7.844	4.219	0.483	102	142	0.267	934.770	26.594	-0.587	20.556	25.067
57	97	0.192	833.076	11.699	5.215	4.509	3.548	103	143	0.269	933.018	26.854	-1.752	20.902	26.508
58	98	0.196	840.781	12.087	7.706	5.226	1.612	104	144	0.264	932.023	27.141	-0.995	21.041	26.023
59	99	0.248	846.076	12.304	5.295	6.204	4.443	105	145	0.253	929.780	27.419	-2.243	21.088	27.547
60	100	0.259	853.374	12.644	7.298	6.630	2.894	106	146	0.255	928.498	27.708	-1.282	21.347	26.865
61	101	0.275	858.409	12.993	5.035	7.182	5.566	107	147	0.245	925.951	28.009	-2.547	21.601	28.395
62	102	0.275	865.136	13.372	6.727	7.409	4.274	108	148	0.236	924.491	28.304	-1.460	21.944	27.578
63	103	0.281	869.679	13.754	4.542	7.724	6.859	109	149	0.224	921.724	28.638	-2.767	22.269	29.143
64	104	0.276	875.806	14.154	6.128	7.923	5.669	110	150	0.217	920.124	28.896	-1.601	22.674	28.237
65	105	0.277	879.818	14.549	4.012	8.189	8.184	111	151	0.205	917.209	29.192	-2.914	23.052	29.807
66	106	0.268	885.430	14.983	5.612	8.463	6.978	112	152	0.199	915.456	29.453	-1.753	23.417	28.903
67	107	0.265	888.924	15.388	3.494	8.733	9.491	113	153	0.186	912.372	29.743	-3.084	23.774	30.487
68	108	0.253	894.121	15.811	5.197	9.101	8.177	114	154	0.175	910.523	29.992	-1.849	24.184	29.508
69	109	0.247	897.224	16.223	3.103	9.488	10.654	115	155	0.160	907.366	30.265	-3.157	24.640	31.063
70	110	0.235	902.009	16.643	4.785	9.845	9.352	116	156	0.143	905.470	30.543	-1.896	25.080	30.047
71	111	0.231	904.670	17.011	2.661	10.170	11.839	117	157	0.129	902.255	30.791	-3.215	25.524	31.601

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 41, NB.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
28	69	0.030	461.216	-6.654	22.870	4.087	-26.813	74	115	0.176	930.678	15.157	4.409	10.731	12.753
29	70	0.128	480.581	-6.003	19.365	3.309	-22.641	75	116	0.158	933.178	15.505	2.501	11.294	15.065
30	71	0.153	501.267	-5.412	20.686	2.179	-23.473	76	117	0.128	937.397	15.819	4.218	11.839	13.741
31	72	0.186	518.726	-4.787	17.459	1.394	-19.755	77	118	0.106	939.823	16.132	2.426	12.504	15.947
32	73	0.193	538.862	-4.255	20.136	1.966	-21.990	78	119	0.046	944.127	16.467	4.304	13.289	14.462
33	74	0.202	555.078	-3.706	16.216	1.819	-17.554	79	120	0.	946.623	16.791	2.496	14.038	16.622
34	75	0.242	574.111	-3.136	19.033	1.763	-19.873	80	121	0.009	950.888	17.122	4.265	14.723	15.213
35	76	0.266	589.434	-2.593	15.323	1.813	-15.767	81	122	0.020	953.399	17.468	2.511	15.472	17.301
36	77	0.268	607.469	-2.093	18.035	1.823	-18.124	82	123	0.004	957.271	17.785	3.873	15.750	16.258
37	78	0.277	621.943	-1.592	14.474	1.878	-14.091	83	124	0.025	957.618	18.137	0.347	14.240	20.120
38	79	0.278	638.987	-1.107	17.044	1.859	-16.258	84	125	0.009	959.016	18.453	1.398	12.444	19.379
39	80	0.285	652.557	-0.632	13.570	1.880	-12.291	85	126	0.027	959.052	18.795	0.036	12.763	21.077
40	81	0.266	668.613	-0.130	16.056	1.870	-14.301	86	127	0.017	960.257	19.110	1.205	13.244	20.217
41	82	0.260	681.360	1.388	12.748	1.933	-10.461	87	128	0.040	959.996	19.456	-0.260	13.565	22.006
42	83	0.239	695.522	1.841	14.162	2.237	-11.389	88	129	0.020	960.977	19.751	0.981	13.994	21.056
43	84	0.220	706.580	2.289	11.058	2.569	-6.675	89	130	0.032	960.372	20.079	-0.606	14.261	22.976
44	85	0.175	720.168	2.715	13.588	3.062	-8.688	90	131	0.015	961.104	20.375	0.732	14.655	21.935
45	86	0.168	730.773	3.183	10.605	3.630	-5.132	91	132	0.157	960.006	20.780	-1.098	14.784	24.085
46	87	0.119	743.835	3.538	13.062	4.089	-7.128	92	133	0.191	961.013	21.092	1.007	15.690	22.130
47	88	0.079	754.117	3.991	10.282	4.709	-3.784	93	134	0.228	960.502	21.401	-0.511	16.814	23.862
48	89	0.021	766.720	4.401	12.603	5.133	-5.647	94	135	0.239	961.496	21.704	0.994	17.327	22.519
49	90	0.060	776.772	4.890	10.052	5.817	-2.626	95	136	0.250	960.959	21.999	-0.537	17.794	24.283
50	91	0.007	788.594	5.293	11.823	5.986	-3.986	96	137	0.254	961.670	22.287	0.711	18.058	23.260
51	92	0.044	796.404	5.779	7.809	4.608	0.497	97	138	0.264	960.959	22.570	-0.710	18.424	24.943
52	93	0.016	805.609	6.199	9.205	2.946	-0.490	98	139	0.261	961.314	22.851	0.355	18.608	24.097
53	94	0.038	812.572	6.664	6.964	2.949	2.207	99	140	0.265	960.317	23.138	-0.997	18.855	25.755
54	95	0.036	821.302	7.095	8.730	3.388	0.856	100	141	0.264	960.323	23.419	0.006	19.075	25.001
55	96	0.039	827.561	7.544	6.259	3.541	3.757	101	142	0.266	959.054	23.697	-1.269	19.355	26.560
56	97	0.063	835.841	7.981	8.281	3.956	2.153	102	143	0.265	958.743	23.974	-0.311	19.597	25.864
57	98	0.195	841.611	8.535	5.769	4.345	5.071	103	144	0.268	957.263	24.245	-1.480	19.930	27.315
58	99	0.202	849.736	8.955	8.126	5.006	2.976	104	145	0.262	956.545	24.522	-0.718	20.074	26.797
59	100	0.249	855.486	9.410	5.750	5.814	5.706	105	146	0.253	954.581	24.800	-1.964	20.121	28.358
60	101	0.257	863.192	9.818	7.706	6.203	3.941	106	147	0.254	953.564	25.066	-1.017	20.387	27.725
61	102	0.272	868.627	10.219	5.435	6.560	6.574	107	148	0.244	951.287	25.336	-2.276	20.631	29.255
62	103	0.271	875.755	10.619	7.128	6.730	5.172	108	149	0.237	950.085	25.593	-1.202	20.999	28.518
63	104	0.277	880.693	11.014	4.937	6.982	7.763	109	150	0.224	947.578	25.854	-2.506	21.341	30.100
64	105	0.273	887.219	11.413	6.527	7.160	6.529	110	151	0.217	946.234	26.110	-1.345	21.752	29.272
65	106	0.274	891.626	11.807	4.406	7.406	9.061	111	152	0.205	943.577	26.367	-2.657	22.195	30.861
66	107	0.265	897.632	12.202	6.006	7.685	7.835	112	153	0.199	942.076	26.620	-1.500	22.554	29.979
67	108	0.263	901.516	12.592	3.884	7.951	10.390	113	154	0.186	939.248	26.876	-2.829	22.936	31.584
68	109	0.253	907.095	12.974	5.580	8.354	9.086	114	155	0.175	937.646	27.124	-1.601	23.348	30.637
69	110	0.247	910.579	13.355	3.483	8.748	11.613	115	156	0.161	934.734	27.369	-2.912	23.811	32.223
70	111	0.237	915.726	13.717	5.148	9.122	10.348	116	157	0.146	933.073	27.603	-1.661	24.247	31.251
71	112	0.234	918.759	14.089	3.033	9.464	12.896	117	158	0.134	930.091	27.836	-2.983	24.695	32.850
72	113	0.214	923.564	14.445	4.805	9.903	11.533	118	159	0.107	928.471	28.039	-1.620	25.249	31.758
73	114	0.193	926.268	14.803	2.704	10.315	14.043	119	160	0.098	925.667	28.275	-2.804	25.909	33.235

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 42, MO.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
30	72	0.115	498.189	-3.078	21.177	2.025	-27.271	76	118	0.118	954.988	17.591	4.632	11.173	10.346
31	73	0.167	516.089	-2.637	17.900	1.210	-23.456	77	119	0.097	957.807	17.983	2.819	11.839	12.526
32	74	0.160	536.742	-2.120	20.652	1.767	-25.606	78	120	0.038	962.462	18.336	4.656	12.589	11.042
33	75	0.171	553.456	-1.622	16.714	1.648	-21.152	79	121	0.	965.318	18.695	2.856	13.332	13.178
34	76	0.188	572.885	-1.226	19.429	1.473	-23.325	80	122	0.004	969.917	19.029	4.599	13.962	11.781
35	77	0.220	588.563	-0.871	15.678	1.484	-19.046	81	123	0.017	972.747	19.348	2.830	14.620	13.888
36	78	0.222	607.070	-0.399	18.507	1.528	-21.361	82	124	0.001	976.956	19.685	4.209	14.894	12.840
37	79	0.250	621.947	0.003	14.877	1.624	-17.236	83	125	0.022	977.613	19.995	0.657	13.387	16.725
38	80	0.242	639.483	0.497	17.537	1.626	-19.444	84	126	0.004	979.347	20.331	1.734	11.565	15.976
39	81	0.249	653.529	0.972	14.046	1.699	-15.448	85	127	0.020	979.691	20.639	0.344	11.914	17.699
40	82	0.231	670.117	1.504	16.587	1.728	-17.524	86	128	0.007	981.220	20.963	1.529	12.363	16.837
41	83	0.233	683.351	1.990	13.234	1.867	-13.657	87	129	0.025	981.251	21.254	0.031	12.699	18.661
42	84	0.198	699.123	3.601	15.773	2.086	-15.723	88	130	0.008	982.565	21.588	1.314	13.123	17.695
43	85	0.194	710.698	4.118	11.575	2.431	-11.044	89	131	0.029	982.256	21.884	-0.309	13.421	19.638
44	86	0.149	724.859	4.690	14.161	2.882	-12.179	90	132	0.004	983.309	22.205	1.053	13.787	18.587
45	87	0.152	735.924	5.151	11.065	3.338	-8.680	91	133	0.144	982.360	22.354	-0.948	13.773	20.903
46	88	0.086	749.550	5.715	13.626	3.802	-10.784	92	134	0.171	983.582	22.569	1.221	14.558	19.026
47	89	0.079	760.290	6.174	10.740	4.405	-7.472	93	135	0.210	983.232	22.731	-0.349	15.712	20.926
48	90	0.007	773.364	6.644	13.073	4.772	-9.358	94	136	0.221	984.460	22.964	1.227	16.245	19.653
49	91	0.058	783.826	7.054	10.463	5.406	-6.309	95	137	0.238	984.147	23.188	-0.313	16.751	21.475
50	92	0.002	796.118	7.524	12.292	5.505	-7.696	96	138	0.242	985.120	23.450	0.973	17.033	20.442
51	93	0.041	804.336	7.933	8.218	4.159	-3.182	97	139	0.253	984.629	23.670	-0.491	17.374	22.184
52	94	0.006	813.997	8.388	9.661	2.401	-4.186	98	140	0.251	985.290	23.976	0.661	17.612	21.296
53	95	0.021	821.376	8.804	7.379	2.457	-1.463	99	141	0.256	984.542	24.224	-0.748	17.857	22.997
54	96	0.016	830.535	9.233	9.159	2.830	-2.807	100	142	0.255	984.831	24.508	0.289	18.073	22.225
55	97	0.032	837.212	9.651	6.677	3.008	0.106	101	143	0.258	983.825	24.771	-1.006	18.351	23.808
56	98	0.036	845.899	10.058	8.687	3.397	-1.476	102	144	0.256	983.796	25.053	-0.029	18.597	23.100
57	99	0.102	851.930	10.319	6.031	3.618	1.602	103	145	0.260	982.560	25.296	-1.236	18.908	24.591
58	100	0.170	860.410	10.674	8.480	4.255	-0.411	104	146	0.253	982.156	25.612	-0.403	19.092	24.015
59	101	0.224	866.351	10.865	5.941	4.980	2.578	105	147	0.244	980.506	25.926	-1.650	19.193	25.562
60	102	0.230	874.419	11.227	8.068	5.343	0.861	106	148	0.240	979.760	26.196	-0.746	19.442	24.954
61	103	0.255	880.145	11.517	5.726	5.774	3.601	107	149	0.231	977.820	26.533	-1.940	19.745	26.435
62	104	0.253	887.673	11.918	7.528	6.004	2.140	108	150	0.223	976.896	26.811	-0.925	20.103	25.704
63	105	0.265	892.966	12.273	5.293	6.262	4.779	109	151	0.211	974.723	27.145	-2.172	20.477	27.230
64	106	0.257	899.904	12.685	6.938	6.473	3.480	110	152	0.206	973.655	27.421	-1.068	20.869	26.405
65	107	0.261	904.685	13.059	4.781	6.711	6.066	111	153	0.198	971.273	27.697	-2.382	21.254	27.983
66	108	0.249	911.124	13.492	6.439	7.022	4.782	112	154	0.189	970.049	27.972	-1.224	21.630	27.089
67	109	0.248	915.398	13.883	4.275	7.285	7.366	113	155	0.179	967.501	28.253	-2.548	21.997	28.668
68	110	0.237	921.409	14.314	6.011	7.684	6.016	114	156	0.167	966.175	28.529	-1.326	22.424	27.697
69	111	0.232	925.292	14.713	3.882	8.073	8.552	115	157	0.155	963.542	28.807	-2.633	22.815	29.245
70	112	0.220	930.873	15.147	5.581	8.457	7.238	116	158	0.139	962.158	29.085	-1.383	23.341	28.220
71	113	0.211	934.315	15.556	3.442	8.797	9.766	117	159	0.124	959.447	29.356	-2.711	23.786	29.796
72	114	0.200	939.529	15.964	5.213	9.225	8.377	118	160	0.101	958.120	29.649	-1.327	24.355	28.671
73	115	0.184	942.649	16.380	3.120	9.683	10.838	119	161	0.096	955.559	29.892	-2.560	25.010	30.153
74	116	0.165	947.461	16.783	4.812	10.046	9.507	120	162	0.065	954.157	30.129	-1.402	25.431	29.237
75	117	0.149	950.355	17.177	2.895	10.595	11.762	121	163	0.061	951.713	30.339	-2.444	26.026	30.515

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 43, TC.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
31	74	0.179	510.353	-5.736	18.502	1.477	-21.829	77	120	0.097	972.722	14.915	3.172	11.249	13.812
32	75	0.179	531.522	-5.220	21.169	1.959	-24.009	78	121	0.038	977.714	15.252	4.992	12.023	12.370
33	76	0.184	548.778	-4.678	17.256	1.756	-19.678	79	122	0.	980.916	15.597	3.201	12.798	14.561
34	77	0.195	568.734	-4.151	19.956	1.577	-21.906	80	123	0.002	985.852	15.935	4.937	13.431	13.171
35	78	0.213	584.926	-3.637	16.192	1.553	-17.695	81	124	0.017	989.013	16.266	3.161	14.095	15.273
36	79	0.214	603.928	-3.142	19.002	1.522	-20.160	82	125	0.000	993.555	16.599	4.542	14.372	14.218
37	80	0.234	619.257	-2.690	15.329	1.528	-15.948	83	126	0.022	994.541	16.928	0.985	12.847	18.098
38	81	0.225	637.299	-2.184	18.042	1.535	-18.310	84	127	0.003	996.607	17.260	2.067	11.041	17.340
39	82	0.236	651.810	-1.719	14.511	1.572	-14.241	85	128	0.018	997.275	17.584	0.668	11.361	19.064
40	83	0.220	668.911	-1.206	17.101	1.629	-16.455	86	129	0.003	999.129	17.909	1.854	11.818	18.196
41	84	0.222	682.617	-0.733	13.706	1.765	-12.485	87	130	0.019	999.477	18.226	0.348	12.130	20.019
42	85	0.199	698.871	-0.252	16.254	1.964	-14.600	88	131	0.002	1001.111	18.546	1.634	12.560	19.047
43	86	0.196	711.898	1.200	13.026	2.242	-10.777	89	132	0.029	1001.113	18.857	0.002	12.822	20.990
44	87	0.169	726.462	1.603	14.564	2.645	-11.848	90	133	0.	1002.481	19.172	1.368	13.209	19.927
45	88	0.166	737.983	2.059	11.521	3.108	-7.238	91	134	0.077	1001.825	19.465	-0.655	13.159	22.260
46	89	0.091	752.035	2.486	14.052	3.572	-9.337	92	135	0.177	1003.376	19.794	1.550	13.977	20.312
47	90	0.085	763.224	2.933	11.188	4.155	-5.912	93	136	0.205	1003.331	20.098	-0.045	15.030	22.078
48	91	0.000	776.734	3.371	13.511	4.604	-7.789	94	137	0.216	1004.839	20.379	1.508	15.531	20.577
49	92	0.059	787.640	3.814	10.906	5.229	-4.711	95	138	0.232	1004.779	20.632	-0.060	15.982	22.367
50	93	0.000	800.371	4.253	12.731	5.357	-6.132	96	139	0.236	1006.031	20.911	1.252	16.240	21.256
51	94	0.042	809.029	4.693	8.657	3.962	-1.609	97	140	0.246	1005.803	21.175	-0.227	16.549	23.003
52	95	0.001	819.131	5.134	10.102	2.242	-2.635	98	141	0.244	1006.756	21.466	0.952	16.791	22.036
53	96	0.015	826.946	5.569	7.815	2.247	0.089	99	142	0.250	1006.274	21.732	-0.482	17.020	23.765
54	97	0.006	836.535	6.000	9.589	2.631	-1.260	100	143	0.248	1006.850	22.019	0.577	17.241	22.966
55	98	0.032	843.641	6.429	7.106	2.774	1.641	101	144	0.251	1006.113	22.288	-0.737	17.501	24.566
56	99	0.034	852.749	6.850	9.109	3.152	0.052	102	145	0.249	1006.368	22.572	0.255	17.750	23.834
57	100	0.102	859.216	7.286	6.467	3.360	3.108	103	146	0.254	1005.389	22.829	-0.979	18.040	25.351
58	101	0.181	868.146	7.736	8.929	4.009	0.978	104	147	0.247	1005.286	23.129	-0.103	18.247	24.724
59	102	0.217	874.497	8.147	6.352	4.592	3.806	105	148	0.240	1003.932	23.426	-1.354	18.374	26.279
60	103	0.220	882.963	8.544	8.466	4.932	1.847	106	149	0.234	1003.473	23.713	-0.458	18.633	25.678
61	104	0.243	889.031	8.886	6.068	5.250	4.638	107	150	0.227	1001.817	23.997	-1.656	18.942	27.178
62	105	0.241	896.963	9.290	7.932	5.476	3.021	108	151	0.219	1001.170	24.275	-0.647	19.312	26.469
63	106	0.253	902.602	9.636	5.639	5.680	5.718	109	152	0.209	999.278	24.555	-1.892	19.696	28.023
64	107	0.245	909.969	10.064	7.367	5.918	4.309	110	153	0.204	998.473	24.818	-0.805	20.094	27.232
65	108	0.250	915.123	10.438	5.154	6.135	6.944	111	154	0.197	996.355	25.082	-2.118	20.482	28.833
66	109	0.240	921.982	10.859	6.860	6.468	5.592	112	155	0.189	995.386	25.337	-0.969	20.857	27.979
67	110	0.240	926.643	11.245	4.661	6.723	8.220	113	156	0.180	993.089	25.588	-2.297	21.217	29.606
68	111	0.229	933.061	11.652	6.418	7.134	6.835	114	157	0.170	992.004	25.829	-1.085	21.633	28.682
69	112	0.227	937.328	12.037	4.267	7.518	9.417	115	158	0.157	989.595	26.054	-2.409	22.053	30.311
70	113	0.216	943.299	12.426	5.971	7.909	8.092	116	159	0.137	988.460	26.302	-1.135	22.519	29.348
71	114	0.208	947.123	12.807	3.824	8.249	10.658	117	160	0.122	986.008	26.561	-2.452	22.978	30.945
72	115	0.199	952.704	13.176	5.581	8.683	9.305	118	161	0.100	984.930	26.810	-1.078	23.561	29.841
73	116	0.186	956.185	13.536	3.481	9.131	11.813	119	162	0.096	982.611	27.052	-2.318	24.226	31.352
74	117	0.170	961.335	13.874	5.150	9.476	10.573	120	163	0.065	981.447	27.290	-1.165	24.681	30.440
75	118	0.152	964.552	14.196	3.217	9.988	12.945	121	164	0.061	979.238	27.525	-2.208	25.276	31.743
76	119	0.116	969.550	14.562	4.998	10.577	11.597	122	165	0.038	977.751	27.760	-1.487	25.428	31.274

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 44, RU.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
33	77	0.143	546.046	-2.732	17.728	1.662	-22.972	79	123	0.	998.241	17.325	3.547	12.139	11.324
34	78	0.147	566.448	-2.286	20.402	1.412	-25.125	80	124	0.002	1003.504	17.651	5.263	12.746	9.927
35	79	0.186	582.986	-1.941	16.537	1.235	-20.760	81	125	0.016	1006.991	17.978	3.488	13.378	12.026
36	80	0.163	602.526	-1.402	19.541	1.346	-23.282	82	126	0.000	1011.856	18.300	4.865	13.644	10.995
37	81	0.184	618.206	-1.050	15.680	1.349	-18.914	83	127	0.021	1013.165	18.625	1.309	12.123	14.861
38	82	0.177	636.786	-0.513	18.580	1.421	-21.333	84	128	0.003	1015.556	18.949	2.391	10.305	14.133
39	83	0.201	651.673	-0.136	14.887	1.432	-17.158	85	129	0.016	1016.543	19.268	0.987	10.635	15.845
40	84	0.177	669.350	0.439	17.677	1.572	-19.494	86	130	0.003	1018.714	19.585	2.171	11.072	15.002
41	85	0.189	683.488	0.871	14.138	1.664	-15.459	87	131	0.012	1019.376	19.899	0.662	11.390	16.820
42	86	0.157	700.338	1.467	16.850	1.927	-17.717	88	132	0.003	1021.320	20.209	1.944	11.805	15.872
43	87	0.150	713.831	1.934	13.493	2.186	-13.873	89	133	0.027	1021.626	20.513	0.305	12.080	17.812
44	88	0.121	729.962	3.501	16.131	2.544	-16.049	90	134	0.000	1023.303	20.822	1.678	12.443	16.774
45	89	0.096	741.916	3.933	11.953	2.923	-11.429	91	135	0.070	1022.905	21.080	-0.398	12.354	19.136
46	90	0.031	756.529	4.494	14.613	3.375	-12.706	92	136	0.	1024.626	21.250	1.721	13.022	17.382
47	91	0.060	768.162	4.939	11.633	3.943	-9.323	93	137	0.183	1024.634	21.303	0.008	13.978	19.349
48	92	0.001	782.146	5.412	13.984	4.301	-11.232	94	138	0.197	1026.364	21.525	1.730	14.487	17.949
49	93	0.054	793.457	5.817	11.311	4.872	-8.192	95	139	0.220	1026.504	21.725	0.140	14.976	19.802
50	94	0.001	806.637	6.266	13.181	4.979	-9.576	96	140	0.223	1028.024	21.993	1.520	15.269	18.631
51	95	0.038	815.714	6.685	9.077	3.593	-5.103	97	141	0.237	1028.010	22.207	-0.014	15.568	20.456
52	96	0.002	826.252	7.121	10.538	1.839	-6.087	98	142	0.235	1029.256	22.500	1.246	15.841	19.432
53	97	0.011	834.493	7.547	8.241	1.862	-3.397	99	143	0.243	1029.034	22.760	-0.222	16.110	21.185
54	98	0.005	844.499	7.964	10.006	2.207	-4.716	100	144	0.240	1029.897	23.047	0.863	16.312	20.339
55	99	0.027	852.019	8.378	7.520	2.347	-1.813	101	145	0.244	1029.420	23.307	-0.477	16.583	21.976
56	100	0.009	861.541	8.792	9.523	2.711	-3.376	102	146	0.242	1029.958	23.590	0.538	16.831	21.217
57	101	0.096	868.341	9.125	6.800	2.835	-0.242	103	147	0.247	1029.227	23.839	-0.730	17.107	22.777
58	102	0.129	877.520	9.375	9.179	3.326	-2.142	104	148	0.239	1029.428	24.143	0.201	17.337	22.095
59	103	0.185	884.027	9.530	6.507	3.802	0.952	105	149	0.233	1028.369	24.438	-1.059	17.515	23.668
60	104	0.189	892.887	9.924	8.860	4.182	-1.021	106	150	0.224	1028.213	24.740	-0.156	17.762	23.067
61	105	0.222	899.202	10.171	6.315	4.556	1.905	107	151	0.218	1026.857	25.039	-1.357	18.055	24.574
62	106	0.219	907.538	10.575	8.336	4.824	0.189	108	152	0.208	1026.518	25.348	-0.338	18.463	23.849
63	107	0.240	913.495	10.893	5.957	5.055	2.972	109	153	0.201	1024.923	25.645	-1.595	18.808	25.401
64	108	0.227	921.284	11.315	7.789	5.316	1.447	110	154	0.194	1024.406	25.933	-0.517	19.216	24.608
65	109	0.238	926.792	11.669	5.508	5.530	4.165	111	155	0.187	1022.583	26.227	-1.824	19.564	26.195
66	110	0.224	934.081	12.098	7.289	5.881	2.722	112	156	0.178	1021.912	26.526	-0.670	19.962	25.315
67	111	0.226	939.114	12.470	5.033	6.134	5.415	113	157	0.170	1019.903	26.814	-2.009	20.335	26.927
68	112	0.214	945.963	12.902	6.849	6.544	3.973	114	158	0.157	1019.124	27.120	-0.780	20.780	25.966
69	113	0.213	950.609	13.280	4.646	6.916	6.587	115	159	0.147	1017.025	27.430	-2.099	21.229	27.550
70	114	0.201	956.998	13.699	6.389	7.294	5.219	116	160	0.131	1016.170	27.710	-0.855	21.700	26.566
71	115	0.195	961.227	14.104	4.229	7.640	7.787	117	161	0.115	1013.988	27.980	-2.182	22.152	28.146
72	116	0.183	967.216	14.512	5.989	8.048	6.408	118	162	0.095	1013.181	28.251	-0.808	22.727	27.020
73	117	0.172	971.125	14.940	3.910	8.515	8.873	119	163	0.093	1011.105	28.493	-2.076	23.363	28.524
74	118	0.152	976.714	15.379	5.588	8.890	7.572	120	164	0.061	1010.199	28.753	-0.905	23.785	27.594
75	119	0.140	980.364	15.813	3.651	9.421	9.883	121	165	0.057	1008.243	29.004	-1.957	24.388	28.880
76	120	0.107	985.752	16.202	5.388	9.996	8.506	122	166	0.030	1006.984	29.233	-1.258	24.532	28.402
77	121	0.090	989.302	16.580	3.550	10.652	10.686	123	167	0.032	1004.922	29.484	-2.063	24.914	29.445
78	122	0.020	994.694	16.980	5.392	11.411	9.183	124	168	0.007	1003.528	29.718	-1.394	25.242	28.988

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 45$, RH.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
35	80	0.170	578.462	-4.524	17.019	1.389	-19.579	81	126	0.019	1022.069	15.077	3.834	12.858	13.317
36	81	0.155	598.510	-4.017	20.048	1.480	-22.120	82	127	0.003	1027.243	15.387	5.175	13.096	12.286
37	82	0.167	614.671	-3.536	16.161	1.449	-17.810	83	128	0.024	1028.906	15.741	1.663	11.598	16.138
38	83	0.165	633.733	-3.053	19.062	1.510	-20.333	84	129	0.008	1031.605	16.050	2.699	9.755	15.399
39	84	0.176	649.073	-2.600	15.340	1.522	-16.084	85	130	0.023	1032.934	16.391	1.328	10.098	17.114
40	85	0.165	667.247	-2.104	18.173	1.653	-18.521	86	131	0.014	1035.413	16.700	2.480	10.511	16.264
41	86	0.168	681.838	-1.650	14.592	1.733	-14.414	87	132	0.032	1036.410	17.034	0.996	10.840	18.076
42	87	0.150	699.176	-1.163	17.337	1.970	-16.723	88	133	0.015	1038.655	17.335	2.245	11.231	17.126
43	88	0.146	713.131	-0.700	13.955	2.219	-12.793	89	134	0.030	1039.295	17.669	0.639	11.523	19.055
44	89	0.125	729.705	-0.258	16.574	2.538	-14.969	90	135	0.012	1041.259	17.956	1.964	11.853	18.009
45	90	0.123	743.040	1.125	13.336	2.848	-11.159	91	136	0.074	1041.226	18.320	-0.033	11.818	20.342
46	91	0.082	758.056	1.528	15.016	3.300	-12.292	92	137	0.023	1043.200	18.574	1.974	12.424	18.500
47	92	0.077	770.132	1.969	12.075	3.854	-7.929	93	138	0.175	1043.530	18.897	0.331	13.410	20.574
48	93	0.018	784.482	2.336	14.350	4.152	-9.805	94	139	0.188	1045.523	19.160	1.993	13.853	18.630
49	94	0.059	796.279	2.822	11.797	4.760	-6.739	95	140	0.210	1045.872	19.368	0.349	14.247	20.493
50	95	0.007	809.829	3.191	13.550	4.800	-8.165	96	141	0.213	1047.683	19.659	1.811	14.549	19.205
51	96	0.043	819.382	3.668	9.553	3.447	-3.652	97	142	0.224	1047.906	19.896	0.222	14.832	21.054
52	97	0.014	830.313	4.061	10.931	1.647	-4.670	98	143	0.225	1049.436	20.180	1.530	15.110	19.984
53	98	0.032	839.000	4.508	8.687	1.677	-1.952	99	144	0.234	1049.454	20.420	0.018	15.355	21.767
54	99	0.029	849.423	4.924	10.422	1.997	-3.285	100	145	0.231	1050.614	20.717	1.160	15.563	20.873
55	100	0.036	857.383	5.364	7.960	2.142	-0.408	101	146	0.236	1050.393	20.973	-0.221	15.824	22.543
56	101	0.049	867.317	5.776	9.934	2.487	-1.994	102	147	0.232	1051.222	21.264	0.829	16.077	21.750
57	102	0.099	874.596	6.255	7.279	2.661	1.076	103	148	0.239	1050.741	21.514	-0.481	16.333	23.346
58	103	0.130	884.197	6.676	9.600	3.152	-1.056	104	149	0.229	1051.255	21.827	0.514	16.592	22.590
59	104	0.165	891.084	7.056	6.887	3.572	2.130	105	150	0.226	1050.498	22.129	-0.757	16.814	24.176
60	105	0.173	900.324	7.437	9.241	3.884	-0.136	106	151	0.216	1050.648	22.435	0.150	17.067	23.549
61	106	0.203	906.944	7.743	6.620	4.152	2.820	107	152	0.211	1049.584	22.728	-1.064	17.358	25.070
62	107	0.200	915.684	8.146	8.740	4.426	0.893	108	153	0.202	1049.542	23.024	-0.042	17.774	24.338
63	108	0.220	921.949	8.454	6.264	4.623	3.756	109	154	0.196	1048.232	23.309	-1.310	18.120	25.910
64	109	0.211	930.174	8.890	8.226	4.916	2.063	110	155	0.188	1047.995	23.589	-0.237	18.529	25.124
65	110	0.222	936.021	9.229	5.846	5.124	4.867	111	156	0.183	1046.445	23.862	-1.550	18.872	26.736
66	111	0.210	943.746	9.666	7.726	5.483	3.298	112	157	0.174	1046.048	24.136	-0.397	19.279	25.865
67	112	0.214	949.153	10.040	5.407	5.736	6.054	113	158	0.166	1044.307	24.404	-1.740	19.657	27.511
68	113	0.203	956.414	10.451	7.261	6.137	4.546	114	159	0.155	1043.792	24.669	-0.515	20.111	26.573
69	114	0.204	961.435	10.826	5.021	6.497	7.203	115	160	0.145	1041.954	24.928	-1.839	20.570	28.212
70	115	0.192	968.231	11.233	6.797	6.875	5.786	116	161	0.130	1041.352	25.182	-0.602	21.053	27.261
71	116	0.189	972.841	11.614	4.610	7.218	8.395	117	162	0.115	1039.418	25.430	-1.934	21.528	28.923
72	117	0.176	979.216	12.000	6.375	7.622	7.008	118	163	0.096	1038.846	25.665	-0.572	22.091	27.878
73	118	0.168	983.503	12.378	4.287	8.085	9.521	119	164	0.093	1037.010	25.906	-1.835	22.707	29.441
74	119	0.149	989.465	12.751	5.962	8.466	8.239	120	165	0.063	1036.340	26.141	-0.670	23.115	28.572
75	120	0.139	993.476	13.112	4.011	8.996	10.654	121	166	0.059	1034.604	26.361	-1.736	23.698	29.920
76	121	0.110	999.206	13.454	5.730	9.576	9.336	122	167	0.038	1033.584	26.600	-1.020	23.843	29.458
77	122	0.093	1003.095	13.792	3.889	10.248	11.670	123	168	0.035	1031.734	26.812	-1.850	24.200	30.556
78	123	0.040	1008.782	14.088	5.687	10.937	10.277	124	169	0.010	1030.549	27.021	-1.185	24.503	30.135
79	124	0.	1012.648	14.407	3.866	11.631	12.593	125	170	0.006	1028.717	27.246	-1.831	24.984	31.045
80	125	0.008	1018.235	14.731	5.587	12.225	11.231	126	171	0.002	1027.148	27.470	-1.570	25.042	31.014

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 46, PD.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
36	82	0.086	596.078	-2.431	20.471	1.335	-24.953	82	128	0.000	1044.262	17.019	5.515	12.463	9.243
37	83	0.047	612.617	-2.053	16.539	1.337	-20.543	83	129	0.019	1046.222	17.316	1.960	10.936	13.056
38	84	0.092	632.207	-1.526	19.590	1.385	-23.109	84	130	0.002	1049.265	17.660	3.043	9.114	12.386
39	85	0.107	647.943	-1.131	15.736	1.441	-18.787	85	131	0.012	1050.895	17.962	1.630	9.435	14.070
40	86	0.087	666.642	-0.605	18.699	1.561	-21.302	86	132	0.002	1053.704	18.290	2.808	9.853	13.268
41	87	0.094	681.670	-0.168	15.029	1.702	-17.137	87	133	0.007	1054.999	18.589	1.296	10.162	15.073
42	88	0.072	699.555	0.379	17.885	1.910	-19.533	88	134	0.002	1057.567	18.912	2.568	10.558	14.162
43	89	0.044	713.953	0.822	14.398	2.170	-15.590	89	135	0.024	1058.485	19.190	0.918	10.814	16.087
44	90	0.038	731.099	1.395	17.146	2.466	-17.899	90	136	0.000	1060.785	19.526	2.300	11.170	15.061
45	91	0.	744.982	1.942	13.883	2.856	-14.190	91	137	0.053	1060.917	19.691	0.132	10.996	17.485
46	92	0.001	761.420	3.364	16.438	3.163	-16.338	92	138	0.000	1063.322	20.122	2.405	11.723	15.635
47	93	0.028	773.894	3.763	12.474	3.684	-11.968	93	139	0.147	1063.371	19.840	0.049	12.171	18.200
48	94	0.001	788.757	4.275	14.863	3.933	-12.991	94	140	0.166	1065.583	20.059	2.212	12.662	16.340
49	95	0.046	800.882	4.603	12.124	4.424	-9.919	95	141	0.193	1066.106	20.234	0.524	13.178	18.230
50	96	0.001	814.948	5.119	14.066	4.506	-11.333	96	142	0.199	1068.177	20.494	2.070	13.518	16.867
51	97	0.031	824.861	5.479	9.913	3.109	-6.911	97	143	0.213	1068.638	20.732	0.461	13.839	18.730
52	98	0.001	836.266	5.952	11.405	1.333	-7.856	98	144	0.217	1070.438	21.002	1.800	14.119	17.621
53	99	0.006	845.355	6.355	9.090	1.346	-5.205	99	145	0.227	1070.704	21.250	0.266	14.399	19.404
54	100	0.003	856.192	6.770	10.837	1.645	-6.491	100	146	0.224	1072.153	21.539	1.449	14.602	18.445
55	101	0.020	864.541	7.158	8.349	1.753	-3.597	101	147	0.230	1072.190	21.797	0.037	14.861	20.151
56	102	0.004	874.890	7.573	10.349	2.096	-5.154	102	148	0.226	1073.305	22.083	1.115	15.113	19.323
57	103	0.077	882.358	7.762	7.468	2.044	-1.877	103	149	0.233	1073.062	22.321	-0.243	15.348	20.984
58	104	0.002	892.431	8.234	10.073	2.594	-3.991	104	150	0.222	1073.892	22.637	0.829	15.639	20.148
59	105	0.103	899.406	8.322	6.975	2.770	-0.546	105	151	0.220	1073.415	22.917	-0.477	15.893	21.782
60	106	0.117	908.982	8.658	9.576	3.167	-2.702	106	152	0.208	1073.872	23.224	0.457	16.149	21.126
61	107	0.166	915.795	8.850	6.812	3.472	0.438	107	153	0.203	1073.098	23.514	-0.774	16.434	22.704
62	108	0.167	924.923	9.238	9.128	3.741	-1.614	108	154	0.193	1073.359	23.817	0.262	16.851	21.955
63	109	0.196	931.454	9.506	6.532	3.958	1.358	109	155	0.189	1072.336	24.104	-1.024	17.184	23.548
64	110	0.188	940.105	9.931	8.650	4.272	-0.481	110	156	0.179	1072.398	24.404	0.063	17.585	22.745
65	111	0.203	946.261	10.241	6.156	4.471	2.417	111	157	0.175	1071.130	24.686	-1.268	17.912	24.379
66	112	0.192	954.424	10.678	8.163	4.846	0.729	112	158	0.164	1071.036	24.988	-0.094	18.335	23.481
67	113	0.198	960.177	11.024	5.753	5.091	3.551	113	159	0.156	1069.583	25.276	-1.453	18.706	25.129
68	114	0.187	967.856	11.442	7.678	5.480	1.964	114	160	0.143	1069.383	25.590	-0.200	19.176	24.162
69	115	0.192	973.235	11.800	5.379	5.827	4.687	115	161	0.134	1067.830	25.876	-1.553	19.632	25.793
70	116	0.176	980.454	12.222	7.219	6.196	3.180	116	162	0.118	1067.559	26.207	-0.271	20.140	24.798
71	117	0.174	985.442	12.601	4.988	6.538	5.849	117	163	0.099	1065.941	26.523	-1.618	20.621	26.416
72	118	0.159	992.242	13.026	6.800	6.949	4.405	118	164	0.082	1065.669	26.824	-0.272	21.204	25.365
73	119	0.153	996.921	13.418	4.679	7.399	6.938	119	165	0.049	1064.129	27.119	-1.540	21.846	26.902
74	120	0.129	1003.347	13.882	6.426	7.836	5.560	120	166	0.050	1063.742	27.402	-0.388	22.266	25.987
75	121	0.120	1007.759	14.283	4.412	8.339	7.993	121	167	0.050	1062.259	27.655	-1.482	22.860	27.321
76	122	0.083	1013.982	14.776	6.223	8.974	6.542	122	168	0.020	1061.507	27.923	-0.752	23.013	26.828
77	123	0.067	1018.277	15.182	4.294	9.617	8.888	123	169	0.028	1059.902	28.168	-1.605	23.364	27.891
78	124	0.010	1024.459	15.677	6.182	10.412	7.349	124	170	0.006	1058.980	28.432	-0.921	23.701	27.424
79	125	0.	1028.683	16.035	4.224	11.086	9.576	125	171	0.004	1057.379	28.662	-1.601	24.163	28.256
80	126	0.002	1034.603	16.368	5.920	11.614	8.156	126	172	0.000	1056.037	28.889	-1.343	24.214	28.207
81	127	0.014	1038.747	16.678	4.144	12.211	10.247	127	173	0.012	1052.761	29.100	-3.276	22.995	30.348

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 47, AG.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
38	85	0.076	628.373	-3.833	20.058	1.569	-21.987	84	131	0.020	1064.183	14.917	3.314	8.644	13.485
39	86	0.093	644.557	-3.385	16.184	1.592	-17.681	85	132	0.032	1066.189	15.294	2.006	8.988	15.176
40	87	0.074	663.751	-2.891	19.193	1.723	-20.215	86	133	0.029	1069.290	15.587	3.101	9.390	14.344
41	88	0.078	679.239	-2.431	15.489	1.871	-16.067	87	134	0.038	1070.947	15.948	1.657	9.718	16.130
42	89	0.071	697.581	-1.974	18.342	2.040	-18.531	88	135	0.031	1073.790	16.223	2.843	10.081	15.214
43	90	0.063	712.417	-1.536	14.836	2.284	-14.511	89	136	0.034	1075.064	16.579	1.274	10.359	17.129
44	91	0.064	730.010	-1.089	17.593	2.539	-16.794	90	137	0.029	1077.619	16.834	2.556	10.669	16.095
45	92	0.057	744.300	-0.683	14.289	2.873	-13.057	91	138	0.060	1078.174	17.257	0.555	10.585	18.466
46	93	0.050	761.144	-0.276	16.845	3.145	-15.134	92	139	0.036	1080.789	17.467	2.614	11.235	16.539
47	94	0.053	774.984	1.089	13.839	3.648	-11.689	93	140	0.073	1081.140	17.769	0.351	11.619	19.247
48	95	0.034	790.180	1.423	15.197	3.829	-12.669	94	141	0.142	1083.554	17.971	2.414	12.059	17.344
49	96	0.053	802.832	1.951	12.652	4.406	-8.730	95	142	0.176	1084.261	18.155	0.707	12.435	19.320
50	97	0.021	817.168	2.220	14.336	4.391	-10.167	96	143	0.184	1086.586	18.409	2.325	12.767	17.331
51	98	0.043	827.627	2.766	10.459	3.053	-5.672	97	144	0.199	1087.276	18.639	0.691	13.109	19.180
52	99	0.031	839.367	3.102	11.741	1.244	-6.686	98	145	0.202	1089.326	18.888	2.050	13.348	17.967
53	100	0.040	848.919	3.564	9.551	1.242	-3.978	99	146	0.215	1089.816	19.112	0.489	13.615	19.805
54	101	0.039	860.161	3.969	11.242	1.553	-5.297	100	147	0.211	1091.558	19.405	1.743	13.827	18.764
55	102	0.039	868.954	4.413	8.793	1.659	-2.437	101	148	0.218	1091.845	19.655	0.287	14.097	20.524
56	103	0.044	879.698	4.808	10.744	1.980	-4.020	102	149	0.213	1093.264	19.959	1.419	14.356	19.630
57	104	0.074	887.657	5.299	7.959	1.979	-0.815	103	150	0.219	1093.257	20.195	-0.007	14.570	21.350
58	105	0.053	898.078	5.647	10.421	2.465	-3.086	104	151	0.209	1094.415	20.523	1.158	14.898	20.438
59	106	0.078	905.497	6.091	7.420	2.606	0.488	105	152	0.210	1094.215	20.800	-0.200	15.179	22.111
60	107	0.079	915.450	6.468	9.952	2.958	-1.787	106	153	0.197	1095.020	21.148	0.804	15.470	21.368
61	108	0.136	922.526	6.731	7.076	3.148	1.512	107	154	0.195	1094.532	21.434	-0.487	15.739	22.986
62	109	0.138	932.030	7.108	9.504	3.411	-0.748	108	155	0.185	1095.102	21.742	0.570	16.159	22.203
63	110	0.168	938.842	7.387	6.811	3.602	2.282	109	156	0.181	1094.361	22.025	-0.741	16.482	23.847
64	111	0.164	947.895	7.790	9.054	3.916	0.115	110	157	0.172	1094.727	22.328	0.366	16.890	23.019
65	112	0.179	954.371	8.110	6.476	4.127	3.089	111	158	0.168	1093.734	22.604	-0.993	17.207	24.691
66	113	0.171	962.946	8.521	8.574	4.476	1.186	112	159	0.157	1093.930	22.894	0.196	17.641	23.779
67	114	0.180	969.037	8.860	6.092	4.722	4.096	113	160	0.150	1092.763	23.179	-1.168	18.023	25.492
68	115	0.170	977.140	9.284	8.103	5.099	2.374	114	161	0.137	1092.841	23.458	0.078	18.498	24.530
69	116	0.176	982.851	9.616	5.711	5.403	5.194	115	162	0.128	1091.574	23.744	-1.267	18.972	26.228
70	117	0.163	990.508	10.054	7.657	5.799	3.564	116	163	0.112	1091.574	24.015	0.000	19.487	25.263
71	118	0.163	995.865	10.423	5.356	6.135	6.316	117	164	0.093	1090.251	24.311	-1.323	20.003	26.936
72	119	0.146	1003.077	10.835	7.212	6.550	4.802	118	165	0.078	1090.249	24.580	-0.003	20.602	25.944
73	120	0.144	1008.125	11.204	5.048	6.989	7.456	119	166	0.054	1088.947	24.817	-1.302	21.233	27.552
74	121	0.118	1014.970	11.623	6.845	7.459	5.995	120	167	0.055	1088.798	25.056	-0.149	21.657	26.749
75	122	0.111	1019.742	11.982	4.771	7.944	8.604	121	168	0.054	1087.552	25.293	-1.246	22.247	28.075
76	123	0.077	1026.383	12.400	6.641	8.623	7.119	122	169	0.039	1087.010	25.503	-0.542	22.375	27.617
77	124	0.068	1031.026	12.749	4.643	9.255	9.660	123	170	0.036	1085.622	25.720	-1.388	22.723	28.782
78	125	0.041	1037.477	13.018	6.451	9.976	8.204	124	171	0.017	1084.853	25.873	-0.769	22.974	28.395
79	126	0.029	1041.977	13.294	4.500	10.587	10.662	125	172	0.012	1083.462	26.082	-1.392	23.433	29.347
80	127	0.021	1048.212	13.609	6.235	11.135	9.322	126	173	0.008	1082.327	26.290	-1.135	23.483	29.338
81	128	0.025	1052.722	13.975	4.511	11.779	11.385	127	174	0.018	1079.336	26.575	-2.991	22.323	31.439
82	129	0.012	1058.495	14.233	5.773	11.965	10.406	128	175	0.014	1077.093	26.770	-2.243	21.650	30.857
83	130	0.028	1060.869	14.647	2.374	10.505	14.196	129	176	0.023	1073.971	27.038	-3.122	22.015	31.994

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 48, CD.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
40	88	0.007	662.390	-1.361	19.637	1.888	-22.760	86	134	0.001	1086.295	17.004	3.443	8.734	11.861
41	89	0.031	678.268	-0.971	15.878	2.030	-18.550	87	135	0.004	1088.221	17.275	1.927	9.031	13.693
42	90	0.007	697.124	-0.457	18.856	2.187	-21.086	88	136	0.001	1091.410	17.620	3.188	9.411	12.748
43	91	0.011	712.433	0.016	15.309	2.468	-17.082	89	137	0.019	1092.932	17.869	1.522	9.638	14.724
44	92	0.004	730.460	0.450	18.027	2.610	-19.352	90	138	0.000	1095.858	18.239	2.926	9.996	13.624
45	93	0.	745.228	0.928	14.768	2.980	-15.660	91	139	0.031	1096.545	18.371	0.687	9.765	16.175
46	94	0.000	762.512	1.367	17.284	3.117	-17.737	92	140	0.	1099.605	18.816	3.059	10.524	14.092
47	95	0.013	776.729	1.745	14.217	3.451	-14.250	93	141	0.025	1100.116	18.976	0.511	10.904	16.957
48	96	0.000	793.320	3.139	16.591	3.604	-16.200	94	142	0.002	1102.798	19.244	2.682	11.181	15.077
49	97	0.035	806.219	3.386	12.899	4.029	-12.093	95	143	0.115	1103.134	18.873	0.336	11.468	17.728
50	98	0.000	821.172	4.004	14.954	4.120	-12.892	96	144	0.151	1105.673	19.088	2.539	11.795	15.758
51	99	0.023	831.900	4.273	10.727	2.723	-8.233	97	145	0.185	1106.511	19.235	0.838	12.110	17.648
52	100	0.001	844.159	4.791	12.259	0.916	-9.358	98	146	0.188	1108.838	19.512	2.328	12.367	16.021
53	101	0.003	854.082	5.163	9.923	0.926	-6.603	99	147	0.206	1109.540	19.724	0.701	12.607	17.919
54	102	0.001	865.734	5.573	11.653	1.174	-7.920	100	148	0.200	1111.587	20.028	2.047	12.854	16.670
55	103	0.013	874.896	5.942	9.161	1.245	-5.025	101	149	0.212	1112.112	20.267	0.525	13.113	18.539
56	104	0.002	886.059	6.361	11.163	1.571	-6.621	102	150	0.204	1113.825	20.560	1.713	13.377	17.511
57	105	0.040	894.209	6.553	8.151	1.374	-3.208	103	151	0.212	1114.070	20.813	0.246	13.585	19.338
58	106	0.000	905.203	7.126	10.994	2.018	-5.677	104	152	0.199	1115.544	21.129	1.474	13.944	18.334
59	107	0.022	912.881	7.383	7.678	2.228	-1.939	105	153	0.203	1115.605	21.389	0.061	14.247	20.103
60	108	0.002	923.256	7.806	10.375	2.530	-4.245	106	154	0.187	1116.735	21.716	1.131	14.549	19.218
61	109	0.	930.500	7.974	7.244	2.799	-0.721	107	155	0.185	1116.522	21.990	-0.213	14.812	20.999
62	110	0.019	940.341	8.311	9.841	3.064	-2.926	108	156	0.173	1117.425	22.324	0.903	15.258	20.150
63	111	0.105	947.228	8.387	6.887	3.139	0.406	109	157	0.171	1116.963	22.602	-0.462	15.570	21.852
64	112	0.096	956.678	8.783	9.450	3.460	-1.826	110	158	0.160	1117.642	22.916	0.679	15.988	20.980
65	113	0.140	963.349	8.978	6.671	3.600	1.295	111	159	0.157	1116.927	23.193	-0.715	16.297	22.722
66	114	0.128	972.350	9.405	9.001	3.951	-0.874	112	160	0.143	1117.472	23.542	0.545	16.779	21.733
67	115	0.148	978.732	9.695	6.382	4.176	2.151	113	161	0.137	1116.589	23.826	-0.884	17.164	23.477
68	116	0.135	987.263	10.123	8.531	4.544	0.249	114	162	0.121	1117.020	24.179	0.431	17.689	22.457
69	117	0.146	993.290	10.438	6.027	4.817	3.174	115	163	0.113	1116.055	24.481	-0.965	18.177	24.158
70	118	0.130	1001.399	10.890	8.109	5.248	1.404	116	164	0.093	1116.405	24.831	0.350	18.727	23.096
71	119	0.136	1007.096	11.231	5.697	5.566	4.217	117	165	0.077	1115.410	25.159	-0.995	19.285	24.784
72	120	0.114	1014.799	11.722	7.703	6.050	2.570	118	166	0.054	1115.716	25.467	0.306	19.862	23.790
73	121	0.121	1020.183	12.058	5.384	6.446	5.326	119	167	0.037	1114.764	25.817	-0.952	20.528	25.366
74	122	0.082	1027.564	12.593	7.381	7.027	3.624	120	168	0.032	1114.845	26.047	0.081	20.881	24.608
75	123	0.080	1032.719	12.977	5.156	7.503	6.411	121	169	0.040	1113.844	26.292	-1.000	21.420	25.939
76	124	0.020	1039.903	13.521	7.184	8.261	4.712	122	170	0.012	1113.621	26.611	-0.223	21.584	25.356
77	125	0.044	1044.899	13.873	4.996	8.844	7.352	123	171	0.023	1112.466	26.844	-1.155	21.911	26.575
78	126	0.005	1051.856	14.380	6.958	9.579	5.691	124	172	0.005	1112.026	27.173	-0.440	22.224	26.085
79	127	0.	1056.751	14.774	4.895	10.180	8.129	125	173	0.003	1110.882	27.421	-1.143	22.686	27.029
80	128	0.001	1063.325	15.113	6.574	10.571	6.786	126	174	0.000	1109.992	27.666	-0.890	22.717	27.006
81	129	0.012	1068.118	15.396	4.793	11.140	8.892	127	175	0.011	1107.167	27.831	-2.825	21.493	29.169
82	130	0.000	1074.283	15.787	6.164	11.384	7.847	128	176	0.003	1105.183	28.090	-1.984	20.851	28.555
83	131	0.016	1076.885	16.016	2.603	9.843	11.732	129	177	0.010	1102.238	28.267	-2.945	21.182	29.744
84	132	0.002	1080.583	16.400	3.697	8.026	10.959	130	178	0.005	1100.149	28.503	-2.089	21.531	29.113
85	133	0.008	1082.852	16.663	2.269	8.335	12.714	131	179	0.006	1097.084	28.682	-3.065	21.855	30.312

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 49, IN.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
41	90	0.021	675.256	-3.012	16.321	2.403	-18.131	87	136	0.003	1103.375	15.154	2.243	8.891	13.943
42	91	0.005	694.569	-2.555	19.313	2.523	-20.684	88	137	0.001	1106.874	15.464	3.499	9.288	13.000
43	92	0.008	710.326	-2.108	15.756	2.791	-16.683	89	138	0.017	1108.700	15.768	1.827	9.459	14.978
44	93	0.004	728.786	-1.675	18.460	2.909	-18.947	90	139	0.001	1111.938	16.080	3.238	9.853	13.867
45	94	0.	743.992	-1.236	15.207	3.280	-15.267	91	140	0.024	1112.915	16.369	0.977	9.556	16.438
46	95	0.001	761.696	-0.815	17.704	3.391	-17.336	92	141	0.001	1116.290	16.685	3.375	10.376	14.327
47	96	0.010	776.337	-0.391	14.641	3.743	-13.856	93	142	0.019	1117.093	16.977	0.803	10.623	17.211
48	97	0.001	793.343	0.023	17.006	3.904	-15.804	94	143	0.002	1120.079	17.281	2.986	10.996	15.316
49	98	0.029	807.498	1.280	14.155	4.220	-12.544	95	144	0.013	1120.648	17.514	0.569	11.213	18.034
50	99	0.001	822.884	1.712	15.386	4.409	-13.390	96	145	0.009	1123.377	17.703	2.728	11.528	16.165
51	100	0.019	834.018	2.118	11.134	2.890	-7.867	97	146	0.151	1124.077	17.566	0.700	11.521	18.481
52	101	0.001	846.696	2.537	12.678	1.233	-9.015	98	147	0.151	1126.676	17.837	2.599	11.795	16.550
53	102	0.003	857.032	2.950	10.336	1.110	-6.260	99	148	0.172	1127.474	17.935	0.799	11.903	18.569
54	103	0.002	869.088	3.354	12.056	1.426	-7.576	100	149	0.168	1129.869	18.282	2.394	12.248	16.907
55	104	0.011	878.655	3.760	9.567	1.441	-4.691	101	150	0.182	1130.553	18.442	0.685	12.443	18.881
56	105	0.002	890.219	4.161	11.564	1.763	-6.292	102	151	0.174	1132.625	18.801	2.072	12.772	17.592
57	106	0.028	898.743	4.534	8.524	1.494	-2.857	103	152	0.180	1133.096	19.025	0.470	12.955	19.541
58	107	0.001	910.159	4.956	11.416	2.166	-5.372	104	153	0.173	1134.926	19.382	1.830	13.366	18.367
59	108	0.015	918.228	5.347	8.069	2.276	-1.620	105	154	0.183	1135.171	19.566	0.245	13.618	20.288
60	109	0.002	928.996	5.741	10.768	2.624	-3.934	106	155	0.168	1136.739	20.004	1.568	14.029	19.139
61	110	0.001	936.633	6.133	7.637	2.841	-0.418	107	156	0.169	1136.793	20.271	0.054	14.283	21.042
62	111	0.007	946.852	6.511	10.219	3.107	-2.615	108	157	0.159	1138.033	20.608	1.240	14.718	20.094
63	112	0.002	954.069	6.841	7.217	3.248	0.760	109	158	0.159	1137.840	20.877	-0.193	15.013	21.898
64	113	0.014	963.862	7.184	9.793	3.537	-1.435	110	159	0.147	1138.867	21.224	1.027	15.470	20.929
65	114	0.071	970.694	7.345	6.832	3.558	1.891	111	160	0.146	1138.423	21.496	-0.443	15.767	22.761
66	115	0.053	980.101	7.750	9.407	3.910	-0.391	112	161	0.133	1139.284	21.811	0.861	16.262	21.715
67	116	0.120	986.730	7.998	6.629	4.064	2.806	113	162	0.127	1138.694	22.105	-0.590	16.665	23.565
68	117	0.113	995.681	8.418	8.951	4.441	0.695	114	163	0.114	1139.430	22.410	0.736	17.205	22.537
69	118	0.123	1002.020	8.730	6.339	4.688	3.747	115	164	0.100	1138.719	22.664	-0.712	17.661	24.378
70	119	0.106	1010.530	9.132	8.511	5.095	1.793	116	165	0.071	1139.412	23.007	0.694	18.276	23.312
71	120	0.117	1016.586	9.490	6.056	5.440	4.743	117	166	0.065	1138.724	23.314	-0.688	18.855	25.053
72	121	0.067	1024.727	9.928	8.140	5.923	2.878	118	167	0.033	1139.347	23.631	0.624	19.478	23.980
73	122	0.072	1030.406	10.223	5.679	6.246	5.858	119	168	0.028	1138.670	23.906	-0.677	20.124	25.616
74	123	0.038	1038.348	10.784	7.942	6.976	3.936	120	169	0.017	1139.001	24.156	0.331	20.457	24.841
75	124	0.047	1043.833	11.113	5.485	7.413	6.780	121	170	0.026	1138.195	24.350	-0.806	20.953	26.225
76	125	0.010	1051.469	11.565	7.636	8.203	4.942	122	171	0.010	1138.258	24.637	0.063	21.166	25.585
77	126	0.035	1056.765	11.866	5.297	8.728	7.660	123	172	0.021	1137.328	24.863	-0.930	21.481	26.820
78	127	0.004	1064.098	12.242	7.333	9.420	5.929	124	173	0.005	1137.129	25.103	-0.199	21.824	26.313
79	128	0.	1069.329	12.578	5.231	10.008	8.391	125	174	0.003	1136.216	25.334	-0.913	22.299	27.267
80	129	0.002	1076.227	12.903	6.899	10.456	7.053	126	175	0.000	1135.554	25.561	-0.662	22.405	27.245
81	130	0.011	1081.347	13.228	5.119	11.075	9.156	127	176	0.010	1132.956	25.789	-2.598	21.199	29.406
82	131	0.001	1087.834	13.552	6.488	11.328	8.107	128	177	0.003	1131.200	26.017	-1.756	20.578	28.789
83	132	0.014	1090.759	13.874	2.925	9.742	11.991	129	178	0.009	1128.479	26.241	-2.721	20.848	29.981
84	133	0.002	1094.783	14.200	4.023	7.993	11.209	130	179	0.004	1126.614	26.465	-1.865	21.226	29.348
85	134	0.007	1097.373	14.521	2.590	8.209	12.967	131	180	0.005	1123.771	26.687	-2.843	21.505	30.548
86	135	0.002	1101.132	14.837	3.759	8.654	12.113	132	181	0.003	1121.814	26.906	-1.957	21.873	29.883

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 50$, SN.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
43	93	0.005	709.057	-1.269	16.196	2.494	-21.549	89	139	0.014	1125.022	16.322	2.126	8.506	10.573
44	94	0.002	727.942	-0.843	18.886	2.523	-23.786	90	140	0.000	1128.570	16.632	3.548	8.865	9.527
45	95	0.	743.578	-0.414	15.636	2.850	-20.116	91	141	0.020	1129.834	16.920	1.264	8.607	12.054
46	96	0.000	761.699	0.003	18.121	2.943	-22.181	92	142	0.000	1133.521	17.231	3.687	9.368	10.058
47	97	0.007	776.757	0.419	15.058	3.234	-18.696	93	143	0.014	1134.613	17.520	1.092	9.773	12.850
48	98	0.000	794.171	0.829	17.415	3.365	-20.584	94	144	0.001	1137.900	17.820	3.286	10.000	11.043
49	99	0.025	808.711	1.213	14.540	3.688	-17.350	95	145	0.006	1138.759	18.111	0.860	10.349	13.715
50	100	0.000	825.369	2.485	16.657	3.754	-18.898	96	146	0.003	1141.775	18.399	3.016	10.682	11.976
51	101	0.016	836.899	2.881	11.530	2.385	-13.532	97	147	0.	1142.444	18.367	0.668	11.015	14.605
52	102	0.001	849.989	3.293	13.090	0.522	-13.734	98	148	0.028	1145.261	18.585	2.817	11.293	13.146
53	103	0.002	860.730	3.697	10.740	0.535	-11.067	99	149	0.112	1145.993	18.519	0.732	11.187	15.580
54	104	0.001	873.182	4.094	12.452	0.728	-12.347	100	150	0.117	1148.652	18.784	2.660	11.519	14.261
55	105	0.009	883.145	4.490	9.963	0.769	-9.459	101	151	0.148	1149.435	18.882	0.783	11.601	16.435
56	106	0.001	895.104	4.885	11.959	1.075	-11.009	102	152	0.140	1151.854	19.229	2.419	11.972	15.246
57	107	0.021	904.005	5.261	8.900	0.814	-7.582	103	153	0.155	1152.510	19.414	0.656	12.103	17.221
58	108	0.000	915.825	5.666	11.821	1.472	-9.956	104	154	0.147	1154.676	19.750	2.166	12.556	16.069
59	109	0.010	924.280	6.051	8.454	1.775	-6.331	105	155	0.160	1155.095	19.925	0.419	12.730	18.029
60	110	0.001	935.433	6.437	11.153	1.935	-8.559	106	156	0.146	1157.053	20.314	1.957	13.214	16.848
61	111	0.	943.455	6.822	8.022	2.279	-5.083	107	157	0.151	1157.345	20.551	0.292	13.445	18.675
62	112	0.003	954.047	7.195	10.592	2.496	-7.253	108	158	0.140	1158.956	20.922	1.611	13.925	17.651
63	113	0.000	961.644	7.575	7.597	2.850	-3.828	109	159	0.142	1159.014	21.174	0.058	14.196	19.370
64	114	0.004	971.803	7.941	10.159	3.167	-5.957	110	160	0.127	1160.402	21.535	1.388	14.681	18.315
65	115	0.038	978.927	8.233	7.124	3.404	-2.510	111	161	0.125	1160.217	21.793	-0.185	14.958	20.060
66	116	0.006	988.753	8.652	9.825	3.780	-4.631	112	162	0.111	1161.477	22.193	1.260	15.539	18.876
67	117	0.041	995.594	8.864	6.841	3.950	-1.352	113	163	0.106	1161.185	22.490	-0.292	15.962	20.559
68	118	0.007	1004.984	9.303	9.390	4.339	-3.360	114	164	0.083	1162.314	22.883	1.129	16.546	19.359
69	119	0.042	1011.541	9.521	6.556	4.514	-0.236	115	165	0.075	1161.942	23.223	-0.372	17.058	20.978
70	120	0.014	1020.547	10.016	9.006	4.989	-2.188	116	166	0.041	1162.995	23.583	1.053	17.680	19.749
71	121	0.012	1026.822	10.235	6.275	5.237	0.787	117	167	0.044	1162.545	23.821	-0.450	18.195	21.350
72	122	0.013	1035.481	10.754	8.659	5.787	-1.128	118	168	0.011	1163.503	24.156	0.958	18.803	20.178
73	123	0.016	1041.502	11.096	6.021	6.111	1.691	119	169	0.022	1163.059	24.389	-0.444	19.354	21.667
74	124	0.009	1049.831	11.483	8.329	6.737	-0.243	120	170	0.011	1163.638	24.637	0.579	19.626	20.862
75	125	0.027	1055.628	11.795	5.797	7.150	2.489	121	171	0.015	1163.061	24.866	-0.577	20.002	22.238
76	126	0.005	1063.643	12.174	8.015	7.784	0.668	122	172	0.008	1163.366	25.108	0.305	20.227	21.635
77	127	0.028	1069.245	12.480	5.602	8.231	3.253	123	173	0.018	1162.659	25.331	-0.707	20.520	22.773
78	128	0.003	1076.938	12.840	7.693	8.739	1.588	124	174	0.004	1162.700	25.571	0.041	20.784	22.300
79	129	0.	1082.498	13.169	5.560	9.304	3.901	125	175	0.003	1162.016	25.800	-0.684	21.255	23.181
80	130	0.001	1089.720	13.492	7.222	9.568	2.548	126	176	0.000	1161.580	26.026	-0.436	21.259	23.153
81	131	0.010	1095.159	13.812	5.439	10.112	4.655	127	177	0.010	1159.206	26.250	-2.374	20.029	25.307
82	132	0.000	1101.968	14.134	6.809	10.348	3.655	128	178	0.002	1157.678	26.478	-1.529	19.390	24.746
83	133	0.013	1105.209	14.450	3.242	8.796	7.491	129	179	0.008	1155.179	26.700	-2.499	19.716	25.914
84	134	0.001	1109.557	14.774	4.347	6.979	6.792	130	180	0.003	1153.536	26.923	-1.643	20.058	25.323
85	135	0.006	1112.463	15.090	2.906	7.282	8.500	131	181	0.004	1150.914	27.143	-2.622	20.381	26.512
86	136	0.001	1116.536	15.404	4.073	7.658	7.694	132	182	0.002	1149.175	27.361	-1.739	20.731	25.874
87	137	0.002	1119.091	15.716	2.555	7.944	9.508	133	183	0.007	1146.397	27.577	-2.778	21.018	27.121
88	138	0.001	1122.896	16.023	3.805	8.307	8.595	134	184	0.001	1144.545	27.793	-1.852	21.343	26.445

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 51$, SB.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
45	96	0.031	738.736	-4.842	16.056	0.115	-19.090	91	142	0.040	1142.797	12.962	1.691	5.801	12.821
46	97	0.029	757.278	-4.421	18.542	0.197	-21.124	92	143	0.022	1146.680	13.159	3.884	6.447	10.846
47	98	0.033	772.805	-3.952	15.527	0.517	-17.687	93	144	0.038	1148.160	13.547	1.480	6.950	13.628
48	99	0.022	790.579	-3.592	17.775	0.588	-19.544	94	145	0.032	1151.692	13.793	3.532	7.107	11.810
49	100	0.041	805.688	-3.023	15.109	1.056	-16.418	95	146	0.070	1152.969	14.209	1.277	7.581	14.397
50	101	0.015	822.585	-2.784	16.896	0.947	-17.895	96	147	0.070	1156.266	14.490	3.297	7.892	12.565
51	102	0.033	835.473	-1.426	12.888	-0.321	-13.363	97	148	0.143	1157.624	15.180	1.358	8.681	14.801
52	103	0.021	848.880	-1.109	13.408	-2.299	-13.562	98	149	0.143	1160.790	15.530	3.167	9.119	13.468
53	104	0.025	860.052	-0.677	11.172	-2.261	-10.041	99	150	0.167	1162.131	16.139	1.341	9.760	15.575
54	105	0.025	872.904	-0.278	12.851	-2.088	-11.336	100	151	0.164	1165.088	16.436	2.957	10.117	14.400
55	106	0.028	883.313	0.167	10.409	-2.014	-8.494	101	152	0.178	1166.317	16.882	1.229	10.548	16.355
56	107	0.026	895.640	0.536	12.327	-1.743	-10.043	102	153	0.170	1168.948	17.094	2.631	10.785	15.333
57	108	0.049	905.087	1.083	9.447	-1.863	-6.749	103	154	0.177	1169.962	17.452	1.014	11.114	17.157
58	109	0.029	917.166	1.341	12.079	-1.348	-9.086	104	155	0.170	1172.342	17.666	2.379	11.421	16.102
59	110	0.042	926.091	1.811	8.925	-0.947	-5.454	105	156	0.180	1173.118	18.022	0.776	11.727	17.919
60	111	0.038	937.589	2.156	11.498	-0.865	-7.697	106	157	0.165	1175.237	18.184	2.119	12.016	16.927
61	112	0.041	946.012	2.557	8.423	-0.511	-4.210	107	158	0.167	1175.824	18.479	0.587	12.358	18.594
62	113	0.053	957.034	2.987	11.022	-0.257	-6.432	108	159	0.156	1177.601	18.646	1.778	12.567	17.674
63	114	0.080	965.064	3.420	8.030	0.136	-3.111	109	160	0.157	1177.934	18.921	0.333	12.846	19.332
64	115	0.073	975.635	3.832	10.571	0.488	-5.319	110	161	0.145	1179.494	19.092	1.560	13.166	18.367
65	116	0.095	983.340	4.412	7.705	0.975	-2.088	111	162	0.144	1179.570	19.354	0.076	13.435	20.040
66	117	0.093	993.460	4.707	10.120	1.302	-4.113	112	163	0.129	1180.961	19.484	1.391	13.799	18.979
67	118	0.111	1000.842	5.248	7.382	1.853	-1.015	113	164	0.124	1180.890	19.705	-0.071	14.172	20.643
68	119	0.103	1010.522	5.538	9.681	2.126	-2.893	114	165	0.108	1182.137	19.824	1.248	14.559	19.562
69	120	0.116	1017.576	6.036	7.054	2.552	0.065	115	166	0.100	1181.962	20.020	-0.176	14.972	21.215
70	121	0.102	1026.826	6.280	9.250	2.850	-1.739	116	167	0.083	1183.113	20.118	1.151	15.388	20.111
71	122	0.111	1033.571	6.749	6.744	3.256	1.087	117	168	0.072	1182.898	20.353	-0.215	15.885	21.710
72	123	0.092	1042.410	6.929	8.839	3.584	-0.638	118	169	0.055	1183.943	20.440	1.045	16.236	20.700
73	124	0.098	1048.805	7.304	6.396	3.924	2.108	119	170	0.042	1183.717	20.659	-0.226	16.699	22.238
74	125	0.071	1057.334	7.503	8.529	4.312	0.354	120	171	0.042	1184.516	20.879	0.799	16.874	21.471
75	126	0.071	1063.529	7.901	6.195	4.828	2.994	121	172	0.043	1184.215	21.158	-0.298	17.254	22.809
76	127	0.046	1071.716	8.073	8.187	5.073	1.345	122	173	0.027	1184.650	21.284	0.432	17.355	22.323
77	128	0.049	1077.743	8.498	6.027	5.616	3.899	123	174	0.029	1184.218	21.559	-0.432	17.728	23.488
78	129	0.026	1085.616	8.679	7.873	5.853	2.367	124	175	0.014	1184.414	21.714	0.197	17.861	23.072
79	130	0.016	1091.486	8.988	5.870	6.426	4.796	125	176	0.010	1183.950	21.934	-0.464	18.327	24.028
80	131	0.015	1099.031	9.311	7.545	6.638	3.480	126	177	0.006	1183.731	22.151	-0.219	18.307	24.029
81	132	0.020	1104.841	9.682	5.810	7.217	5.547	127	178	0.016	1181.641	22.435	-2.089	17.130	26.144
82	133	0.010	1111.918	9.950	7.077	7.395	4.572	128	179	0.011	1180.311	22.633	-1.331	16.462	25.571
83	134	0.023	1115.566	10.356	3.648	5.924	8.372	129	180	0.018	1178.076	22.898	-2.234	16.825	26.731
84	135	0.015	1120.181	10.624	4.615	4.051	7.665	130	181	0.016	1176.644	23.108	-1.432	17.149	26.126
85	136	0.023	1123.447	10.985	3.266	4.393	9.381	131	182	0.023	1174.267	23.353	-2.377	17.493	27.309
86	137	0.020	1127.816	11.281	4.369	4.739	8.565	132	183	0.019	1172.736	23.560	-1.531	17.827	26.670
87	138	0.024	1130.709	11.618	2.892	5.041	10.378	133	184	0.024	1170.207	23.811	-2.528	18.142	27.903
88	139	0.020	1134.813	11.917	4.104	5.386	9.464	134	185	0.015	1168.536	23.991	-1.671	18.428	27.244
89	140	0.027	1137.314	12.292	2.501	5.644	11.392	135	186	0.022	1165.828	24.267	-2.709	18.713	28.536
90	141	0.019	1141.106	12.536	3.792	5.937	10.364	136	187	0.009	1163.941	24.424	-1.887	18.894	27.887

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 52$, TE.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
46	98	0.001	754.335	-2.943	18.964	-1.902	-24.056	92	144	0.000	1161.006	14.325	4.262	4.141	8.205
47	99	0.012	770.252	-2.552	15.917	-1.621	-20.590	93	145	0.022	1162.720	14.560	1.714	4.591	10.987
48	100	0.001	788.488	-2.091	18.236	-1.506	-22.453	94	146	0.002	1166.583	14.891	3.863	4.767	9.195
49	101	0.033	803.907	-1.781	15.419	-1.145	-19.262	95	147	0.027	1168.048	15.079	1.465	5.140	11.854
50	102	0.001	821.328	-1.257	17.421	-1.139	-20.754	96	148	0.023	1171.642	15.376	3.594	5.448	10.380
51	103	0.022	834.536	-0.937	13.208	-2.471	-16.236	97	149	0.172	1173.476	15.852	1.833	6.421	12.570
52	104	0.001	849.229	0.349	14.693	-4.435	-17.248	98	150	0.173	1176.924	16.134	3.448	6.854	11.454
53	105	0.003	860.786	0.733	11.557	-4.408	-13.763	99	151	0.197	1178.706	16.575	1.782	7.967	13.413
54	106	0.002	874.036	1.133	13.251	-4.248	-14.242	100	152	0.190	1181.890	16.802	3.184	8.334	12.356
55	107	0.013	884.814	1.501	10.778	-4.210	-11.376	101	153	0.202	1183.499	17.181	1.609	9.211	14.194
56	108	0.002	897.556	1.916	12.742	-3.921	-12.914	102	154	0.194	1186.337	17.388	2.838	9.389	13.276
57	109	0.036	907.297	2.210	9.741	-4.143	-9.543	103	155	0.200	1187.661	17.699	1.324	9.931	15.045
58	110	0.001	919.855	2.689	12.557	-3.545	-11.845	104	156	0.190	1190.255	17.913	2.594	10.106	14.071
59	111	0.019	929.110	3.019	9.255	-3.190	-8.269	105	157	0.197	1191.382	18.264	1.127	10.577	15.779
60	112	0.003	941.019	3.430	11.910	-3.101	-10.465	106	158	0.179	1193.635	18.398	2.253	10.664	14.943
61	113	0.001	949.820	3.808	8.801	-2.755	-7.012	107	159	0.178	1194.493	18.669	0.858	11.103	16.553
62	114	0.012	961.171	4.137	11.351	-2.557	-9.099	108	160	0.167	1196.483	18.882	1.990	11.135	15.681
63	115	0.002	969.533	4.469	8.363	-2.217	-5.685	109	161	0.166	1197.078	19.144	0.595	11.438	17.293
64	116	0.066	980.470	4.835	10.936	-1.872	-7.634	110	162	0.153	1198.828	19.335	1.750	11.578	16.395
65	117	0.108	988.564	5.225	8.095	-1.375	-4.434	111	163	0.151	1199.157	19.587	0.329	11.849	18.032
66	118	0.106	999.044	5.584	10.480	-1.054	-6.252	112	164	0.137	1200.751	19.790	1.593	12.054	17.007
67	119	0.136	1006.847	6.005	7.803	-0.376	-3.262	113	165	0.130	1200.917	20.027	0.167	12.406	18.637
68	120	0.119	1016.859	6.336	10.012	-0.189	-4.997	114	166	0.114	1202.394	20.257	1.477	12.622	17.553
69	121	0.134	1024.305	6.728	7.446	0.416	-2.152	115	167	0.104	1202.442	20.480	0.048	12.962	19.150
70	122	0.117	1033.875	7.048	9.570	0.595	-3.853	116	168	0.083	1203.826	20.713	1.385	13.217	18.043
71	123	0.123	1040.989	7.419	7.115	1.154	-1.132	117	169	0.071	1203.861	20.963	0.035	13.624	19.555
72	124	0.099	1050.131	7.721	9.141	1.289	-2.777	118	170	0.044	1205.173	21.230	1.312	13.883	18.455
73	125	0.113	1056.906	8.101	6.775	1.789	-0.181	119	171	0.032	1205.205	21.487	0.032	14.364	19.920
74	126	0.066	1065.740	8.406	8.834	1.964	-1.858	120	172	0.023	1206.245	21.729	1.040	14.447	19.106
75	127	0.068	1072.278	8.749	6.538	2.482	0.606	121	173	0.038	1206.191	21.972	-0.054	14.837	20.440
76	128	0.015	1080.860	9.144	8.582	2.734	-1.101	122	174	0.011	1206.923	22.273	0.732	14.991	19.893
77	129	0.041	1087.201	9.458	6.341	3.278	1.301	123	175	0.022	1206.704	22.486	-0.219	15.348	21.022
78	130	0.005	1095.499	9.883	8.298	3.561	-0.289	124	176	0.005	1207.196	22.782	0.492	15.535	20.569
79	131	0.	1101.728	10.243	6.229	4.188	2.010	125	177	0.003	1206.978	23.027	-0.218	16.023	21.477
80	132	0.002	1109.605	10.574	7.877	4.372	0.698	126	178	0.000	1207.003	23.272	0.025	16.008	21.463
81	133	0.012	1115.707	10.867	6.102	4.915	2.786	127	179	0.011	1205.099	23.458	-1.904	14.788	23.619
82	134	0.000	1123.156	11.238	7.448	5.141	1.790	128	180	0.003	1204.025	23.714	-1.075	14.150	23.046
83	135	0.015	1127.063	11.497	3.908	3.610	5.628	129	181	0.010	1201.987	23.911	-2.037	14.486	24.225
84	136	0.002	1132.046	11.865	4.982	1.783	4.916	130	182	0.004	1200.794	24.150	-1.154	14.821	23.627
85	137	0.008	1135.599	12.152	3.554	2.095	6.639	131	183	0.006	1198.623	24.357	-2.170	15.149	24.822
86	138	0.002	1140.304	12.488	4.705	2.452	5.828	132	184	0.003	1197.328	24.593	-1.295	15.497	24.181
87	139	0.003	1143.495	12.786	3.191	2.737	7.646	133	185	0.009	1194.997	24.790	-2.331	15.788	25.434
88	140	0.001	1147.923	13.110	4.428	3.093	6.734	134	186	0.001	1193.581	25.045	-1.416	16.111	24.757
89	141	0.018	1150.688	13.373	2.764	3.302	8.704	135	187	0.016	1191.045	25.218	-2.536	16.354	26.079
90	142	0.000	1154.835	13.730	4.148	3.644	7.667	136	188	0.	1189.424	25.483	-1.621	16.584	25.414
91	143	0.028	1156.744	13.947	1.908	3.426	10.178	137	189	0.017	1186.111	25.641	-3.314	16.255	27.306

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 53$, I.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
48	101	0.014	783.862	-4.626	18.610	-1.711	-21.309	94	147	0.028	1179.120	12.536	4.123	4.144	10.091
49	102	0.044	799.791	-4.116	15.929	-1.308	-18.200	95	148	0.152	1181.240	13.192	2.120	4.785	12.396
50	103	0.008	817.517	-3.810	17.726	-1.357	-19.618	96	149	0.165	1185.263	13.621	4.023	5.276	11.025
51	104	0.032	831.199	-3.337	13.681	-2.785	-15.142	97	150	0.188	1187.596	14.120	2.333	6.332	13.034
52	105	0.012	846.240	-2.989	15.042	-4.639	-16.129	98	151	0.190	1191.336	14.412	3.740	6.775	12.016
53	106	0.018	859.012	-1.774	12.771	-4.756	-13.437	99	152	0.205	1193.463	14.757	2.127	7.544	13.926
54	107	0.017	872.656	-1.381	13.644	-4.520	-13.921	100	153	0.200	1196.910	15.020	3.447	7.824	12.979
55	108	0.025	883.859	-0.955	11.203	-4.488	-10.306	101	154	0.209	1198.830	15.331	1.920	8.403	14.755
56	109	0.019	896.972	-0.584	13.113	-4.227	-11.837	102	155	0.202	1201.924	15.587	3.094	8.541	13.908
57	110	0.061	907.227	-0.070	10.255	-4.381	-8.586	103	156	0.209	1203.543	15.882	1.619	8.931	15.621
58	111	0.023	920.058	0.204	12.831	-3.877	-10.785	104	157	0.198	1206.379	16.124	2.836	9.135	14.716
59	112	0.052	929.771	0.662	9.713	-3.611	-7.281	105	158	0.202	1207.795	16.413	1.416	9.538	16.338
60	113	0.045	942.025	1.006	12.254	-3.436	-9.454	106	159	0.188	1210.263	16.628	2.468	9.627	15.560
61	114	0.115	951.290	1.470	9.265	-3.096	-6.094	107	160	0.186	1211.381	16.888	1.118	9.968	17.099
62	115	0.100	963.066	1.895	11.776	-2.818	-8.096	108	161	0.175	1213.589	17.106	2.208	10.057	16.270
63	116	0.138	972.053	2.520	8.987	-2.254	-4.947	109	162	0.173	1214.441	17.363	0.852	10.322	17.827
64	117	0.139	983.348	2.878	11.295	-1.981	-6.738	110	163	0.163	1216.407	17.579	1.966	10.511	16.961
65	118	0.163	992.009	3.445	8.662	-1.350	-3.766	111	164	0.160	1216.975	17.818	0.568	10.746	18.574
66	119	0.153	1002.802	3.758	10.793	-1.128	-5.440	112	165	0.147	1218.772	18.021	1.796	10.983	17.601
67	120	0.165	1011.079	4.232	8.277	-0.556	-2.608	113	166	0.141	1219.165	18.247	0.393	11.300	19.201
68	121	0.154	1021.370	4.511	10.291	-0.385	-4.211	114	167	0.126	1220.809	18.415	1.645	11.553	18.184
69	122	0.162	1029.240	4.935	7.870	0.103	-1.490	115	168	0.118	1221.087	18.645	0.277	11.902	19.759
70	123	0.147	1039.075	5.200	9.835	0.258	-3.071	116	169	0.099	1222.633	18.807	1.547	12.201	18.719
71	124	0.149	1046.572	5.582	7.497	0.700	-0.455	117	170	0.083	1222.846	18.985	0.213	12.589	20.262
72	125	0.130	1055.943	5.812	9.371	0.821	-1.976	118	171	0.066	1224.343	19.170	1.497	12.935	19.199
73	126	0.132	1063.100	6.194	7.157	1.234	0.511	119	172	0.043	1224.569	19.364	0.226	13.375	20.697
74	127	0.102	1072.102	6.362	9.002	1.397	-0.989	120	173	0.043	1225.849	19.604	1.280	13.611	19.879
75	128	0.097	1078.976	6.698	6.875	1.876	1.390	121	174	0.045	1226.034	19.843	0.185	14.022	21.213
76	129	0.059	1087.720	6.860	8.744	2.091	-0.163	122	175	0.022	1226.944	20.021	0.910	14.133	20.728
77	130	0.055	1094.427	7.226	6.708	2.604	2.157	123	176	0.028	1226.983	20.279	0.039	14.469	21.849
78	131	0.020	1102.956	7.457	8.529	2.946	0.661	124	177	0.009	1227.672	20.476	0.690	14.727	21.428
79	132	0.	1109.521	7.792	6.564	3.482	2.971	125	178	0.006	1227.684	20.706	0.011	15.171	22.359
80	133	0.008	1117.711	8.106	8.190	3.800	1.673	126	179	0.003	1227.936	20.933	0.253	15.227	22.354
81	134	0.017	1124.163	8.455	6.452	4.382	3.747	127	180	0.014	1226.288	21.188	-1.649	14.043	24.490
82	135	0.004	1131.909	8.753	7.746	4.582	2.762	128	181	0.006	1225.429	21.405	-0.858	13.404	23.916
83	136	0.020	1136.179	9.116	4.271	3.044	6.573	129	182	0.014	1223.638	21.650	-1.792	13.701	25.088
84	137	0.008	1141.456	9.410	5.276	1.243	5.868	130	183	0.011	1222.663	21.869	-0.975	14.057	24.489
85	138	0.017	1145.349	9.750	3.894	1.488	7.586	131	184	0.016	1220.726	22.103	-1.936	14.355	25.681
86	139	0.011	1150.358	10.054	5.009	1.883	6.776	132	185	0.011	1219.648	22.320	-1.078	14.709	25.042
87	140	0.017	1153.875	10.380	3.517	2.133	8.590	133	186	0.019	1217.556	22.558	-2.093	14.994	26.284
88	141	0.012	1158.609	10.685	4.734	2.497	7.680	134	187	0.008	1216.342	22.761	-1.214	15.311	25.617
89	142	0.025	1161.720	11.033	3.112	2.717	9.615	135	188	0.020	1214.055	23.010	-2.286	15.553	26.923
90	143	0.010	1166.140	11.304	4.419	3.032	8.597	136	189	0.001	1212.634	23.210	-1.421	15.803	26.258
91	144	0.043	1168.428	11.684	2.288	2.819	11.052	137	190	0.023	1209.562	23.451	-3.073	15.439	28.134
92	145	0.013	1172.924	11.919	4.496	3.523	9.117	138	191	0.005	1208.277	23.634	-1.284	16.041	26.551
93	146	0.040	1174.996	12.276	2.072	3.904	11.867	139	192	0.028	1205.153	23.891	-3.124	16.388	28.624

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 54, XE.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
50	104	0.001	815.275	-2.243	18.158	-1.508	-22.513	96	150	0.184	1199.848	14.584	4.341	4.969	8.659
51	105	0.030	829.329	-1.870	14.055	-2.873	-18.037	97	151	0.202	1202.570	14.974	2.722	6.226	10.609
52	106	0.002	844.792	-1.448	15.463	-4.831	-19.026	98	152	0.206	1206.607	15.271	4.037	6.670	9.656
53	107	0.007	857.952	-1.060	13.160	-4.878	-16.334	99	153	0.219	1209.106	15.643	2.499	7.335	11.512
54	108	0.004	872.771	0.115	14.819	-4.753	-17.592	100	154	0.215	1212.802	15.893	3.696	7.583	10.646
55	109	0.019	884.352	0.493	11.581	-4.728	-13.963	101	155	0.222	1215.050	16.220	2.247	8.049	12.358
56	110	0.005	897.858	0.887	13.506	-4.473	-14.720	102	156	0.217	1218.381	16.457	3.332	8.197	11.582
57	111	0.066	908.491	1.264	10.633	-4.618	-11.465	103	157	0.223	1220.312	16.769	1.931	8.518	13.239
58	112	0.004	921.708	1.649	13.217	-4.143	-13.592	104	158	0.213	1223.351	16.972	3.039	8.719	12.435
59	113	0.061	931.788	2.017	10.081	-3.804	-10.142	105	159	0.212	1225.041	17.246	1.690	9.085	14.008
60	114	0.047	944.413	2.388	12.624	-3.737	-12.093	106	160	0.198	1227.698	17.434	2.656	9.148	13.314
61	115	0.140	954.187	2.898	9.775	-3.217	-8.822	107	161	0.195	1229.077	17.696	1.379	9.400	14.781
62	116	0.142	966.323	3.257	12.136	-2.991	-10.500	108	162	0.184	1231.485	17.896	2.408	9.555	13.999
63	117	0.180	975.827	3.774	9.504	-2.288	-7.501	109	163	0.180	1232.586	18.145	1.100	9.798	15.518
64	118	0.172	987.461	4.113	11.633	-2.005	-9.063	110	164	0.170	1234.767	18.360	2.181	9.989	14.678
65	119	0.190	996.580	4.571	9.119	-1.248	-6.255	111	165	0.167	1235.590	18.615	0.823	10.217	16.241
66	120	0.179	1007.689	4.887	11.109	-1.076	-7.772	112	166	0.154	1237.584	18.812	1.993	10.460	15.310
67	121	0.189	1016.377	5.298	8.688	-0.482	-5.086	113	167	0.147	1238.210	19.046	0.627	10.758	16.876
68	122	0.176	1026.967	5.597	10.590	-0.372	-6.583	114	168	0.133	1240.064	19.254	1.853	11.018	15.867
69	123	0.182	1035.222	5.982	8.255	0.080	-3.977	115	169	0.123	1240.570	19.483	0.506	11.358	17.408
70	124	0.165	1045.334	6.259	10.112	0.181	-5.443	116	170	0.105	1242.325	19.692	1.755	11.636	16.351
71	125	0.165	1053.184	6.613	7.850	0.585	-2.938	117	171	0.087	1242.760	19.914	0.435	12.023	17.853
72	126	0.146	1062.828	6.885	9.643	0.658	-4.401	118	172	0.069	1244.483	20.140	1.723	12.362	16.731
73	127	0.144	1070.330	7.231	7.502	1.046	-2.004	119	173	0.043	1244.946	20.377	0.463	12.790	18.221
74	128	0.116	1079.584	7.482	9.253	1.158	-3.444	120	174	0.043	1246.465	20.616	1.520	12.997	17.381
75	129	0.108	1086.775	7.798	7.191	1.574	-1.180	121	175	0.045	1246.890	20.855	0.424	13.390	18.718
76	130	0.066	1095.802	8.082	9.027	1.767	-2.728	122	176	0.016	1248.049	21.105	1.160	13.509	18.227
77	131	0.057	1102.835	8.407	7.033	2.262	-0.542	123	177	0.026	1248.318	21.335	0.268	13.832	19.339
78	132	0.009	1111.709	8.752	8.874	2.554	-2.061	124	178	0.006	1249.260	21.588	0.943	14.042	18.907
79	133	0.	1118.601	9.081	6.893	3.105	0.208	125	179	0.004	1249.508	21.825	0.248	14.509	19.833
80	134	0.002	1127.127	9.416	8.526	3.333	-1.095	126	180	0.000	1249.996	22.059	0.487	14.505	19.829
81	135	0.014	1133.889	9.726	6.761	3.865	0.997	127	181	0.012	1248.563	22.275	-1.433	13.290	21.983
82	136	0.001	1141.970	10.062	8.082	4.070	0.004	128	182	0.003	1247.944	22.514	-0.619	12.646	21.404
83	137	0.018	1146.541	10.361	4.570	2.538	3.836	129	183	0.011	1246.369	22.731	-1.575	12.975	22.591
84	138	0.003	1152.153	10.697	5.612	0.702	3.122	130	184	0.006	1245.625	22.962	-0.744	13.305	21.992
85	139	0.011	1156.352	11.002	4.199	0.993	4.854	131	185	0.008	1243.908	23.182	-1.717	13.626	23.193
86	140	0.003	1161.683	11.324	5.331	1.342	4.043	132	186	0.004	1243.058	23.409	-0.850	13.969	22.554
87	141	0.006	1165.506	11.631	3.823	1.612	5.866	133	187	0.013	1241.177	23.621	-1.881	14.258	23.810
88	142	0.002	1170.553	11.945	5.047	1.954	4.958	134	188	0.002	1240.196	23.854	-0.981	14.573	23.135
89	143	0.022	1173.954	12.234	3.401	2.164	6.916	135	189	0.018	1238.110	24.055	-2.086	14.818	24.461
90	144	0.001	1178.697	12.557	4.743	2.479	5.889	136	190	0.	1236.913	24.279	-1.197	15.037	23.795
91	145	0.041	1181.259	12.831	2.562	2.276	8.373	137	191	0.020	1234.046	24.484	-2.867	14.706	25.681
92	146	0.001	1186.081	13.156	4.822	2.950	6.442	138	192	0.	1232.995	24.717	-1.051	15.276	24.089
93	147	0.036	1188.428	13.432	2.347	3.389	9.195	139	193	0.025	1230.059	24.906	-2.936	15.653	26.185
94	148	0.008	1192.853	13.734	4.425	3.552	7.569	140	194	0.008	1228.719	25.127	-1.340	15.780	24.812
95	149	0.175	1195.506	14.267	2.653	4.491	9.790	141	195	0.157	1226.105	25.471	-2.614	16.548	26.293

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 55$, CS.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
51	106	0.034	824.984	-4.345	14.474	-3.102	-16.833	97	152	0.216	1215.480	12.911	3.084	5.946	11.292
52	107	0.001	840.835	-3.957	15.851	-4.977	-17.781	98	153	0.219	1219.836	13.229	4.355	6.277	10.335
53	108	0.007	854.397	-3.556	13.561	-5.097	-15.128	99	154	0.228	1222.666	13.560	2.831	6.775	12.146
54	109	0.003	869.607	-3.164	15.210	-4.929	-16.380	100	155	0.225	1226.625	13.823	3.959	6.994	11.331
55	110	0.023	882.356	-1.996	12.749	-4.951	-13.539	101	156	0.230	1229.181	14.131	2.556	7.423	12.997
56	111	0.004	896.244	-1.614	13.888	-4.707	-14.278	102	157	0.226	1232.768	14.387	3.587	7.563	12.262
57	112	0.079	907.333	-1.158	11.089	-4.821	-10.358	103	158	0.232	1235.004	14.692	2.236	7.879	13.871
58	113	0.	920.864	-0.843	13.531	-4.402	-12.265	104	159	0.223	1238.267	14.916	3.263	8.048	13.154
59	114	0.154	931.537	-0.251	10.673	-3.985	-9.081	105	160	0.220	1240.229	15.188	1.962	8.391	14.673
60	115	0.163	944.583	0.171	13.046	-3.770	-10.883	106	161	0.209	1243.076	15.378	2.847	8.402	14.046
61	116	0.203	955.041	0.853	10.457	-3.026	-7.906	107	162	0.204	1244.702	15.625	1.626	8.612	15.503
62	117	0.199	967.544	1.220	12.503	-2.776	-9.452	108	163	0.194	1247.321	15.836	2.619	8.763	14.758
63	118	0.222	977.615	1.788	10.072	-1.969	-6.677	109	164	0.189	1248.663	16.077	1.341	8.987	16.270
64	119	0.212	989.542	2.081	11.927	-1.819	-8.083	110	165	0.180	1251.049	16.282	2.386	9.165	15.473
65	120	0.222	999.134	2.554	9.592	-1.214	-5.446	111	166	0.175	1252.111	16.521	1.062	9.375	17.032
66	121	0.209	1010.508	2.820	11.374	-1.134	-6.826	112	167	0.164	1254.304	16.721	2.193	9.602	16.147
67	122	0.213	1019.601	3.225	9.093	-0.703	-4.250	113	168	0.157	1255.148	16.937	0.844	9.877	17.727
68	123	0.200	1030.462	3.496	10.861	-0.634	-5.661	114	169	0.145	1257.196	17.132	2.048	10.129	16.759
69	124	0.202	1039.108	3.887	8.646	-0.265	-3.141	115	170	0.136	1257.894	17.324	0.698	10.434	18.338
70	125	0.188	1049.464	4.130	10.355	-0.201	-4.499	116	171	0.119	1259.830	17.505	1.936	10.726	17.351
71	126	0.183	1057.645	4.460	8.181	-0.110	-2.026	117	172	0.094	1260.431	17.671	0.601	11.050	18.909
72	127	0.169	1067.544	4.716	9.899	0.174	-3.408	118	173	0.074	1262.385	17.902	1.953	11.456	17.785
73	128	0.162	1075.357	5.027	7.813	0.491	-1.031	119	174	0.046	1263.063	18.118	0.679	11.922	19.243
74	129	0.141	1084.812	5.229	9.455	0.575	-2.349	120	175	0.046	1264.825	18.360	1.762	12.187	18.345
75	130	0.130	1092.292	5.517	7.479	0.897	-0.092	121	176	0.048	1265.494	18.604	0.669	12.630	19.679
76	131	0.078	1101.511	5.709	9.219	1.114	-1.507	122	177	0.018	1266.875	18.825	1.381	12.731	19.206
77	132	0.065	1108.865	6.030	7.354	1.594	0.620	123	178	0.027	1267.385	19.068	0.511	13.056	20.287
78	133	0.010	1118.027	6.318	9.162	2.012	-0.913	124	179	0.006	1268.559	19.299	1.174	13.320	19.865
79	134	0.	1125.250	6.649	7.223	2.528	1.268	125	180	0.003	1269.043	19.534	0.484	13.765	20.776
80	135	0.002	1134.103	6.976	8.853	2.852	-0.038	126	181	0.000	1269.764	19.768	0.721	13.796	20.770
81	136	0.014	1141.192	7.303	7.089	3.376	2.043	127	182	0.012	1268.566	20.003	-1.198	12.587	22.919
82	137	0.000	1149.594	7.624	8.402	3.588	1.056	128	183	0.003	1268.177	20.234	-0.388	11.946	22.344
83	138	0.019	1154.492	7.951	4.898	2.034	4.868	129	184	0.012	1266.834	20.465	-1.343	12.252	23.524
84	139	0.002	1160.423	8.270	5.931	0.219	4.165	130	185	0.006	1266.318	20.693	-0.516	12.594	22.929
85	140	0.012	1164.943	8.592	4.520	0.469	5.882	131	186	0.009	1264.829	20.921	-1.489	12.897	24.125
86	141	0.002	1170.590	8.907	5.647	0.839	5.076	132	187	0.004	1264.204	21.146	-0.625	13.246	23.488
87	142	0.006	1174.729	9.223	4.139	1.085	6.888	133	188	0.014	1262.548	21.372	-1.656	13.527	24.738
88	143	0.001	1180.088	9.534	5.358	1.434	5.983	134	189	0.001	1261.789	21.593	-0.759	13.845	24.068
89	144	0.023	1183.803	9.849	3.716	1.633	7.928	135	190	0.019	1259.926	21.816	-1.863	14.075	25.385
90	145	0.000	1188.849	10.152	5.046	1.945	6.916	136	191	0.	1258.945	22.032	-0.981	14.308	24.730
91	146	0.050	1191.740	10.481	2.891	1.725	9.359	137	192	0.021	1256.301	22.255	-2.643	13.951	26.603
92	147	0.	1196.840	10.760	5.100	2.406	7.514	138	193	0.	1255.461	22.466	-0.840	14.532	25.023
93	148	0.158	1199.640	11.212	2.800	2.917	10.049	139	194	0.027	1252.748	22.689	-2.714	14.891	27.102
94	149	0.172	1204.514	11.661	4.874	3.295	8.524	140	195	0.009	1251.616	22.897	-1.132	15.043	25.745
95	150	0.199	1207.725	12.218	3.211	4.434	10.502	141	196	0.172	1249.611	23.506	-2.005	16.163	26.993
96	151	0.204	1212.396	12.548	4.671	4.981	9.402	142	197	0.185	1248.761	23.755	-0.849	16.875	26.094

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 56, BA.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
53	109	0.018	852.444	-1.952	13.958	-5.180	-18.071	99	155	0.235	1237.174	14.507	3.143	6.309	9.807
54	110	0.012	868.035	-1.572	15.591	-5.052	-19.305	100	156	0.232	1241.396	14.771	4.222	6.494	9.054
55	111	0.030	881.183	-1.173	13.148	-5.064	-16.474	101	157	0.237	1244.248	15.067	2.852	6.847	10.687
56	112	0.022	896.192	-0.051	15.009	-4.874	-17.922	102	158	0.233	1248.093	15.325	3.845	6.995	9.994
57	113	0.098	907.817	0.484	11.625	-4.830	-14.020	103	159	0.240	1250.639	15.635	2.546	7.294	11.553
58	114	0.137	921.674	0.810	13.857	-4.479	-14.889	104	160	0.230	1254.119	15.852	3.481	7.443	10.914
59	115	0.189	932.917	1.380	11.243	-3.868	-11.777	105	161	0.225	1256.339	16.110	2.220	7.732	12.410
60	116	0.191	946.352	1.768	13.434	-3.651	-13.330	106	162	0.215	1259.423	16.347	3.084	7.777	11.786
61	117	0.226	957.310	2.269	10.958	-2.774	-10.481	107	163	0.209	1261.297	16.595	1.874	7.960	13.220
62	118	0.222	970.156	2.612	12.846	-2.552	-11.834	108	164	0.199	1264.151	16.829	2.854	8.158	12.476
63	119	0.242	980.677	3.062	10.521	-1.805	-9.171	109	165	0.193	1265.739	17.076	1.589	8.367	13.956
64	120	0.229	992.906	3.364	12.229	-1.713	-10.438	110	166	0.184	1268.360	17.311	2.621	8.580	13.155
65	121	0.239	1002.900	3.766	9.994	-1.222	-7.896	111	167	0.179	1269.668	17.557	1.308	8.787	14.686
66	122	0.223	1014.569	4.061	11.669	-1.187	-9.181	112	168	0.169	1272.092	17.788	2.424	9.030	13.798
67	123	0.225	1024.019	4.417	9.450	-0.856	-6.675	113	169	0.161	1273.172	18.024	1.080	9.287	15.355
68	124	0.212	1035.185	4.723	11.166	-0.799	-8.033	114	170	0.148	1275.450	18.254	2.278	9.571	14.377
69	125	0.211	1044.182	5.074	8.997	-0.489	-5.585	115	171	0.139	1276.399	18.505	0.949	9.893	15.891
70	126	0.193	1054.836	5.372	10.654	-0.426	-6.903	116	172	0.122	1278.557	18.727	2.159	10.199	14.883
71	127	0.192	1063.354	5.709	8.517	-0.163	-4.492	117	173	0.104	1279.387	18.956	0.829	10.522	16.371
72	128	0.173	1073.544	6.000	10.191	-0.085	-5.865	118	174	0.087	1281.523	19.139	2.137	10.903	15.254
73	129	0.163	1081.681	6.324	8.137	0.202	-3.534	119	175	0.051	1282.388	19.325	0.865	11.333	16.739
74	130	0.147	1091.418	6.605	9.737	0.295	-4.862	120	176	0.053	1284.390	19.565	2.002	11.612	15.815
75	131	0.135	1099.221	6.929	7.803	0.596	-2.695	121	177	0.052	1285.298	19.804	0.908	12.058	17.067
76	132	0.102	1108.703	7.192	9.482	0.824	-4.111	122	178	0.023	1286.890	20.015	1.592	12.130	16.600
77	133	0.085	1116.331	7.466	7.629	1.262	-2.097	123	179	0.030	1287.642	20.257	0.752	12.457	17.709
78	134	0.019	1125.736	7.709	9.405	1.539	-3.584	124	180	0.007	1289.037	20.477	1.395	12.692	17.301
79	135	0.	1133.283	8.033	7.547	2.153	-1.535	125	181	0.004	1289.752	20.709	0.715	13.139	18.222
80	136	0.003	1142.453	8.349	9.170	2.449	-2.824	126	182	0.001	1290.702	20.938	0.950	13.146	18.221
81	137	0.016	1149.867	8.675	7.415	2.971	-0.753	127	183	0.013	1289.739	21.174	-0.963	11.936	20.366
82	138	0.001	1158.578	8.984	8.711	3.156	-1.723	128	184	0.004	1289.576	21.399	-0.163	11.286	19.804
83	139	0.021	1163.805	9.313	5.227	1.621	2.075	129	185	0.013	1288.465	21.630	-1.112	11.607	20.983
84	140	0.003	1170.043	9.620	6.238	-0.223	1.391	130	186	0.007	1288.172	21.853	-0.293	11.933	20.398
85	141	0.016	1174.883	9.940	4.840	0.047	3.105	131	187	0.013	1286.909	22.080	-1.262	12.245	21.595
86	142	0.005	1180.835	10.245	5.952	0.387	2.314	132	188	0.006	1286.504	22.300	-0.406	12.584	20.967
87	143	0.013	1185.288	10.558	4.452	0.641	4.126	133	189	0.017	1285.074	22.526	-1.429	12.871	22.215
88	144	0.004	1190.949	10.861	5.661	0.971	3.233	134	190	0.002	1284.529	22.740	-0.546	13.176	21.557
89	145	0.026	1194.982	11.179	4.034	1.181	5.168	135	191	0.020	1282.892	22.966	-1.637	13.420	22.868
90	146	0.002	1200.317	11.468	5.334	1.468	4.174	136	192	0.	1282.122	23.177	-0.770	13.631	22.225
91	147	0.065	1203.572	11.832	3.255	1.323	6.559	137	193	0.023	1279.702	23.400	-2.420	13.297	24.099
92	148	0.003	1208.907	12.066	5.335	1.914	4.859	138	194	0.	1279.068	23.606	-0.634	13.859	22.527
93	149	0.169	1212.256	12.616	3.350	2.702	7.197	139	195	0.030	1276.579	23.831	-2.489	14.237	24.598
94	150	0.184	1217.445	12.931	5.189	3.069	6.057	140	196	0.159	1275.821	24.206	-0.757	14.531	23.250
95	151	0.210	1221.016	13.291	3.571	4.293	8.042	141	197	0.178	1274.073	24.462	-1.748	15.719	24.702
96	152	0.213	1225.989	13.594	4.974	4.841	7.058	142	198	0.190	1273.462	24.701	-0.611	16.448	23.824
97	153	0.225	1229.388	13.908	3.398	5.587	8.922	143	199	0.200	1271.676	24.920	-1.786	17.276	25.270
98	154	0.227	1234.030	14.195	4.643	5.888	8.040	144	200	0.203	1270.887	25.131	-0.789	17.585	24.519

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 57, LA.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
55	112	0.146	877.488	-3.695	13.561	-5.203	-15.142	101	158	0.244	1257.304	13.056	3.152	6.343	11.294
56	113	0.149	893.015	-3.177	15.527	-4.887	-16.637	102	159	0.242	1261.410	13.317	4.105	6.490	10.628
57	114	0.190	906.003	-1.815	12.987	-4.649	-13.720	103	160	0.247	1264.251	13.612	2.841	6.775	12.154
58	115	0.190	920.358	-1.316	14.356	-4.180	-14.611	104	161	0.239	1267.967	13.848	3.716	6.904	11.567
59	116	0.225	932.240	-0.678	11.881	-3.389	-11.030	105	162	0.233	1270.427	14.088	2.460	7.128	13.063
60	117	0.228	946.046	-0.306	13.806	-3.113	-12.451	106	163	0.225	1273.734	14.312	3.308	7.172	12.464
61	118	0.250	957.539	0.229	11.493	-2.293	-9.762	107	164	0.218	1275.844	14.548	2.110	7.320	13.897
62	119	0.247	970.723	0.568	13.184	-2.155	-11.004	108	165	0.209	1278.913	14.763	3.069	7.543	13.180
63	120	0.259	981.686	1.009	10.962	-1.650	-8.442	109	166	0.201	1280.732	14.993	1.819	7.735	14.659
64	121	0.250	994.221	1.315	12.536	-1.618	-9.613	110	167	0.194	1283.571	15.211	2.839	7.955	13.881
65	122	0.254	1004.606	1.706	10.384	-1.305	-7.150	111	168	0.188	1285.107	15.439	1.536	8.150	15.422
66	123	0.242	1016.562	1.993	11.956	-1.275	-8.354	112	169	0.179	1287.744	15.652	2.637	8.400	14.562
67	124	0.242	1026.370	2.351	9.808	-1.059	-5.915	113	170	0.171	1289.044	15.872	1.300	8.638	16.130
68	125	0.230	1037.815	2.630	11.445	-0.988	-7.209	114	171	0.160	1291.507	16.058	2.463	8.908	15.206
69	126	0.227	1047.151	2.968	9.336	-0.745	-4.802	115	172	0.150	1292.658	16.260	1.151	9.216	16.751
70	127	0.216	1058.079	3.243	10.928	-0.679	-6.066	116	173	0.136	1294.976	16.418	2.317	9.485	15.827
71	128	0.207	1066.897	3.544	8.819	-0.506	-3.665	117	174	0.115	1295.995	16.608	1.019	9.806	17.373
72	129	0.197	1077.365	3.821	10.468	-0.394	-5.012	118	175	0.098	1298.345	16.821	2.350	10.219	16.274
73	130	0.184	1085.773	4.092	8.408	-0.166	-2.646	119	176	0.095	1299.423	17.035	1.078	10.697	17.752
74	131	0.168	1095.743	4.325	9.970	-0.096	-3.912	120	177	0.064	1301.583	17.192	2.160	10.903	16.912
75	132	0.154	1103.810	4.589	8.066	0.158	-1.720	121	178	0.058	1302.707	17.409	1.125	11.349	18.208
76	133	0.123	1113.452	4.749	9.642	0.345	-2.988	122	179	0.020	1304.568	17.678	1.861	11.448	17.717
77	134	0.103	1121.370	5.039	7.918	0.783	-0.951	123	180	0.027	1305.555	17.913	0.987	11.766	18.760
78	135	0.016	1130.966	5.230	9.596	1.160	-2.349	124	181	0.008	1307.191	18.155	1.636	12.022	18.354
79	136	0.	1138.846	5.564	7.881	1.686	-0.363	125	182	0.005	1308.141	18.389	0.949	12.460	19.254
80	137	0.005	1148.332	5.880	9.486	2.010	-1.675	126	183	0.001	1309.322	18.621	1.182	12.468	19.255
81	138	0.016	1156.073	6.206	7.741	2.528	0.394	127	184	0.013	1308.598	18.859	-0.724	11.260	21.392
82	139	0.002	1165.098	6.520	9.025	2.700	-0.570	128	185	0.005	1308.665	19.089	0.067	10.606	20.831
83	140	0.020	1170.651	6.846	5.553	1.164	3.212	129	186	0.013	1307.787	19.322	-0.878	10.927	22.005
84	141	0.005	1177.206	7.163	6.555	-0.683	2.533	130	187	0.008	1307.722	19.550	-0.066	11.249	21.421
85	142	0.015	1182.367	7.484	5.161	-0.420	4.233	131	188	0.013	1306.688	19.779	-1.033	11.559	22.612
86	143	0.007	1188.631	7.796	6.264	-0.087	3.445	132	189	0.008	1306.507	20.003	-0.182	11.894	21.988
87	144	0.013	1193.399	8.111	4.768	0.161	5.245	133	190	0.016	1305.303	20.229	-1.204	12.179	23.230
88	145	0.008	1199.368	8.419	5.968	0.483	4.358	134	191	0.004	1304.978	20.449	-0.326	12.479	22.579
89	146	0.024	1203.708	8.726	4.341	0.684	6.284	135	192	0.019	1303.564	20.672	-1.413	12.721	23.882
90	147	0.006	1209.348	9.032	5.640	0.966	5.304	136	193	0.	1303.018	20.896	-0.546	12.934	23.238
91	148	0.145	1212.983	9.411	3.635	0.885	7.593	137	194	0.022	1300.812	21.110	-2.206	12.591	25.103
92	149	0.164	1218.671	9.764	5.688	1.527	5.954	138	195	0.002	1300.394	21.326	-0.418	13.154	23.547
93	150	0.192	1222.719	10.463	4.048	2.684	7.909	139	196	0.163	1298.289	21.711	-2.105	13.693	25.438
94	151	0.204	1228.275	10.831	5.556	3.140	6.765	140	197	0.179	1297.992	22.171	-0.297	14.236	23.946
95	152	0.223	1232.265	11.249	3.990	4.330	8.660	141	198	0.191	1296.503	22.430	-1.489	15.460	25.373
96	153	0.226	1237.528	11.538	5.263	4.719	7.725	142	199	0.202	1296.163	22.702	-0.340	16.253	24.460
97	154	0.239	1241.288	11.900	3.760	5.268	9.521	143	200	0.209	1294.623	22.947	-1.540	16.717	25.888
98	155	0.237	1246.198	12.168	4.910	5.508	8.696	144	201	0.212	1294.053	23.167	-0.570	16.997	25.144
99	156	0.243	1249.667	12.494	3.469	5.892	10.418	145	202	0.217	1292.420	23.417	-1.633	17.370	26.418
100	157	0.241	1254.152	12.757	4.485	6.022	9.694	146	203	0.219	1291.640	23.620	-0.780	17.589	25.776

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 58, CE.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
56	114	0.161	891.500	-1.515	15.905	-4.830	-19.244	102	160	0.248	1275.622	14.212	4.367	5.931	8.412
57	115	0.203	904.965	-1.037	13.465	-4.513	-16.332	103	161	0.253	1278.752	14.501	3.130	6.209	9.913
58	116	0.212	920.427	0.069	15.462	-4.060	-17.753	104	162	0.245	1282.707	14.740	3.955	6.319	9.379
59	117	0.243	932.813	0.573	12.385	-3.300	-14.235	105	163	0.238	1285.416	14.989	2.709	6.482	10.865
60	118	0.249	946.995	0.948	14.182	-2.975	-14.817	106	164	0.231	1288.959	15.224	3.543	6.544	10.273
61	119	0.266	958.937	1.398	11.943	-2.275	-12.183	107	165	0.224	1291.311	15.466	2.352	6.676	11.701
62	120	0.264	972.462	1.738	13.524	-2.185	-13.356	108	166	0.215	1294.608	15.695	3.298	6.891	10.986
63	121	0.271	983.826	2.141	11.365	-1.779	-10.846	109	167	0.206	1296.670	15.937	2.061	7.078	12.451
64	122	0.265	996.673	2.452	12.847	-1.778	-11.953	110	168	0.199	1299.747	16.176	3.078	7.302	11.631
65	123	0.266	1007.425	2.819	10.752	-1.547	-9.524	111	169	0.192	1301.524	16.416	1.776	7.489	13.180
66	124	0.255	1019.673	3.111	12.248	-1.528	-10.663	112	170	0.183	1304.392	16.648	2.868	7.737	12.309
67	125	0.253	1029.824	3.454	10.151	-1.371	-8.250	113	171	0.174	1305.931	16.887	1.539	7.968	13.848
68	126	0.242	1041.566	3.751	11.743	-1.297	-9.502	114	172	0.163	1308.627	17.120	2.696	8.240	12.906
69	127	0.238	1051.230	4.079	9.663	-1.084	-7.129	115	173	0.151	1310.020	17.361	1.393	8.553	14.409
70	128	0.226	1062.450	4.372	11.221	-1.030	-8.363	116	174	0.136	1312.585	17.610	2.566	8.841	13.424
71	129	0.219	1071.571	4.673	9.120	-0.907	-5.976	117	175	0.121	1313.837	17.842	1.251	9.143	14.929
72	130	0.207	1082.345	4.980	10.774	-0.786	-7.300	118	176	0.099	1316.392	18.048	2.556	9.540	13.825
73	131	0.191	1091.049	5.276	8.704	-0.599	-4.984	119	177	0.095	1317.713	18.290	1.320	10.031	15.223
74	132	0.175	1101.307	5.564	10.258	-0.532	-6.302	120	178	0.064	1320.133	18.550	2.420	10.314	14.333
75	133	0.158	1109.682	5.872	8.375	-0.294	-4.160	121	179	0.059	1321.503	18.795	1.370	10.820	15.509
76	134	0.130	1119.637	6.185	9.955	-0.076	-5.502	122	180	0.033	1323.533	18.964	2.030	10.847	15.107
77	135	0.110	1127.834	6.464	8.197	0.318	-3.555	123	181	0.033	1324.763	19.208	1.230	11.169	16.135
78	136	0.051	1137.701	6.735	9.867	0.703	-4.982	124	182	0.008	1326.612	19.421	1.850	11.427	15.748
79	137	0.	1145.875	7.029	8.174	1.249	-3.154	125	183	0.004	1327.795	19.654	1.182	11.858	16.566
80	138	0.004	1155.684	7.352	9.809	1.653	-4.558	126	184	0.001	1329.208	19.886	1.413	11.876	16.560
81	139	0.018	1163.745	7.672	8.061	2.167	-2.537	127	185	0.013	1328.714	20.116	-0.494	10.667	18.692
82	140	0.001	1173.081	7.983	9.336	2.333	-3.465	128	186	0.004	1329.009	20.344	0.295	10.012	18.166
83	141	0.023	1178.957	8.306	5.876	0.794	0.267	129	187	0.014	1328.360	20.573	-0.649	10.326	19.324
84	142	0.004	1185.817	8.611	6.860	-1.056	-0.340	130	188	0.008	1328.518	20.797	0.159	10.647	18.773
85	143	0.021	1191.294	8.927	5.477	-0.806	1.319	131	189	0.018	1327.712	21.024	-0.806	10.952	19.957
86	144	0.006	1197.862	9.231	6.568	-0.476	0.610	132	190	0.007	1327.751	21.244	0.039	11.285	19.405
87	145	0.031	1202.943	9.544	5.081	-0.235	2.388	133	191	0.023	1326.774	21.471	-0.977	11.570	20.592
88	146	0.006	1209.210	9.842	6.267	0.080	1.565	134	192	0.002	1326.664	21.686	-0.110	11.865	20.013
89	147	0.030	1213.870	10.161	4.660	0.287	3.434	135	193	0.021	1325.474	21.910	-1.190	12.105	21.232
90	148	0.003	1219.794	10.445	5.924	0.550	2.495	136	194	0.	1325.133	22.115	-0.341	12.309	20.636
91	149	0.148	1223.842	10.859	4.049	0.565	4.650	137	195	0.026	1323.159	22.347	-1.974	11.972	22.456
92	150	0.172	1229.846	11.175	6.003	1.234	3.449	138	196	0.	1322.944	22.550	-0.215	12.528	20.965
93	151	0.204	1234.258	11.539	4.412	2.391	5.476	139	197	0.167	1321.155	22.866	-1.789	13.159	22.705
94	152	0.215	1240.142	11.867	5.885	2.941	4.447	140	198	0.187	1321.093	23.101	-0.062	13.731	21.708
95	153	0.231	1244.470	12.205	4.328	3.919	6.331	141	199	0.200	1319.842	23.338	-1.252	14.968	23.206
96	154	0.235	1250.027	12.499	5.556	4.287	5.471	142	200	0.208	1319.728	23.565	-0.113	15.612	22.332
97	155	0.246	1254.112	12.824	4.086	4.802	7.242	143	201	0.215	1318.415	23.792	-1.314	16.047	23.757
98	156	0.244	1259.302	13.104	5.190	5.018	6.457	144	202	0.217	1318.055	24.002	-0.359	16.298	23.039
99	157	0.249	1263.064	13.397	3.762	5.381	8.158	145	203	0.221	1316.633	24.213	-1.472	16.663	24.317
100	158	0.247	1267.815	13.663	4.751	5.490	7.470	146	204	0.223	1316.059	24.420	-0.574	16.878	23.686
101	159	0.250	1271.255	13.951	3.440	5.787	9.051	147	205	0.227	1314.515	24.629	-1.544	17.217	24.870

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 59, PR.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
58	117	0.241	917.795	-2.632	15.904	-3.515	-17.031	104	163	0.251	1295.499	12.792	4.196	5.794	9.959
59	118	0.260	931.395	-1.417	13.600	-2.902	-14.303	105	164	0.244	1298.449	13.033	2.950	5.903	11.434
60	119	0.266	945.972	-1.023	14.576	-2.682	-14.837	106	165	0.240	1302.229	13.270	3.780	5.967	10.847
61	120	0.275	958.323	-0.615	12.351	-2.212	-11.523	107	166	0.232	1304.812	13.502	2.584	6.091	12.298
62	121	0.274	972.197	-0.264	13.874	-2.144	-12.660	108	167	0.226	1308.338	13.729	3.525	6.308	11.596
63	122	0.278	983.938	0.112	11.740	-1.896	-10.167	109	168	0.215	1310.596	13.927	2.258	6.457	13.109
64	123	0.274	997.118	0.445	13.180	-1.901	-11.251	110	169	0.210	1313.921	14.173	3.325	6.713	12.281
65	124	0.274	1008.227	0.802	11.109	-1.754	-8.851	111	170	0.202	1315.919	14.395	1.998	6.892	13.842
66	125	0.267	1020.792	1.119	12.565	-1.724	-9.964	112	171	0.195	1318.997	14.605	3.078	7.130	13.018
67	126	0.264	1031.282	1.458	10.490	-1.619	-7.586	113	172	0.185	1320.751	14.820	1.754	7.348	14.585
68	127	0.255	1043.318	1.752	12.036	-1.538	-8.804	114	173	0.176	1323.647	15.020	2.896	7.607	13.684
69	128	0.250	1053.305	2.075	9.986	-1.360	-6.452	115	174	0.163	1325.227	15.207	1.580	7.888	15.239
70	129	0.241	1064.812	2.362	11.507	-1.298	-7.659	116	175	0.147	1327.984	15.398	2.757	8.181	14.303
71	130	0.239	1074.263	2.692	9.451	-1.183	-5.302	117	176	0.136	1329.434	15.598	1.451	8.481	15.848
72	131	0.224	1085.283	2.938	11.020	-1.091	-6.543	118	177	0.113	1332.154	15.761	2.719	8.883	14.825
73	132	0.205	1094.223	3.174	8.940	-0.969	-4.181	119	178	0.103	1333.683	15.971	1.530	9.394	16.236
74	133	0.195	1104.739	3.432	10.516	-0.921	-5.470	120	179	0.067	1336.230	16.097	2.546	9.590	15.467
75	134	0.176	1113.352	3.670	8.613	-0.716	-3.257	121	180	0.062	1337.857	16.354	1.627	10.139	16.658
76	135	0.151	1123.496	3.859	10.144	-0.542	-4.490	122	181	0.043	1340.115	16.583	2.258	10.238	16.264
77	136	0.128	1131.937	4.102	8.440	-0.168	-2.485	123	182	0.039	1341.578	16.815	1.462	10.575	17.269
78	137	0.094	1141.938	4.237	10.002	0.191	-3.752	124	183	0.014	1343.578	16.965	2.000	10.714	16.952
79	138	0.060	1150.344	4.469	8.406	0.679	-1.836	125	184	0.008	1344.985	17.191	1.408	11.135	17.851
80	139	0.020	1160.426	4.742	10.082	1.165	-3.186	126	185	0.004	1346.623	17.415	1.638	11.137	17.863
81	140	0.026	1168.833	5.088	8.407	1.692	-1.149	127	186	0.017	1346.392	17.679	-0.231	9.957	19.971
82	141	0.008	1178.441	5.360	9.608	1.814	-2.059	128	187	0.010	1346.901	17.892	0.509	9.284	19.434
83	142	0.031	1184.694	5.737	6.253	0.326	1.647	129	188	0.022	1346.509	18.149	-0.393	9.615	20.582
84	143	0.018	1191.830	6.013	7.136	-1.563	1.025	130	189	0.020	1346.886	18.368	0.378	9.926	20.015
85	144	0.042	1197.690	6.396	5.859	-1.256	2.647	131	190	0.041	1346.374	18.662	-0.513	10.292	21.139
86	145	0.040	1204.548	6.686	6.858	-0.953	1.897	132	191	0.030	1346.583	18.832	0.210	10.567	20.579
87	146	0.051	1209.993	7.050	5.445	-0.669	3.631	133	192	0.040	1345.894	19.120	-0.689	10.910	21.752
88	147	0.044	1216.522	7.312	6.529	-0.405	2.830	134	193	0.016	1345.923	19.260	0.030	11.121	21.198
89	148	0.040	1221.506	7.636	4.984	-0.188	4.690	135	194	0.025	1344.986	19.513	-0.937	11.388	22.462
90	149	0.123	1227.710	7.917	6.205	0.048	3.765	136	195	0.004	1344.832	19.700	-0.154	11.560	21.869
91	150	0.179	1232.512	8.670	4.802	0.509	5.473	137	196	0.034	1343.127	19.968	-1.705	11.268	23.664
92	151	0.199	1238.951	9.105	6.439	1.308	4.177	138	197	0.013	1343.077	20.133	-0.050	11.764	22.185
93	152	0.222	1243.807	9.549	4.856	2.529	6.071	139	198	0.186	1342.018	20.863	-1.059	12.911	23.451
94	153	0.230	1250.019	9.877	6.212	3.053	5.050	140	199	0.209	1342.265	21.172	0.247	13.576	22.313
95	154	0.242	1254.715	10.245	4.696	3.701	6.879	141	200	0.219	1341.278	21.437	-0.987	14.694	23.788
96	155	0.245	1260.572	10.546	5.857	4.002	6.025	142	201	0.220	1341.390	21.661	0.112	15.103	22.918
97	156	0.253	1264.977	10.865	4.405	4.417	7.769	143	202	0.223	1340.312	21.898	-1.077	15.514	24.312
98	157	0.251	1270.440	11.138	5.463	4.617	7.022	144	203	0.225	1340.168	22.112	-0.145	15.709	23.591
99	158	0.256	1274.503	11.439	4.063	4.920	8.690	145	204	0.227	1338.963	22.329	-1.205	16.045	24.857
100	159	0.254	1279.523	11.708	5.020	5.030	8.025	146	205	0.230	1338.603	22.544	-0.360	16.255	24.218
101	160	0.256	1283.252	11.997	3.728	5.290	9.585	147	206	0.232	1337.274	22.758	-1.329	16.559	25.395
102	161	0.254	1287.883	12.261	4.631	5.436	8.964	148	207	0.232	1336.694	22.957	-0.580	16.759	24.851
103	162	0.258	1291.303	12.551	3.420	5.704	10.438	149	208	0.234	1335.281	23.170	-1.413	17.100	25.881

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 60, ND.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
60	120	0.283	946.018	0.046	15.665	-2.704	-17.662	106	166	0.247	1316.328	14.099	4.034	5.326	8.785
61	121	0.289	958.755	0.432	12.737	-2.353	-14.314	107	167	0.236	1319.152	14.339	2.824	5.440	10.266
62	122	0.289	972.988	0.791	14.233	-2.302	-14.727	108	168	0.231	1322.923	14.585	3.771	5.669	9.515
63	123	0.291	985.084	1.147	12.096	-2.148	-12.258	109	169	0.220	1325.419	14.823	2.497	5.814	11.020
64	124	0.287	998.593	1.475	13.509	-2.163	-13.304	110	170	0.214	1328.978	15.057	3.559	6.075	10.165
65	125	0.285	1010.046	1.819	11.452	-2.076	-10.923	111	171	0.205	1331.232	15.313	2.254	6.267	11.702
66	126	0.278	1022.914	2.122	12.868	-2.054	-12.004	112	172	0.199	1334.553	15.557	3.321	6.511	10.811
67	127	0.274	1033.732	2.450	10.818	-1.988	-9.652	113	173	0.187	1336.548	15.797	1.995	6.730	12.395
68	128	0.266	1046.070	2.752	12.339	-1.897	-10.859	114	174	0.178	1339.684	16.037	3.136	6.997	11.454
69	129	0.260	1056.370	3.066	10.300	-1.749	-8.534	115	175	0.165	1341.504	16.278	1.821	7.279	12.974
70	130	0.251	1068.178	3.366	11.808	-1.683	-9.743	116	176	0.150	1344.500	16.516	2.995	7.578	12.007
71	131	0.248	1077.957	3.694	9.779	-1.568	-7.434	117	177	0.139	1346.197	16.762	1.697	7.882	13.471
72	132	0.232	1089.260	3.977	11.303	-1.485	-8.648	118	178	0.113	1349.137	16.984	2.941	8.257	12.431
73	133	0.210	1098.487	4.263	9.226	-1.379	-6.339	119	179	0.102	1350.914	17.231	1.777	8.783	13.749
74	134	0.202	1109.313	4.573	10.826	-1.327	-7.651	120	180	0.070	1353.733	17.503	2.819	9.045	12.910
75	135	0.180	1118.224	4.872	8.911	-1.121	-5.544	121	181	0.065	1355.597	17.740	1.864	9.589	14.023
76	136	0.156	1128.669	5.172	10.445	-0.934	-6.875	122	182	0.040	1358.064	17.949	2.467	9.636	13.643
77	137	0.131	1137.404	5.467	8.735	-0.573	-4.950	123	183	0.036	1359.747	18.169	1.683	9.949	14.614
78	138	0.087	1147.725	5.787	10.321	-0.207	-6.347	124	184	0.007	1362.054	18.476	2.307	10.226	14.242
79	139	0.	1156.457	6.113	8.732	0.328	-4.592	125	185	0.004	1363.704	18.719	1.650	10.646	15.096
80	140	0.002	1166.902	6.476	10.445	0.906	-6.036	126	186	0.000	1365.581	18.958	1.877	10.673	15.102
81	141	0.019	1175.600	6.766	8.698	1.429	-4.111	127	187	0.013	1365.553	19.160	-0.028	9.463	17.238
82	142	0.000	1185.558	7.117	9.959	1.579	-5.043	128	188	0.003	1366.308	19.407	0.755	8.805	16.697
83	143	0.025	1192.073	7.379	6.515	0.033	-1.300	129	189	0.015	1366.119	19.610	-0.189	9.110	17.867
84	144	0.003	1199.554	7.724	7.481	-1.822	-1.929	130	190	0.008	1366.730	19.844	0.612	9.426	17.305
85	145	0.029	1205.662	7.973	6.108	-1.589	-0.260	131	191	0.026	1366.380	20.006	-0.350	9.725	18.491
86	146	0.004	1212.841	8.293	7.179	-1.271	-0.986	132	192	0.006	1366.864	20.281	0.484	10.050	17.919
87	147	0.054	1218.569	8.577	5.728	-1.020	0.753	133	193	0.031	1366.339	20.445	-0.525	10.332	19.120
88	148	0.002	1225.413	8.891	6.844	-0.744	0.032	134	194	0.001	1366.666	20.742	0.327	10.620	18.532
89	149	0.034	1230.693	9.187	5.280	-0.545	1.863	135	195	0.022	1365.919	20.933	-0.747	10.850	19.785
90	150	0.	1237.203	9.493	6.510	-0.301	0.934	136	196	0.	1366.009	21.176	0.090	11.050	19.184
91	151	0.188	1242.346	9.834	5.143	0.181	2.953	137	197	0.028	1364.480	21.353	-1.529	10.711	21.013
92	152	0.207	1249.096	10.144	6.750	1.007	1.852	138	198	0.	1364.687	21.610	0.207	11.259	19.855
93	153	0.230	1254.286	10.479	5.190	2.149	3.802	139	199	0.193	1363.796	21.777	-0.891	12.342	21.469
94	154	0.238	1260.811	10.792	6.525	2.670	2.880	140	200	0.220	1364.283	22.018	0.488	13.044	20.437
95	155	0.248	1265.815	11.100	5.003	3.262	4.730	141	201	0.227	1363.525	22.247	-0.759	14.075	21.846
96	156	0.251	1271.964	11.391	6.149	3.526	3.920	142	202	0.225	1363.842	22.452	0.317	14.453	20.958
97	157	0.260	1276.679	11.702	4.716	3.914	5.671	143	203	0.227	1362.976	22.664	-0.866	14.839	22.306
98	158	0.257	1282.411	11.971	5.731	4.089	4.992	144	204	0.229	1363.038	22.870	0.062	15.015	21.585
99	159	0.261	1286.766	12.263	4.355	4.359	6.627	145	205	0.230	1362.039	23.076	-0.999	15.329	22.861
100	160	0.260	1292.054	12.531	5.288	4.457	5.994	146	206	0.233	1361.886	23.283	-0.153	15.536	22.220
101	161	0.262	1296.065	12.813	4.010	4.706	7.539	147	207	0.235	1360.763	23.489	-1.123	15.834	23.420
102	162	0.260	1300.958	13.076	4.894	4.848	6.941	148	208	0.235	1360.380	23.686	-0.383	16.026	22.902
103	163	0.263	1304.675	13.372	3.717	5.125	8.379	149	209	0.237	1359.170	23.889	-1.210	16.359	23.922
104	164	0.257	1309.100	13.602	4.425	5.183	7.952	150	210	0.232	1358.435	24.075	-0.735	16.403	23.652
105	165	0.248	1312.293	13.844	3.193	5.246	9.420	151	211	0.231	1357.029	24.269	-1.406	16.623	24.492

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 61, PM.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
61	122	0.306	957.478	-1.276	13.820	-2.212	-15.113	107	168	0.254	1331.655	12.504	3.021	4.911	10.554
62	123	0.302	972.044	-0.944	14.566	-2.222	-15.516	108	169	0.250	1335.657	12.734	4.002	5.133	9.856
63	124	0.304	984.507	-0.578	12.462	-2.111	-12.381	109	170	0.236	1338.361	12.942	2.704	5.254	11.426
64	125	0.299	998.340	-0.253	13.833	-2.152	-13.409	110	171	0.232	1342.151	13.173	3.790	5.518	10.629
65	126	0.297	1010.127	0.082	11.787	-2.105	-11.016	111	172	0.218	1344.582	13.350	2.430	5.690	12.251
66	127	0.293	1023.298	0.384	13.170	-2.115	-12.052	112	173	0.211	1348.161	13.608	3.579	5.945	11.373
67	128	0.288	1034.429	0.697	11.131	-2.093	-9.666	113	174	0.203	1350.355	13.807	2.195	6.142	13.009
68	129	0.283	1047.054	0.983	12.625	-2.033	-10.810	114	175	0.192	1353.696	14.012	3.340	6.404	12.119
69	130	0.277	1057.653	1.283	10.599	-1.924	-8.429	115	176	0.179	1355.725	14.220	2.029	6.679	13.682
70	131	0.272	1069.740	1.562	12.088	-1.873	-9.565	116	177	0.164	1358.885	14.385	3.160	6.943	12.798
71	132	0.267	1079.830	1.873	10.090	-1.770	-7.219	117	178	0.150	1360.785	14.589	1.900	7.263	14.319
72	133	0.257	1091.365	2.105	11.535	-1.742	-8.318	118	179	0.123	1363.881	14.744	3.096	7.602	13.370
73	134	0.265	1100.880	2.393	9.514	-1.678	-5.936	119	180	0.109	1365.861	14.946	1.980	8.131	14.720
74	135	0.232	1111.897	2.584	11.017	-1.681	-7.154	120	181	0.080	1368.837	15.105	2.977	8.389	13.967
75	136	0.201	1121.011	2.787	9.114	-1.507	-4.832	121	182	0.070	1370.925	15.328	2.087	8.946	15.102
76	137	0.179	1131.672	3.003	10.661	-1.363	-6.044	122	183	0.045	1373.578	15.514	2.654	9.054	14.778
77	138	0.150	1140.596	3.192	8.924	-1.051	-3.994	123	184	0.039	1375.514	15.767	1.936	9.362	15.748
78	139	0.112	1151.083	3.357	10.487	-0.709	-5.225	124	185	0.009	1378.017	15.963	2.503	9.607	15.415
79	140	0.084	1160.083	3.626	9.001	-0.148	-3.433	125	186	0.005	1379.900	16.196	1.883	10.027	16.267
80	141	0.008	1170.706	3.804	10.623	0.473	-4.743	126	187	0.001	1382.008	16.428	2.108	10.136	16.274
81	142	0.022	1179.733	4.134	9.027	1.094	-2.818	127	188	0.015	1382.222	16.670	0.214	8.942	18.399
82	143	0.002	1189.991	4.432	10.258	1.270	-3.740	128	189	0.005	1383.204	16.896	0.981	8.285	17.860
83	144	0.028	1196.842	4.769	6.852	-0.286	-0.024	129	190	0.018	1383.253	17.134	0.049	8.565	19.022
84	145	0.007	1204.619	5.065	7.777	-2.117	-0.642	130	191	0.012	1384.089	17.359	0.836	8.893	18.461
85	146	0.057	1211.072	5.410	6.453	-1.917	0.991	131	192	0.041	1384.000	17.620	-0.089	9.197	19.612
86	147	0.047	1218.540	5.699	7.468	-1.585	0.284	132	193	0.016	1384.677	17.813	0.677	9.496	19.073
87	148	0.074	1224.663	6.093	6.122	-1.322	1.933	133	194	0.040	1384.415	18.076	-0.262	9.746	20.231
88	149	0.084	1231.774	6.361	7.111	-1.069	1.230	134	195	0.005	1384.922	18.256	0.507	10.044	19.687
89	150	0.133	1237.355	6.662	5.581	-0.933	3.055	135	196	0.023	1384.410	18.491	-0.512	10.221	20.925
90	151	0.176	1244.517	7.314	7.162	-0.300	1.773	136	197	0.	1384.711	18.702	0.301	10.493	20.328
91	152	0.211	1250.166	7.819	5.649	0.365	3.576	137	198	0.300	1383.760	19.280	-0.951	10.478	21.797
92	153	0.231	1257.305	8.210	7.140	1.300	2.378	138	199	0.289	1384.483	19.796	0.723	11.355	20.084
93	154	0.248	1262.909	8.623	5.603	2.101	4.192	139	200	0.278	1383.939	20.143	-0.544	12.516	21.585
94	155	0.255	1269.762	8.951	6.854	2.516	3.194	140	201	0.263	1384.588	20.305	0.650	13.216	20.686
95	156	0.261	1275.102	9.287	5.339	3.000	4.975	141	202	0.251	1384.017	20.492	-0.572	13.703	22.134
96	157	0.265	1281.568	9.604	6.466	3.254	4.115	142	203	0.242	1384.499	20.658	0.483	13.939	21.317
97	158	0.270	1286.620	9.941	5.053	3.611	5.787	143	204	0.239	1383.840	20.864	-0.659	14.267	22.690
98	159	0.268	1292.611	10.200	5.990	3.743	5.118	144	205	0.240	1384.117	21.080	0.277	14.433	21.966
99	160	0.270	1297.265	10.499	4.655	3.993	6.735	145	206	0.237	1383.324	21.285	-0.794	14.716	23.235
100	161	0.270	1302.821	10.767	5.556	4.086	6.103	146	207	0.241	1383.401	21.515	0.077	14.938	22.570
101	162	0.271	1307.117	11.052	4.296	4.319	7.639	147	208	0.242	1382.500	21.737	-0.901	15.242	23.737
102	163	0.270	1312.272	11.314	5.155	4.454	7.049	148	209	0.241	1382.309	21.929	-0.191	15.411	23.226
103	164	0.271	1316.270	11.595	3.998	4.724	8.479	149	210	0.242	1381.305	22.135	-1.004	15.736	24.241
104	165	0.267	1320.931	11.831	4.661	4.753	8.080	150	211	0.238	1380.739	22.304	-0.566	15.750	24.000
105	166	0.257	1324.331	12.037	3.400	4.732	9.620	151	212	0.236	1379.516	22.487	-1.223	15.940	24.858
106	167	0.261	1328.635	12.307	4.304	4.841	9.014	152	213	0.235	1378.564	22.678	-0.952	15.909	24.795

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 62, SM.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
63	125	0.302	984.148	-0.358	12.806	-2.901	-14.813	109	171	0.230	1351.998	13.637	2.993	4.551	9.459
64	126	0.297	998.329	-0.012	14.180	-2.954	-15.165	110	172	0.226	1356.050	13.899	4.052	4.832	8.603
65	127	0.294	1010.464	0.336	12.135	-2.916	-12.788	111	173	0.214	1358.752	14.170	2.702	5.037	10.204
66	128	0.288	1023.980	0.683	13.517	-2.908	-13.831	112	174	0.210	1362.582	14.421	3.830	5.309	9.304
67	129	0.283	1035.461	1.032	11.480	-2.880	-11.468	113	175	0.202	1365.032	14.677	2.450	5.505	10.906
68	130	0.277	1048.441	1.388	12.981	-2.768	-12.638	114	176	0.192	1368.624	14.928	3.591	5.775	9.994
69	131	0.271	1059.393	1.740	10.952	-2.634	-10.296	115	177	0.178	1370.901	15.176	2.277	6.057	11.538
70	132	0.263	1071.829	2.088	12.436	-2.537	-11.462	116	178	0.162	1374.322	15.437	3.422	6.343	10.579
71	133	0.259	1082.265	2.435	10.436	-2.400	-9.152	117	179	0.150	1376.469	15.683	2.147	6.669	12.055
72	134	0.248	1094.161	2.796	11.896	-2.312	-10.294	118	180	0.124	1379.799	15.918	3.330	7.004	11.074
73	135	0.244	1103.960	3.080	9.799	-2.292	-7.906	119	181	0.109	1382.022	16.161	2.223	7.530	12.330
74	136	0.224	1115.397	3.500	11.437	-2.158	-9.168	120	182	0.078	1385.244	16.406	3.222	7.811	11.527
75	137	0.201	1124.845	3.834	9.449	-1.936	-6.984	121	183	0.069	1387.574	16.649	2.330	8.365	12.580
76	138	0.179	1135.820	4.148	10.974	-1.788	-8.299	122	184	0.044	1390.479	16.901	2.905	8.452	12.225
77	139	0.150	1145.076	4.480	9.256	-1.443	-6.338	123	185	0.039	1392.650	17.136	2.171	8.758	13.159
78	140	0.113	1155.868	4.785	10.792	-1.096	-6.775	124	186	0.009	1395.385	17.367	2.734	9.025	12.822
79	141	0.082	1165.181	5.098	9.314	-0.518	-6.025	125	187	0.004	1397.500	17.600	2.116	9.458	13.649
80	142	0.005	1176.132	5.426	10.951	0.112	-7.450	126	188	0.000	1399.839	17.831	2.339	9.490	13.666
81	143	0.022	1185.469	5.735	9.336	0.716	-5.667	127	189	0.014	1400.281	18.059	0.442	8.282	15.778
82	144	0.001	1196.036	6.045	10.567	0.839	-6.579	128	190	0.004	1401.492	18.289	1.211	7.616	15.248
83	145	0.029	1203.195	6.353	7.159	-0.699	-2.868	129	191	0.017	1401.768	18.515	0.275	7.920	16.422
84	146	0.005	1211.281	6.662	8.086	-2.572	-3.464	130	192	0.010	1402.829	18.741	1.062	8.226	15.859
85	147	0.049	1218.041	6.969	6.760	-2.327	-1.842	131	193	0.041	1402.967	18.967	0.138	8.554	17.015
86	148	0.043	1225.813	7.273	7.772	-2.036	-2.458	132	194	0.013	1403.864	19.187	0.896	8.839	16.523
87	149	0.071	1232.221	7.559	6.408	-1.736	-0.791	133	195	0.040	1403.826	19.411	-0.038	9.151	17.669
88	150	0.077	1239.627	7.854	7.406	-1.509	-1.453	134	196	0.002	1404.552	19.630	0.726	9.393	17.139
89	151	0.135	1245.508	8.153	5.880	-1.357	0.444	135	197	0.023	1404.256	19.846	-0.296	9.622	18.342
90	152	0.175	1252.959	8.442	7.451	-0.749	-0.672	136	198	0.	1404.774	20.063	0.518	9.813	17.755
91	153	0.209	1258.901	8.735	5.942	-0.087	1.292	137	199	0.292	1403.784	20.024	-0.990	9.570	19.476
92	154	0.225	1266.318	9.013	7.417	0.820	0.230	138	200	0.275	1404.741	20.258	0.957	10.437	18.488
93	155	0.242	1272.174	9.265	5.855	1.532	2.140	139	201	0.256	1404.492	20.554	-0.248	11.717	19.882
94	156	0.248	1279.294	9.532	7.120	1.903	1.223	140	202	0.244	1405.368	20.780	0.876	12.386	18.917
95	157	0.255	1284.900	9.799	5.606	2.319	3.044	141	203	0.241	1405.034	21.017	-0.334	12.943	20.323
96	158	0.259	1291.625	10.058	6.725	2.519	2.231	142	204	0.234	1405.748	21.249	0.714	13.169	19.468
97	159	0.266	1296.946	10.326	5.321	2.836	3.934	143	205	0.234	1405.301	21.460	-0.447	13.481	20.809
98	160	0.264	1303.218	10.608	6.272	2.959	3.277	144	206	0.235	1405.777	21.659	0.476	13.640	20.086
99	161	0.266	1308.142	10.877	4.924	3.168	4.897	145	207	0.234	1405.188	21.864	-0.589	13.917	21.363
100	162	0.265	1313.974	11.152	5.831	3.268	4.275	146	208	0.238	1405.455	22.054	0.267	14.122	20.695
101	163	0.267	1318.539	11.422	4.565	3.478	5.813	147	209	0.239	1404.753	22.253	-0.701	14.419	21.896
102	164	0.265	1323.967	11.695	5.428	3.618	5.228	148	210	0.239	1404.763	22.454	0.010	14.582	21.391
103	165	0.268	1328.229	11.958	4.262	3.869	6.661	149	211	0.239	1403.956	22.651	-0.807	14.898	22.407
104	166	0.262	1333.168	12.237	4.940	3.915	6.260	150	212	0.235	1403.591	22.853	-0.364	14.917	22.166
105	167	0.253	1336.867	12.536	3.699	3.896	7.756	151	213	0.234	1402.576	23.060	-1.015	15.111	23.008
106	168	0.254	1341.427	12.793	4.561	4.032	7.132	152	214	0.233	1401.820	23.257	-0.756	15.090	22.933
107	169	0.246	1344.731	13.076	3.304	4.143	8.660	153	215	0.229	1400.379	23.458	-1.441	15.055	23.813
108	170	0.241	1349.005	13.348	4.274	4.382	7.933	154	216	0.230	1399.385	23.649	-0.995	15.204	23.551

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 63, EU.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
65	128	0.297	1009.366	-1.097	12.473	-3.435	-12.852	111	174	0.230	1371.103	12.351	2.930	4.447	10.574
66	129	0.293	1023.210	-0.770	13.844	-3.425	-13.874	112	175	0.224	1375.156	12.574	4.053	4.710	9.724
67	130	0.289	1035.021	-0.440	11.811	-3.402	-11.491	113	176	0.214	1377.835	12.803	2.679	4.959	11.362
68	131	0.284	1048.314	-0.127	13.293	-3.279	-12.617	114	177	0.207	1381.656	13.033	3.821	5.200	10.497
69	132	0.278	1059.585	0.192	11.271	-3.139	-10.236	115	178	0.190	1384.118	13.218	2.462	5.468	12.108
70	133	0.273	1072.331	0.502	12.746	-3.018	-11.357	116	179	0.177	1387.742	13.420	3.624	5.751	11.229
71	134	0.268	1083.084	0.819	10.753	-2.863	-9.015	117	180	0.160	1390.091	13.622	2.349	6.071	12.749
72	135	0.260	1095.271	1.110	12.187	-2.764	-10.102	118	181	0.136	1393.570	13.771	3.479	6.390	11.883
73	136	0.266	1105.446	1.486	10.175	-2.679	-7.734	119	182	0.115	1395.988	13.966	2.419	6.908	13.217
74	137	0.246	1117.078	1.682	11.632	-2.582	-8.912	120	183	0.086	1399.372	14.128	3.384	7.196	12.514
75	138	0.221	1126.738	1.893	9.660	-2.436	-6.514	121	184	0.073	1401.922	14.348	2.550	7.766	13.603
76	139	0.201	1137.955	2.135	11.217	-2.237	-7.680	122	185	0.051	1405.027	14.548	3.105	7.894	13.290
77	140	0.167	1147.410	2.334	9.455	-1.896	-5.583	123	186	0.043	1407.424	14.774	2.397	8.204	14.240
78	141	0.136	1158.374	2.506	10.964	-1.593	-6.744	124	187	0.003	1410.367	14.982	2.943	8.493	13.936
79	142	0.096	1167.900	2.718	9.526	-0.991	-4.956	125	188	0.	1412.723	15.222	2.356	8.914	14.763
80	143	0.	1179.019	2.887	11.120	-0.358	-6.207	126	189	0.	1415.277	15.438	2.554	8.965	14.789
81	144	0.026	1188.674	3.206	9.655	0.296	-4.401	127	190	0.013	1415.958	15.677	0.681	7.763	16.907
82	145	0.	1199.544	3.509	10.870	0.543	-5.303	128	191	0.	1417.407	15.915	1.449	7.104	16.370
83	146	0.037	1207.034	3.839	7.490	-0.994	-1.624	129	192	0.016	1417.906	16.139	0.499	7.389	17.538
84	147	0.	1215.417	4.136	8.383	-2.869	-2.209	130	193	0.	1419.200	16.370	1.294	7.701	16.983
85	148	0.072	1222.573	4.531	7.156	-2.565	-0.679	131	194	0.050	1419.604	16.637	0.405	8.056	18.091
86	149	0.074	1230.648	4.834	8.075	-2.267	-1.323	132	195	0.041	1420.713	16.849	1.108	8.329	17.594
87	150	0.086	1237.392	5.171	6.745	-1.975	0.306	133	196	0.046	1420.909	17.083	0.196	8.613	18.724
88	151	0.125	1245.169	5.542	7.777	-1.666	-0.429	134	197	0.	1421.816	17.264	0.907	8.844	18.241
89	152	0.165	1251.505	5.997	6.336	-1.453	1.288	135	198	0.024	1421.747	17.491	-0.069	9.037	19.457
90	153	0.195	1259.410	6.452	7.906	-0.658	-0.031	136	199	0.	1422.477	17.703	0.730	9.260	18.880
91	154	0.222	1265.766	6.865	6.355	0.116	1.777	137	200	0.296	1422.446	18.662	-0.031	9.741	19.858
92	155	0.240	1273.531	7.213	7.765	0.719	0.617	138	201	0.285	1423.592	18.851	1.146	10.586	18.446
93	156	0.251	1279.734	7.561	6.203	1.274	2.421	139	202	0.270	1423.502	19.010	-0.089	11.448	19.948
94	157	0.257	1287.162	7.868	7.427	1.561	1.440	140	203	0.260	1424.575	19.206	1.072	11.797	19.075
95	158	0.261	1293.074	8.174	5.912	1.870	3.217	141	204	0.252	1424.434	19.400	-0.141	12.200	20.518
96	159	0.265	1300.097	8.472	7.024	2.040	2.368	142	205	0.245	1425.327	19.579	0.894	12.444	19.712
97	160	0.270	1305.713	8.767	5.615	2.316	4.037	143	206	0.241	1425.081	19.780	-0.247	12.769	21.087
98	161	0.268	1312.257	9.039	6.544	2.394	3.370	144	207	0.242	1425.768	19.991	0.687	12.974	20.368
99	162	0.270	1317.466	9.324	5.210	2.551	4.980	145	208	0.240	1425.367	20.180	-0.401	13.232	21.655
100	163	0.269	1323.569	9.595	6.103	2.664	4.360	146	209	0.243	1425.867	20.412	0.500	13.455	20.977
101	164	0.271	1328.412	9.874	4.843	2.852	5.895	147	210	0.243	1425.371	20.618	-0.496	13.752	22.145
102	165	0.269	1334.107	10.141	5.695	2.991	5.310	148	211	0.242	1425.580	20.817	0.209	13.885	21.640
103	166	0.271	1338.645	10.417	4.538	3.234	6.740	149	212	0.242	1424.975	21.020	-0.605	14.181	22.655
104	167	0.267	1343.840	10.672	5.195	3.273	6.345	150	213	0.239	1424.802	21.210	-0.174	14.198	22.422
105	168	0.258	1347.777	10.911	3.937	3.212	7.884	151	214	0.237	1423.971	21.395	-0.831	14.371	23.284
106	169	0.261	1352.609	11.181	4.831	3.383	7.289	152	215	0.236	1423.409	21.589	-0.562	14.376	23.226
107	170	0.256	1356.155	11.424	3.547	3.530	8.829	153	216	0.233	1422.154	21.774	-1.256	14.342	24.118
108	171	0.252	1360.674	11.670	4.519	3.745	8.142	154	217	0.234	1421.356	21.971	-0.797	14.498	23.865
109	172	0.243	1363.871	11.873	3.197	3.921	9.737	155	218	0.233	1419.773	22.163	-1.583	14.557	24.841
110	173	0.238	1368.173	12.123	4.302	4.221	8.942	156	219	0.233	1418.876	22.352	-0.898	14.845	24.351

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 64, GD.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
66	130	0.285	1022.748	-0.462	14.194	-3.876	-15.648	112	176	0.215	1388.415	13.259	4.317	4.070	7.794
67	131	0.281	1034.914	-0.107	12.166	-3.844	-13.280	113	177	0.208	1391.371	13.535	2.956	4.324	9.399
68	132	0.275	1048.566	0.252	13.651	-3.710	-14.425	114	178	0.200	1395.444	13.788	4.074	4.567	8.511
69	133	0.269	1060.191	0.607	11.626	-3.564	-12.066	115	179	0.185	1398.188	14.070	2.744	4.861	10.078
70	134	0.263	1073.287	0.956	13.096	-3.449	-13.202	116	180	0.172	1402.057	14.315	3.869	5.138	9.153
71	135	0.259	1084.387	1.302	11.099	-3.301	-10.878	117	181	0.157	1404.671	14.580	2.614	5.475	10.621
72	136	0.249	1096.930	1.659	12.543	-3.194	-11.993	118	182	0.131	1408.423	14.853	3.752	5.806	9.662
73	137	0.249	1107.384	1.938	10.454	-3.176	-9.586	119	183	0.114	1411.103	15.115	2.680	6.339	10.902
74	138	0.231	1119.442	2.364	12.058	-3.014	-10.863	120	184	0.085	1414.742	15.370	3.639	6.648	10.133
75	139	0.210	1129.492	2.754	10.050	-2.763	-8.560	121	185	0.072	1417.534	15.612	2.792	7.217	11.169
76	140	0.194	1141.044	3.089	11.552	-2.647	-9.788	122	186	0.048	1420.882	15.855	3.348	7.343	10.814
77	141	0.162	1150.848	3.438	9.803	-2.293	-7.762	123	187	0.041	1423.520	16.096	2.638	7.651	11.736
78	142	0.129	1162.161	3.787	11.313	-1.954	-9.077	124	188	0.010	1426.703	16.336	3.183	7.928	11.421
79	143	0.094	1172.029	4.130	9.868	-1.341	-7.434	125	189	0.005	1429.283	16.561	2.580	8.338	12.229
80	144	0.010	1183.491	4.472	11.462	-0.671	-8.831	126	190	0.001	1432.083	16.806	2.800	8.404	12.236
81	145	0.025	1193.459	4.784	9.968	-0.017	-7.156	127	191	0.015	1432.995	17.037	0.912	7.200	14.350
82	146	0.001	1204.628	5.083	11.169	0.200	-8.036	128	192	0.005	1434.662	17.255	1.667	6.528	13.847
83	147	0.032	1212.426	5.392	7.798	-1.338	-4.390	129	193	0.019	1435.401	17.495	0.739	6.825	14.995
84	148	0.009	1221.111	5.694	8.686	-3.219	-4.928	130	194	0.013	1436.913	17.713	1.512	7.126	14.470
85	149	0.069	1228.542	5.969	7.431	-2.948	-3.388	131	195	0.046	1437.524	17.920	0.611	7.461	15.595
86	150	0.071	1236.916	6.269	8.374	-2.660	-3.932	132	196	0.028	1438.851	18.138	1.327	7.726	15.134
87	151	0.084	1243.958	6.565	7.041	-2.378	-2.292	133	197	0.043	1439.275	18.366	0.424	8.012	16.265
88	152	0.115	1252.010	6.841	8.052	-2.098	-2.983	134	198	0.005	1440.421	18.606	1.147	8.263	15.761
89	153	0.156	1258.597	7.092	6.586	-1.920	-1.116	135	199	0.024	1440.575	18.828	0.154	8.454	16.944
90	154	0.190	1266.760	7.350	8.164	-1.162	-2.256	136	200	0.	1441.522	19.045	0.947	8.675	16.388
91	155	0.216	1273.365	7.599	6.605	-0.438	-0.307	137	201	0.283	1441.255	18.809	-0.267	8.704	17.806
92	156	0.229	1281.372	7.842	8.007	0.119	-1.348	138	202	0.266	1442.668	19.077	1.413	9.599	16.813
93	157	0.243	1287.819	8.085	6.447	0.623	0.529	139	203	0.253	1442.867	19.364	0.199	10.788	18.256
94	158	0.249	1295.508	8.346	7.689	0.895	-0.407	140	204	0.242	1444.169	19.594	1.302	11.133	17.370
95	159	0.255	1301.683	8.609	6.175	1.214	1.395	141	205	0.240	1444.257	19.823	0.088	11.469	18.791
96	160	0.258	1308.967	8.869	7.284	1.378	0.574	142	206	0.234	1445.385	20.058	1.128	11.722	17.961
97	161	0.264	1314.844	9.132	5.878	1.649	2.260	143	207	0.234	1445.354	20.273	-0.031	12.024	19.323
98	162	0.262	1321.664	9.407	6.819	1.743	1.599	144	208	0.235	1446.240	20.472	0.886	12.197	18.613
99	163	0.265	1327.147	9.681	5.483	1.906	3.212	145	209	0.234	1446.061	20.694	-0.178	12.466	19.885
100	164	0.264	1333.525	9.956	6.378	2.012	2.593	146	210	0.238	1446.734	20.867	0.673	12.662	19.239
101	165	0.265	1338.635	10.223	5.110	2.198	4.134	147	211	0.239	1446.438	21.067	-0.296	12.955	20.415
102	166	0.264	1344.603	10.496	5.968	2.335	3.549	148	212	0.238	1446.848	21.268	0.410	13.099	19.914
103	167	0.266	1349.402	10.757	4.799	2.569	4.988	149	213	0.239	1446.441	21.466	-0.407	13.393	20.931
104	168	0.261	1354.879	11.039	5.477	2.617	4.579	150	214	0.235	1446.472	21.671	0.031	13.415	20.695
105	169	0.253	1359.116	11.338	4.237	2.592	6.087	151	215	0.234	1445.853	21.882	-0.620	13.602	21.541
106	170	0.253	1364.202	11.593	5.086	2.739	5.503	152	216	0.233	1445.489	22.079	-0.364	13.602	21.482
107	171	0.246	1368.034	11.878	3.832	2.872	7.021	153	217	0.230	1444.439	22.285	-1.050	13.568	22.364
108	172	0.241	1372.826	12.151	4.792	3.103	6.320	154	218	0.230	1443.832	22.476	-0.607	13.717	22.114
109	173	0.232	1376.333	12.462	3.507	3.307	7.861	155	219	0.229	1442.445	22.671	-1.387	13.770	23.090
110	174	0.229	1380.895	12.722	4.562	3.595	7.055	156	220	0.228	1441.741	22.865	-0.704	14.061	22.600
111	175	0.219	1384.098	12.995	3.203	3.805	8.665	157	221	0.226	1440.131	23.058	-1.610	14.226	23.697

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 65, TB.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
68	133	0.274	1047.343	-1.223	13.985	-4.162	-14.351	114	179	0.210	1407.484	12.039	4.311	4.033	8.808
69	134	0.269	1059.303	-0.888	11.960	-4.013	-11.987	115	180	0.199	1410.427	12.239	2.944	4.297	10.439
70	135	0.263	1072.726	-0.561	13.423	-3.883	-13.110	116	181	0.186	1414.509	12.452	4.082	4.558	9.602
71	136	0.260	1084.155	-0.232	11.428	-3.725	-10.775	117	182	0.168	1417.303	12.632	2.794	4.890	11.168
72	137	0.252	1097.016	0.086	12.861	-3.610	-11.877	118	183	0.143	1421.222	12.799	3.919	5.185	10.350
73	138	0.254	1107.797	0.413	10.781	-3.582	-9.452	119	184	0.119	1424.092	12.989	2.870	5.707	11.705
74	139	0.238	1120.150	0.707	12.352	-3.417	-10.697	120	185	0.092	1427.921	13.179	3.829	6.056	11.029
75	140	0.223	1130.474	0.982	10.324	-3.267	-8.310	121	186	0.076	1430.914	13.380	2.993	6.631	12.138
76	141	0.211	1142.303	1.259	11.829	-3.070	-9.438	122	187	0.052	1434.473	13.592	3.560	6.806	11.829
77	142	0.178	1152.301	1.453	9.998	-2.732	-7.255	123	188	0.043	1437.341	13.821	2.868	7.124	12.760
78	143	0.151	1163.813	1.652	11.512	-2.437	-8.347	124	189	0.014	1440.729	14.027	3.388	7.407	12.477
79	144	0.106	1173.877	1.848	10.064	-1.828	-6.506	125	190	0.008	1443.537	14.253	2.807	7.818	13.308
80	145	0.029	1185.521	2.030	11.643	-1.148	-7.697	126	191	0.003	1446.563	14.480	3.026	7.901	13.326
81	146	0.031	1195.810	2.351	10.289	-0.385	-5.987	127	192	0.017	1447.727	14.732	1.164	6.709	15.423
82	147	0.007	1207.253	2.625	11.443	-0.061	-6.841	128	193	0.009	1449.613	14.951	1.886	6.041	14.915
83	148	0.037	1215.401	2.975	8.148	-1.569	-3.221	129	194	0.024	1450.600	15.200	0.987	6.347	16.051
84	149	0.024	1224.372	3.261	8.971	-3.467	-3.767	130	195	0.023	1452.336	15.423	1.736	6.634	15.515
85	150	0.089	1232.202	3.660	7.830	-3.127	-2.313	131	196	0.051	1453.203	15.679	0.866	7.002	16.612
86	151	0.094	1240.884	3.967	8.682	-2.829	-2.907	132	197	0.041	1454.757	15.906	1.554	7.262	16.134
87	152	0.095	1248.245	4.287	7.362	-2.622	-1.292	133	198	0.046	1455.400	16.125	0.643	7.500	17.271
88	153	0.145	1256.698	4.688	8.453	-2.245	-2.082	134	199	0.018	1456.736	16.315	1.337	7.729	16.796
89	154	0.186	1263.722	5.125	7.024	-1.966	-0.435	135	200	0.027	1457.128	16.552	0.391	7.924	17.980
90	155	0.203	1272.275	5.515	8.554	-1.189	-1.777	136	201	0.001	1458.278	16.756	1.151	8.167	17.428
91	156	0.222	1279.242	5.877	6.967	-0.558	0.016	137	202	0.279	1458.699	17.444	0.420	8.656	18.386
92	157	0.234	1287.565	6.193	8.323	-0.140	-1.124	138	203	0.264	1460.341	17.673	1.642	9.569	16.822
93	158	0.245	1294.318	6.499	6.753	0.258	0.691	139	204	0.253	1460.756	17.889	0.415	10.015	18.308
94	159	0.250	1302.296	6.788	7.977	0.470	-0.284	140	205	0.245	1462.266	18.097	1.510	10.379	17.456
95	160	0.255	1308.758	7.075	6.462	0.729	1.496	141	206	0.242	1462.563	18.306	0.297	10.766	18.903
96	161	0.258	1316.322	7.356	7.564	0.866	0.659	142	207	0.237	1463.894	18.509	1.331	11.024	18.084
97	162	0.264	1322.480	7.636	6.158	1.111	2.335	143	208	0.236	1464.070	18.717	0.177	11.342	19.464
98	163	0.262	1329.576	7.912	7.096	1.184	1.643	144	209	0.237	1465.164	18.924	1.093	11.541	18.755
99	164	0.265	1335.335	8.188	5.759	1.328	3.273	145	210	0.236	1465.190	19.129	0.027	11.815	20.023
100	165	0.264	1341.986	8.462	6.651	1.435	2.639	146	211	0.239	1466.071	19.337	0.881	12.008	19.376
101	166	0.265	1347.370	8.735	5.383	1.608	4.181	147	212	0.240	1465.979	19.541	-0.092	12.317	20.535
102	167	0.264	1353.608	9.004	6.238	1.744	3.594	148	213	0.239	1466.590	19.742	0.611	12.428	20.019
103	168	0.266	1358.676	9.273	5.068	1.969	5.036	149	214	0.240	1466.385	19.944	-0.205	12.719	21.042
104	169	0.261	1364.420	9.541	5.744	2.018	4.626	150	215	0.236	1466.611	20.138	0.226	12.736	20.807
105	170	0.253	1368.922	9.807	4.502	1.982	6.147	151	216	0.235	1466.188	20.335	-0.423	12.918	21.679
106	171	0.254	1374.272	10.070	5.350	2.137	5.585	152	217	0.234	1466.020	20.532	-0.168	12.923	21.626
107	172	0.248	1378.364	10.330	4.092	2.291	7.104	153	218	0.231	1465.163	20.725	-0.857	12.897	22.514
108	173	0.244	1383.412	10.586	5.048	2.508	6.429	154	219	0.232	1464.752	20.920	-0.411	13.048	22.274
109	174	0.235	1387.167	10.834	3.756	2.717	8.004	155	220	0.231	1463.558	21.114	-1.194	13.110	23.249
110	175	0.233	1391.981	11.086	4.814	3.011	7.218	156	221	0.230	1463.045	21.305	-0.513	13.394	22.764
111	176	0.226	1395.426	11.328	3.445	3.260	8.850	157	222	0.229	1461.627	21.496	-1.418	13.558	23.866
112	177	0.222	1399.987	11.572	4.561	3.519	8.015	158	223	0.227	1461.013	21.682	-0.613	13.843	23.257
113	178	0.216	1403.172	11.802	3.186	3.774	9.664	159	224	0.224	1459.459	21.865	-1.555	14.090	24.395

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 66, DY.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
70	136	0.258	1072.597	-0.129	13.763	-4.263	-14.834	116	182	0.173	1427.688	13.179	4.359	3.949	7.631
71	137	0.255	1084.357	0.202	11.759	-4.130	-12.505	117	183	0.158	1430.790	13.487	3.102	4.307	9.121
72	138	0.245	1097.563	0.547	13.206	-4.020	-13.627	118	184	0.133	1435.014	13.792	4.224	4.663	8.205
73	139	0.240	1108.670	0.873	11.107	-4.012	-11.213	119	185	0.115	1438.167	14.075	3.153	5.202	9.479
74	140	0.228	1121.382	1.232	12.712	-3.843	-12.499	120	186	0.088	1442.270	14.349	4.102	5.551	8.732
75	141	0.210	1132.082	1.608	10.700	-3.597	-10.190	121	187	0.074	1445.520	14.606	3.250	6.122	9.739
76	142	0.195	1144.264	1.961	12.182	-3.473	-11.390	122	188	0.051	1449.319	14.845	3.799	6.282	9.422
77	143	0.165	1154.684	2.383	10.420	-3.103	-9.343	123	189	0.042	1452.424	15.083	3.105	6.594	10.341
78	144	0.136	1166.589	2.776	11.905	-2.750	-10.585	124	190	0.011	1456.062	15.332	3.638	6.885	10.039
79	145	0.099	1177.042	3.164	10.453	-2.101	-8.885	125	191	0.005	1459.107	15.570	3.045	7.292	10.849
80	146	0.015	1189.040	3.519	11.998	-1.416	-10.222	126	192	0.001	1462.367	15.805	3.261	7.369	10.867
81	147	0.028	1199.629	3.820	10.589	-0.695	-8.619	127	193	0.016	1463.745	16.019	1.378	6.167	12.982
82	148	0.002	1211.397	4.144	11.768	-0.389	-9.485	128	194	0.005	1465.869	16.256	2.124	5.491	12.469
83	149	0.035	1219.822	4.421	8.425	-1.932	-5.845	129	195	0.021	1467.069	16.469	1.200	5.779	13.622
84	150	0.012	1229.106	4.734	9.284	-3.817	-6.382	130	196	0.015	1469.032	16.696	1.963	6.075	13.091
85	151	0.080	1237.194	4.992	8.088	-3.527	-4.897	131	197	0.049	1470.109	16.906	1.076	6.413	14.204
86	152	0.084	1246.171	5.288	8.977	-3.235	-5.426	132	198	0.039	1471.888	17.131	1.779	6.680	13.749
87	153	0.090	1253.833	5.588	7.662	-3.004	-3.807	133	199	0.045	1472.750	17.351	0.862	6.931	14.884
88	154	0.125	1262.504	5.806	8.671	-2.707	-4.518	134	200	0.006	1474.325	17.589	1.575	7.179	14.400
89	155	0.161	1269.716	5.994	7.212	-2.537	-2.628	135	201	0.025	1474.924	17.796	0.599	7.354	15.579
90	156	0.191	1278.476	6.200	8.759	-1.829	-3.807	136	202	0.	1476.302	18.024	1.378	7.586	15.024
91	157	0.214	1285.659	6.417	7.183	-1.233	-1.884	137	203	0.273	1476.380	17.682	0.078	7.510	16.538
92	158	0.226	1294.227	6.662	8.568	-0.828	-2.929	138	204	0.246	1478.282	17.941	1.902	8.465	15.258
93	159	0.239	1301.229	6.911	7.002	-0.431	-1.058	139	205	0.245	1478.939	18.183	0.658	9.389	16.730
94	160	0.244	1309.472	7.176	8.243	-0.196	-1.994	140	206	0.233	1480.684	18.418	1.745	9.721	15.857
95	161	0.251	1316.199	7.441	6.727	0.085	-0.193	141	207	0.233	1481.195	18.632	0.511	10.033	17.293
96	162	0.254	1324.032	7.710	7.833	0.229	-1.014	142	208	0.230	1482.752	18.858	1.556	10.287	16.460
97	163	0.260	1330.437	7.957	6.405	0.459	0.693	143	209	0.231	1483.137	19.066	0.385	10.585	17.836
98	164	0.258	1337.826	8.249	7.389	0.564	-0.014	144	210	0.232	1484.431	19.268	1.295	10.751	17.136
99	165	0.261	1343.843	8.508	6.018	0.704	1.633	145	211	0.232	1484.665	19.475	0.234	11.016	18.404
100	166	0.260	1350.769	8.782	6.926	0.810	0.999	146	212	0.235	1485.732	19.661	1.067	11.197	17.777
101	167	0.262	1356.419	9.049	5.650	0.977	2.546	147	213	0.237	1485.826	19.847	0.095	11.470	18.955
102	168	0.260	1362.930	9.322	6.511	1.110	1.957	148	214	0.236	1486.644	20.054	0.818	11.615	18.458
103	169	0.263	1368.263	9.587	5.334	1.333	3.403	149	215	0.237	1486.636	20.251	-0.008	11.903	19.465
104	170	0.257	1374.287	9.867	6.024	1.388	2.968	150	216	0.233	1487.085	20.474	0.449	11.942	19.224
105	171	0.250	1379.074	10.152	4.788	1.377	4.483	151	217	0.232	1486.864	20.676	-0.221	12.128	20.076
106	172	0.249	1384.685	10.413	5.611	1.511	3.926	152	218	0.231	1486.895	20.875	0.031	12.128	20.022
107	173	0.241	1389.058	10.694	4.373	1.647	5.425	153	219	0.228	1486.243	21.080	-0.652	12.096	20.901
108	174	0.237	1394.389	10.977	5.331	1.892	4.727	154	220	0.228	1486.025	21.273	-0.219	12.241	20.662
109	175	0.229	1398.416	11.249	4.028	2.088	6.273	155	221	0.227	1485.027	21.468	-0.998	12.293	21.637
110	176	0.225	1403.493	11.512	5.077	2.372	5.483	156	222	0.225	1484.710	21.665	-0.317	12.583	21.150
111	177	0.216	1407.219	11.793	3.726	2.591	7.086	157	223	0.223	1483.488	21.861	-1.222	12.748	22.246
112	178	0.212	1412.053	12.067	4.834	2.864	6.221	158	224	0.220	1483.071	22.058	-0.417	13.035	21.632
113	179	0.206	1415.509	12.336	3.455	3.116	7.836	159	225	0.213	1481.723	22.264	-1.348	13.296	22.751
114	180	0.198	1420.084	12.600	4.575	3.374	6.965	160	226	0.210	1481.194	22.484	-0.529	13.568	22.114
115	181	0.185	1423.329	12.902	3.245	3.663	8.531	161	227	0.206	1479.706	22.680	-1.488	13.818	23.236

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 67, HO.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
71	138	0.255	1083.154	-1.203	12.084	-4.445	-12.605	117	184	0.163	1442.437	11.647	3.309	3.715	9.564
72	139	0.247	1096.674	-0.889	13.521	-4.347	-13.711	118	185	0.141	1446.864	11.849	4.427	4.060	8.756
73	140	0.245	1108.101	-0.569	11.427	-4.349	-11.265	119	186	0.121	1450.220	12.052	3.356	4.622	10.153
74	141	0.233	1121.110	-0.272	13.009	-4.201	-12.501	120	187	0.093	1454.476	12.206	4.256	4.959	9.553
75	142	0.218	1132.092	0.009	10.982	-4.000	-10.110	121	188	0.076	1457.958	12.438	3.482	5.571	10.664
76	143	0.206	1144.558	0.294	12.467	-3.886	-11.182	122	189	0.054	1461.982	12.663	4.024	5.766	10.367
77	144	0.174	1155.221	0.538	10.663	-3.548	-8.983	123	190	0.044	1465.318	12.894	3.336	6.109	11.300
78	145	0.148	1167.374	0.785	12.153	-3.224	-10.016	124	191	0.011	1469.173	13.111	3.855	6.405	11.018
79	146	0.117	1178.036	0.994	10.662	-2.561	-8.103	125	192	0.005	1472.452	13.345	3.279	6.816	11.837
80	147	0.026	1190.228	1.188	12.192	-1.880	-9.201	126	193	0.000	1475.945	13.578	3.493	6.921	11.853
81	148	0.031	1201.129	1.500	10.902	-1.043	-7.516	127	194	0.016	1477.556	13.810	1.611	5.724	13.962
82	149	0.001	1213.195	1.798	12.065	-0.621	-8.381	128	195	0.005	1479.909	14.040	2.354	5.051	13.451
83	150	0.039	1221.942	2.120	8.747	-2.163	-4.765	129	196	0.022	1481.341	14.272	1.432	5.319	14.599
84	151	0.014	1231.515	2.408	9.573	-0.033	-5.296	130	197	0.017	1483.530	14.498	2.189	5.622	14.069
85	152	0.090	1239.963	2.769	8.448	-3.733	-3.864	131	198	0.053	1484.855	14.746	1.325	5.959	15.159
86	153	0.101	1249.244	3.073	9.281	-3.423	-4.437	132	199	0.043	1486.852	14.964	1.997	6.221	14.695
87	154	0.100	1257.204	3.370	7.960	-3.293	-2.826	133	200	0.048	1487.942	15.192	1.090	6.444	15.828
88	155	0.142	1266.306	3.802	9.102	-2.873	-3.670	134	201	0.004	1489.720	15.395	1.778	6.668	15.359
89	156	0.177	1273.886	4.170	7.580	-2.654	-2.007	135	202	0.026	1490.544	15.620	0.823	6.849	16.545
90	157	0.198	1282.993	4.517	9.107	-2.000	-3.364	136	203	0.	1492.136	15.834	1.592	7.104	15.994
91	158	0.219	1290.515	4.856	7.523	-1.501	-1.641	137	204	0.270	1492.757	16.377	0.621	7.334	17.184
92	159	0.230	1299.389	5.162	8.873	-1.182	-2.841	138	205	0.247	1494.887	16.605	2.130	8.314	15.455
93	160	0.241	1306.695	5.466	7.306	-0.842	-1.044	139	206	0.245	1495.759	16.819	0.871	8.765	16.743
94	161	0.246	1315.223	5.752	8.528	-0.637	-2.054	140	207	0.237	1497.706	17.022	1.947	9.070	15.833
95	162	0.251	1322.236	6.037	7.012	-0.378	-0.275	141	208	0.236	1498.429	17.233	0.723	9.377	17.289
96	163	0.254	1330.347	6.315	8.111	-0.244	-1.119	142	209	0.232	1500.190	17.439	1.762	9.629	16.449
97	164	0.260	1337.029	6.593	6.682	-0.024	0.576	143	210	0.232	1500.785	17.648	0.594	9.927	17.834
98	165	0.258	1344.693	6.868	7.664	0.076	-0.150	144	211	0.233	1502.286	17.855	1.502	10.098	17.127
99	166	0.261	1350.985	7.142	6.292	0.210	1.501	145	212	0.233	1502.726	18.062	0.440	10.361	18.388
100	167	0.259	1358.183	7.414	7.197	0.311	0.858	146	213	0.236	1503.999	18.268	1.273	10.541	17.758
101	168	0.261	1364.104	7.685	5.921	0.474	2.408	147	214	0.238	1504.319	18.493	0.320	10.834	18.901
102	169	0.259	1370.884	7.954	6.779	0.602	1.814	148	215	0.237	1505.318	18.674	0.999	10.952	18.396
103	170	0.262	1376.472	8.209	5.588	0.807	3.277	149	216	0.238	1505.527	18.891	0.209	11.252	19.409
104	171	0.257	1382.775	8.488	6.303	0.872	2.819	150	217	0.234	1506.157	19.072	0.630	11.272	19.165
105	172	0.250	1387.828	8.754	5.053	0.858	4.350	151	218	0.233	1506.134	19.270	-0.023	11.454	20.051
106	173	0.249	1393.701	9.016	5.872	0.986	3.817	152	219	0.232	1506.362	19.467	0.227	11.456	20.004
107	174	0.243	1398.333	9.275	4.632	1.115	5.324	153	220	0.229	1505.905	19.661	-0.457	11.421	20.890
108	175	0.239	1403.907	9.518	5.574	1.340	4.687	154	221	0.229	1505.881	19.857	-0.023	11.566	20.665
109	176	0.231	1408.194	9.778	4.287	1.535	6.247	155	222	0.228	1505.078	20.051	-0.803	11.620	21.641
110	177	0.229	1413.522	10.029	5.328	1.816	5.491	156	223	0.227	1504.952	20.242	-0.126	11.905	21.160
111	178	0.221	1417.492	10.273	3.969	2.030	7.122	157	224	0.225	1503.920	20.433	-1.031	12.067	22.271
112	179	0.217	1422.562	10.509	5.070	2.286	6.341	158	225	0.223	1503.691	20.620	-0.229	12.351	21.676
113	180	0.211	1426.266	10.757	3.704	2.545	7.968	159	226	0.217	1502.526	20.803	-1.165	12.604	22.828
114	181	0.205	1431.077	10.994	4.812	2.796	7.141	160	227	0.213	1502.160	20.966	-0.366	12.852	22.260
115	182	0.192	1434.537	11.208	3.459	3.069	8.791	161	228	0.210	1500.874	21.167	-1.286	13.120	23.383
116	183	0.180	1439.129	11.440	4.592	3.350	7.975	162	229	0.207	1500.372	21.349	-0.501	13.368	22.789

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 68, ER.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
73	141	0.226	1107.827	-0.274	11.773	-4.825	-13.083	119	187	0.113	1463.246	13.027	3.657	4.161	7.997
74	142	0.217	1121.199	0.089	13.372	-4.658	-14.288	120	188	0.088	1467.840	13.364	4.593	4.530	7.297
75	143	0.199	1132.594	0.502	11.395	-4.371	-11.990	121	189	0.074	1471.567	13.609	3.727	5.105	8.389
76	144	0.182	1145.456	0.897	12.861	-4.221	-13.105	122	190	0.052	1475.835	13.853	4.268	5.270	8.073
77	145	0.157	1156.576	1.354	11.120	-3.802	-11.040	123	191	0.043	1479.409	14.091	3.574	5.594	8.987
78	146	0.129	1169.150	1.776	12.574	-3.409	-12.205	124	192	0.011	1483.507	14.334	4.098	5.893	8.688
79	147	0.098	1180.244	2.208	11.094	-2.735	-10.444	125	193	0.005	1487.015	14.563	3.508	6.296	9.486
80	148	0.019	1192.830	2.603	12.587	-2.054	-11.646	126	194	0.001	1490.736	14.791	3.720	6.379	9.513
81	149	0.029	1204.032	2.902	11.201	-1.305	-10.029	127	195	0.016	1492.578	15.022	1.842	5.176	11.613
82	150	0.002	1216.395	3.200	12.363	-0.940	-10.902	128	196	0.006	1495.158	15.249	2.580	4.496	11.107
83	151	0.036	1225.436	3.494	9.042	-2.488	-7.288	129	197	0.021	1496.817	15.476	1.659	4.777	12.268
84	152	0.014	1235.317	3.802	9.881	-4.375	-7.796	130	198	0.016	1499.231	15.701	2.414	5.067	11.732
85	153	0.080	1244.025	4.062	8.708	-4.092	-6.350	131	199	0.050	1500.764	15.909	1.533	5.400	12.842
86	154	0.084	1253.596	4.352	9.571	-3.805	-6.822	132	200	0.040	1502.988	16.136	2.224	5.661	12.413
87	155	0.090	1261.854	4.650	8.258	-3.635	-5.213	133	201	0.046	1504.297	16.354	1.309	5.893	13.541
88	156	0.117	1271.096	4.790	9.243	-3.370	-5.906	134	202	0.007	1506.306	16.586	2.009	6.123	13.070
89	157	0.147	1278.847	4.961	7.750	-3.282	-4.105	135	203	0.025	1507.347	16.803	1.041	6.302	14.227
90	158	0.176	1288.092	5.100	9.246	-2.707	-5.286	136	204	0.	1509.158	17.023	1.811	6.538	13.679
91	159	0.203	1295.765	5.250	7.673	-2.246	-3.395	137	205	0.140	1509.559	16.802	0.401	6.340	15.303
92	160	0.216	1304.868	5.479	9.103	-1.903	-4.557	138	206	0.181	1511.719	16.832	2.159	7.122	13.857
93	161	0.231	1312.387	5.692	7.519	-1.567	-2.727	139	207	0.200	1512.757	16.998	1.038	8.081	15.218
94	162	0.238	1321.178	5.954	8.791	-1.345	-3.763	140	208	0.215	1514.935	17.229	2.178	8.358	14.274
95	163	0.245	1328.445	6.210	7.268	-1.079	-1.996	141	209	0.221	1515.857	17.428	0.922	8.622	15.713
96	164	0.248	1336.823	6.476	8.378	-0.944	-2.875	142	210	0.221	1517.836	17.645	1.979	8.857	14.844
97	165	0.255	1343.761	6.731	6.938	-0.733	-1.172	143	211	0.224	1518.631	17.847	0.796	9.141	16.232
98	166	0.253	1351.703	7.010	7.943	-0.624	-1.941	144	212	0.226	1520.332	18.046	1.701	9.286	15.522
99	167	0.257	1358.258	7.273	6.555	-0.473	-0.270	145	213	0.227	1520.975	18.249	0.643	9.544	16.780
100	168	0.255	1365.729	7.547	7.471	-0.391	-0.933	146	214	0.230	1522.438	18.438	1.463	9.712	16.159
101	169	0.257	1371.916	7.811	6.186	-0.223	0.632	147	215	0.232	1522.932	18.613	0.494	9.972	17.321
102	170	0.255	1378.966	8.083	7.051	-0.097	0.026	148	216	0.231	1524.154	18.836	1.222	10.127	16.787
103	171	0.259	1384.812	8.340	5.846	0.098	1.510	149	217	0.234	1524.540	19.013	0.387	10.419	17.826
104	172	0.252	1391.396	8.621	6.584	0.171	1.020	150	218	0.229	1525.403	19.246	0.863	10.464	17.537
105	173	0.246	1396.736	8.907	5.340	0.177	2.564	151	219	0.228	1525.583	19.449	0.180	10.653	18.442
106	174	0.243	1402.874	9.173	6.139	0.292	2.064	152	220	0.227	1526.012	19.650	0.429	10.632	18.395
107	175	0.235	1407.811	9.479	4.937	0.442	3.561	153	221	0.225	1525.764	19.859	-0.249	10.605	19.276
108	176	0.230	1413.658	9.752	5.847	0.678	2.948	154	222	0.224	1525.936	20.055	0.173	10.746	19.062
109	177	0.221	1418.231	10.037	4.573	0.878	4.505	155	223	0.223	1525.330	20.252	-0.607	10.792	20.042
110	178	0.217	1423.831	10.309	5.600	1.147	3.771	156	224	0.219	1525.409	20.457	0.079	11.090	19.554
111	179	0.208	1428.121	10.629	4.290	1.410	5.361	157	225	0.215	1524.585	20.664	-0.824	11.263	20.667
112	180	0.204	1433.452	10.890	5.331	1.664	4.587	158	226	0.212	1524.571	20.880	-0.014	11.566	20.079
113	181	0.196	1437.436	11.170	3.984	1.922	6.196	159	227	0.206	1523.637	21.111	-0.934	11.854	21.186
114	182	0.187	1442.546	11.468	5.110	2.197	5.337	160	228	0.203	1523.474	21.314	-0.163	12.108	20.620
115	183	0.176	1446.321	11.784	3.775	2.517	6.928	161	229	0.198	1522.379	21.505	-1.095	12.361	21.748
116	184	0.162	1451.218	12.090	4.897	2.840	6.060	162	230	0.195	1522.078	21.706	-0.301	12.589	21.154
117	185	0.151	1454.837	12.400	3.618	3.213	7.571	163	231	0.185	1520.913	21.986	-1.165	12.912	22.208
118	186	0.129	1459.590	12.726	4.753	3.607	6.673	164	232	0.185	1520.313	22.135	-0.600	12.995	21.841

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 69$, TM.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
75	144	0.194	1131.568	-1.026	11.746	-4.828	-11.810	121	190	0.076	1483.126	11.559	3.952	4.612	9.131
76	145	0.181	1144.753	-0.703	13.185	-4.652	-12.840	122	191	0.056	1487.613	11.778	4.487	4.842	8.873
77	146	0.161	1156.163	-0.413	11.410	-4.224	-10.656	123	192	0.046	1491.412	12.003	3.799	5.159	9.835
78	147	0.132	1169.017	-0.132	12.855	-3.836	-11.643	124	193	0.007	1495.719	12.212	4.307	5.442	9.577
79	148	0.101	1180.402	0.159	11.385	-3.114	-9.729	125	194	0.002	1499.466	12.451	3.747	5.853	10.404
80	149	0.046	1193.220	0.390	12.818	-2.448	-10.775	126	195	0.	1503.408	12.673	3.942	5.940	10.434
81	150	0.037	1204.710	0.678	11.490	-1.620	-9.011	127	196	0.015	1505.483	12.905	2.074	4.736	12.540
82	151	0.	1217.366	0.971	12.656	-1.157	-9.867	128	197	0.	1508.303	13.145	2.820	4.063	12.021
83	152	0.043	1226.739	1.302	9.373	-2.686	-6.276	129	198	0.022	1510.180	13.363	1.877	4.329	13.182
84	153	0.	1236.892	1.575	10.153	-4.598	-6.795	130	199	0.001	1512.823	13.592	2.643	4.619	12.650
85	154	0.088	1245.991	1.966	9.099	-4.246	-5.410	131	200	0.056	1514.619	13.854	1.795	4.983	13.721
86	155	0.091	1255.858	2.263	9.867	-3.951	-6.014	132	201	0.046	1517.055	14.067	2.436	5.230	13.252
87	156	0.093	1264.408	2.554	8.550	-3.850	-4.408	133	202	0.050	1518.593	14.296	1.538	5.443	14.375
88	157	0.121	1273.959	2.863	9.551	-3.579	-5.134	134	203	0.	1520.792	14.486	2.199	5.645	13.940
89	158	0.152	1282.024	3.177	8.065	-3.475	-3.410	135	204	0.027	1522.055	14.708	1.263	5.818	15.141
90	159	0.177	1291.588	3.496	9.564	-3.013	-4.729	136	205	0.	1524.079	14.921	2.024	6.064	14.591
91	160	0.197	1299.528	3.763	7.940	-2.653	-2.996	137	206	0.143	1524.793	15.234	0.714	5.954	16.128
92	161	0.207	1308.878	4.009	9.349	-2.410	-4.285	138	207	0.178	1527.192	15.474	2.399	6.762	14.414
93	162	0.221	1316.632	4.245	7.755	-2.178	-2.480	139	208	0.192	1528.427	15.670	1.234	7.375	15.582
94	163	0.226	1325.667	4.489	9.034	-2.017	-3.583	140	209	0.205	1530.788	15.853	2.361	7.605	14.542
95	164	0.236	1333.166	4.720	7.499	-1.824	-1.794	141	210	0.211	1531.897	16.040	1.109	7.843	15.911
96	165	0.238	1341.806	4.983	8.641	-1.712	-2.704	142	211	0.213	1534.080	16.245	2.184	8.079	15.001
97	166	0.246	1348.980	5.219	7.174	-1.551	-0.973	143	212	0.217	1535.072	16.441	0.991	8.348	16.376
98	167	0.244	1357.206	5.503	8.227	-1.436	-1.775	144	213	0.219	1536.973	16.641	1.901	8.487	15.640
99	168	0.249	1364.014	5.756	6.808	-1.310	-0.080	145	214	0.222	1537.814	16.839	0.841	8.734	16.894
100	169	0.247	1371.766	6.036	7.751	-1.223	-0.767	146	215	0.223	1539.471	17.033	1.657	8.890	16.269
101	170	0.250	1378.210	6.294	6.444	-1.070	0.815	147	216	0.226	1540.158	17.226	0.687	9.137	17.433
102	171	0.247	1385.540	6.573	7.330	-0.938	0.189	148	217	0.226	1541.584	17.430	1.426	9.290	16.885
103	172	0.251	1391.633	6.821	6.093	-0.766	1.698	149	218	0.229	1542.158	17.618	0.574	9.544	17.938
104	173	0.244	1398.517	7.121	6.884	-0.661	1.160	150	219	0.225	1543.243	17.839	1.084	9.630	17.612
105	174	0.239	1404.156	7.420	5.639	-0.611	2.689	151	220	0.224	1543.625	18.041	0.382	9.803	18.533
106	175	0.233	1410.590	7.716	6.434	-0.480	2.172	152	221	0.223	1544.258	18.245	0.633	9.806	18.481
107	176	0.227	1415.823	8.012	5.234	-0.300	3.651	153	222	0.221	1544.216	18.452	-0.042	9.787	19.360
108	177	0.222	1421.953	8.295	6.130	-0.042	3.040	154	223	0.219	1544.590	18.653	0.374	9.933	19.149
109	178	0.214	1426.819	8.588	4.866	0.191	4.591	155	224	0.219	1544.180	18.850	-0.410	9.981	20.138
110	179	0.210	1432.700	8.869	5.881	0.498	3.892	156	225	0.214	1544.469	19.060	0.289	10.293	19.635
111	180	0.204	1437.256	9.135	4.556	0.767	5.481	157	226	0.210	1543.868	19.283	-0.601	10.495	20.748
112	181	0.199	1442.849	9.398	5.593	1.032	4.734	158	227	0.207	1544.040	19.469	0.173	10.793	20.194
113	182	0.192	1447.100	9.664	4.251	1.313	6.366	159	228	0.202	1543.311	19.674	-0.729	11.096	21.305
114	183	0.185	1452.467	9.921	5.367	1.610	5.557	160	229	0.199	1543.344	19.870	0.033	11.358	20.761
115	184	0.176	1456.496	10.175	4.029	1.935	7.183	161	230	0.194	1542.449	20.070	-0.895	11.628	21.896
116	185	0.165	1461.625	10.407	5.129	2.253	6.399	162	231	0.192	1542.339	20.261	-0.110	11.884	21.360
117	186	0.154	1465.480	10.643	3.855	2.649	8.002	163	232	0.184	1541.371	20.458	-0.967	12.203	22.406
118	187	0.130	1470.461	10.872	4.981	3.038	7.177	164	233	0.184	1540.957	20.643	-0.415	12.289	22.062
119	188	0.114	1474.354	11.107	3.893	3.622	8.612	165	234	0.177	1539.741	20.833	-1.215	12.519	23.061
120	189	0.090	1479.174	11.334	4.820	4.015	7.963	166	235	0.174	1539.144	21.016	-0.597	12.671	22.682

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 70, YB.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
76	146	0.160	1144.725	-0.028	13.594	-4.769	-14.802	122	192	0.048	1500.465	12.852	4.761	4.330	6.706
77	147	0.142	1156.592	0.429	11.867	-4.297	-12.711	123	193	0.041	1504.513	13.101	4.048	4.651	7.602
78	148	0.114	1169.891	0.874	13.300	-3.859	-13.798	124	194	0.010	1509.088	13.369	4.575	4.958	7.304
79	149	0.091	1181.663	1.260	11.771	-3.208	-11.925	125	195	0.005	1513.060	13.594	3.972	5.356	8.146
80	150	0.012	1194.917	1.697	13.254	-2.528	-13.097	126	196	0.000	1517.240	13.832	4.180	5.439	8.171
81	151	0.027	1206.716	2.006	11.799	-1.823	-11.433	127	197	0.015	1519.541	14.058	2.301	4.231	10.282
82	152	0.001	1219.681	2.314	12.964	-1.445	-12.298	128	198	0.005	1522.580	14.277	3.039	3.549	9.773
83	153	0.034	1229.314	2.576	9.634	-3.012	-8.670	129	199	0.019	1524.690	14.510	2.111	3.818	10.932
84	154	0.009	1239.799	2.907	10.485	-4.891	-9.222	130	200	0.013	1527.557	14.734	2.866	4.104	10.403
85	155	0.070	1249.062	3.071	9.263	-4.669	-7.702	131	201	0.046	1529.525	14.906	1.968	4.413	11.528
86	156	0.072	1259.218	3.359	10.156	-4.394	-8.232	132	202	0.031	1532.186	15.131	2.661	4.660	11.058
87	157	0.082	1268.043	3.635	8.825	-4.277	-6.605	133	203	0.043	1533.949	15.356	1.763	4.890	12.181
88	158	0.096	1277.832	3.872	9.789	-4.059	-7.250	134	204	0.004	1536.414	15.622	2.465	5.131	11.698
89	159	0.129	1286.077	4.053	8.245	-4.072	-5.418	135	205	0.024	1537.888	15.833	1.474	5.297	12.916
90	160	0.146	1295.750	4.161	9.673	-3.642	-6.576	136	206	0.	1540.139	16.060	2.251	5.538	12.358
91	161	0.174	1303.810	4.282	8.060	-3.332	-4.711	137	207	0.036	1540.823	16.030	0.684	5.181	14.143
92	162	0.189	1313.370	4.492	9.560	-3.018	-5.994	138	208	0.145	1543.226	16.034	2.403	5.773	12.695
93	163	0.208	1321.301	4.669	7.931	-2.760	-4.149	139	209	0.172	1544.547	16.121	1.321	6.693	13.957
94	164	0.216	1330.589	4.922	9.288	-2.574	-5.306	140	210	0.186	1547.025	16.237	2.478	7.011	12.943
95	165	0.229	1338.320	5.154	7.731	-2.362	-3.513	141	211	0.195	1548.299	16.402	1.274	7.247	14.311
96	166	0.231	1347.224	5.418	8.904	-2.249	-4.472	142	212	0.202	1550.666	16.585	2.366	7.436	13.399
97	167	0.241	1354.649	5.669	7.425	-2.091	-2.728	143	213	0.209	1551.831	16.759	1.165	7.679	14.762
98	168	0.239	1363.152	5.945	8.503	-1.966	-3.584	144	214	0.211	1553.926	16.953	2.095	7.795	14.012
99	169	0.245	1370.216	6.202	7.065	-1.839	-1.863	145	215	0.216	1554.958	17.144	1.032	8.031	15.270
100	170	0.242	1378.242	6.477	8.026	-1.756	-2.562	146	216	0.217	1556.809	17.338	1.852	8.182	14.617
101	171	0.245	1384.947	6.737	6.704	-1.607	-0.971	147	217	0.220	1557.687	17.528	0.877	8.417	15.797
102	172	0.243	1392.548	7.009	7.602	-1.476	-1.602	148	218	0.220	1559.314	17.730	1.627	8.581	15.240
103	173	0.247	1398.894	7.261	6.346	-1.316	-0.081	149	219	0.225	1560.072	17.913	0.758	8.845	16.312
104	174	0.240	1406.062	7.545	7.168	-1.199	-0.643	150	220	0.220	1561.375	18.133	1.304	8.927	15.944
105	175	0.234	1411.979	7.823	5.917	-1.128	0.890	151	221	0.220	1561.956	18.331	0.580	9.121	16.890
106	176	0.227	1418.693	8.103	6.713	-0.998	0.384	152	222	0.218	1562.794	18.536	0.838	9.095	16.831
107	177	0.221	1424.211	8.388	5.519	-0.819	1.871	153	223	0.217	1562.956	18.740	0.163	9.078	17.714
108	178	0.213	1430.628	8.675	6.417	-0.541	1.260	154	224	0.214	1563.536	18.946	0.580	9.229	17.501
109	179	0.206	1435.809	8.990	5.181	-0.297	2.799	155	225	0.214	1563.322	19.142	-0.214	9.263	18.503
110	180	0.200	1441.954	9.254	6.145	0.001	2.118	156	226	0.207	1563.833	19.364	0.511	9.602	17.957
111	181	0.194	1446.800	9.544	4.846	0.274	3.698	157	227	0.202	1563.452	19.584	-0.382	9.827	19.101
112	182	0.187	1452.684	9.835	5.884	0.558	2.946	158	228	0.198	1563.834	19.793	0.382	10.129	18.551
113	183	0.179	1457.241	10.141	4.557	0.826	4.553	159	229	0.193	1563.322	20.011	-0.511	10.443	19.655
114	184	0.171	1462.896	10.429	5.655	1.150	3.736	160	230	0.189	1563.563	20.219	0.241	10.697	19.128
115	185	0.160	1467.241	10.746	4.345	1.510	5.325	161	231	0.184	1562.916	20.467	-0.647	10.984	20.220
116	186	0.149	1472.699	11.074	5.458	1.859	4.491	162	232	0.182	1562.995	20.657	0.079	11.227	19.693
117	187	0.140	1476.856	11.376	4.157	2.240	6.069	163	233	0.177	1562.237	20.865	-0.759	11.563	20.727
118	188	0.119	1482.183	11.722	5.327	2.670	5.150	164	234	0.173	1562.020	21.064	-0.216	11.648	20.388
119	189	0.107	1486.354	12.000	4.171	3.222	6.596	165	235	0.163	1561.043	21.302	-0.977	11.835	21.352
120	190	0.081	1491.474	12.301	5.120	3.590	5.898	166	236	0.158	1560.682	21.538	-0.361	12.074	20.983
121	191	0.071	1495.703	12.577	4.229	4.162	7.016	167	237	0.150	1559.442	21.733	-1.241	12.238	22.029

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 71, LU.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
78	149	0.111	1168.955	-0.937	13.643	-4.093	-13.360	124	195	0.009	1520.424	11.336	4.815	4.516	8.128
79	150	0.093	1181.038	-0.625	12.083	-3.420	-11.372	125	196	0.004	1524.629	11.569	4.205	4.922	8.991
80	151	0.009	1194.501	-0.416	13.463	-2.812	-12.378	126	197	0.000	1529.040	11.800	4.411	5.026	9.015
81	152	0.027	1206.600	-0.117	12.099	-2.098	-10.476	127	198	0.015	1531.570	12.030	2.530	3.809	11.123
82	153	0.000	1219.862	0.182	13.262	-1.653	-11.356	128	199	0.004	1534.840	12.260	3.269	3.136	10.609
83	154	0.034	1229.795	0.481	9.933	-3.210	-7.724	129	200	0.019	1537.178	12.487	2.338	3.400	11.770
84	155	0.008	1240.578	0.779	10.783	-5.083	-8.298	130	201	0.012	1540.270	12.714	3.693	3.673	11.236
85	156	0.081	1250.204	1.142	9.626	-4.830	-6.829	131	202	0.053	1542.462	12.937	2.191	3.987	12.364
86	157	0.083	1260.656	1.438	10.452	-4.531	-7.509	132	203	0.029	1545.348	13.162	2.886	4.230	11.862
87	158	0.088	1269.799	1.756	9.143	-4.487	-5.910	133	204	0.046	1547.329	13.380	1.981	4.416	13.015
88	159	0.099	1279.877	2.045	10.078	-4.277	-6.614	134	205	0.002	1550.022	13.608	2.693	4.672	12.502
89	160	0.124	1288.391	2.314	8.514	-4.312	-4.795	135	206	0.024	1551.715	13.827	1.693	4.827	13.746
90	161	0.134	1298.316	2.566	9.925	-3.939	-5.891	136	207	0.	1554.184	14.045	2.469	5.098	13.178
91	162	0.160	1306.593	2.783	8.277	-3.726	-4.160	137	208	0.097	1555.138	14.315	0.954	4.788	14.920
92	163	0.175	1316.369	3.000	9.776	-3.514	-5.530	138	209	0.133	1557.722	14.496	2.584	5.348	13.434
93	164	0.194	1324.500	3.199	8.131	-3.323	-3.685	139	210	0.163	1559.186	14.638	1.463	6.098	14.743
94	165	0.203	1334.024	3.435	9.524	-3.148	-4.891	140	211	0.174	1561.828	14.803	2.642	6.340	13.333
95	166	0.219	1341.969	3.649	7.945	-2.958	-3.075	141	212	0.184	1563.282	14.983	1.454	6.560	14.655
96	167	0.222	1351.139	3.915	9.169	-2.823	-4.108	142	213	0.193	1565.810	15.144	2.528	6.727	13.749
97	168	0.233	1358.786	4.137	7.647	-2.675	-2.317	143	214	0.200	1567.155	15.324	1.345	6.963	15.091
98	169	0.232	1367.571	4.419	8.785	-2.530	-3.222	144	215	0.203	1569.446	15.520	2.291	7.070	14.328
99	170	0.239	1374.898	4.682	7.327	-2.377	-1.497	145	216	0.209	1570.644	15.686	1.198	7.277	15.614
100	171	0.236	1383.193	4.951	8.295	-2.308	-2.241	146	217	0.210	1572.701	15.891	2.057	7.433	14.936
101	172	0.239	1390.164	5.217	6.971	-2.145	-0.624	147	218	0.215	1573.771	16.085	1.070	7.662	16.119
102	173	0.237	1398.031	5.483	7.867	-2.029	-1.286	148	219	0.215	1575.601	16.287	1.830	7.835	15.535
103	174	0.241	1404.637	5.742	6.605	-1.868	0.267	149	220	0.221	1576.537	16.466	0.936	8.084	16.628
104	175	0.233	1412.087	6.024	7.450	-1.748	-0.358	150	221	0.215	1578.064	16.689	1.527	8.185	16.219
105	176	0.228	1418.294	6.315	6.207	-1.634	1.207	151	222	0.216	1578.842	16.886	0.778	8.389	17.179
106	177	0.219	1425.299	6.607	7.005	-1.513	0.686	152	223	0.214	1579.888	17.094	1.046	8.350	17.109
107	178	0.213	1431.105	6.894	5.806	-1.346	2.182	153	224	0.213	1580.255	17.298	0.367	8.335	17.993
108	179	0.205	1437.825	7.197	6.720	-1.059	1.551	154	225	0.208	1581.043	17.507	0.788	8.490	17.770
109	180	0.199	1443.289	7.480	5.464	-0.829	3.095	155	226	0.207	1581.007	17.686	-0.035	8.496	18.819
110	181	0.192	1449.716	7.762	6.426	-0.533	2.411	156	227	0.200	1581.770	17.937	0.763	8.885	18.227
111	182	0.187	1454.848	8.047	5.132	-0.266	3.988	157	228	0.196	1581.602	18.151	-0.168	9.127	19.373
112	183	0.179	1461.012	8.328	6.165	0.018	3.228	158	229	0.191	1582.195	18.362	0.593	9.431	18.823
113	184	0.173	1465.849	8.608	4.837	0.298	4.841	159	230	0.187	1581.909	18.587	-0.286	9.746	19.918
114	185	0.164	1471.784	8.888	5.935	0.640	4.023	160	231	0.183	1582.354	18.791	0.445	10.019	19.388
115	186	0.154	1476.408	9.166	4.624	1.013	5.628	161	232	0.179	1581.906	18.990	-0.448	10.300	20.484
116	187	0.143	1482.143	9.443	5.735	1.381	4.807	162	233	0.177	1582.181	19.186	0.275	10.542	19.966
117	188	0.134	1486.550	9.695	4.408	1.760	6.428	163	234	0.173	1581.626	19.389	-0.556	10.881	20.994
118	189	0.116	1492.167	9.984	5.617	2.247	5.515	164	235	0.167	1581.613	19.592	-0.013	10.979	20.651
119	190	0.107	1496.590	10.236	4.423	2.815	7.019	165	236	0.159	1580.883	19.840	-0.730	11.217	21.590
120	191	0.085	1501.937	10.463	5.347	3.181	6.379	166	237	0.153	1580.689	20.007	-0.194	11.437	21.269
121	192	0.075	1506.389	10.685	4.452	3.740	7.629	167	238	0.143	1579.656	20.215	-1.032	11.620	22.320
122	193	0.055	1511.333	10.868	4.945	3.864	7.410	168	239	0.133	1579.429	20.430	-0.227	11.990	21.769
123	194	0.042	1515.609	11.096	4.276	4.188	8.418	169	240	0.117	1578.389	20.632	-1.040	12.386	22.788

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 72, HF.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
80	152	0.005	1195.341	0.840	14.001	-2.846	-14.649	126	198	0.000	1541.911	12.871	4.638	4.528	6.843
81	153	0.022	1207.724	1.124	12.383	-2.234	-12.775	127	199	0.014	1544.667	13.096	2.756	3.311	8.945
82	154	0.001	1221.289	1.426	13.565	-1.923	-13.642	128	200	0.004	1548.165	13.326	3.459	2.630	8.462
83	155	0.028	1231.498	1.703	10.209	-3.513	-10.037	129	201	0.016	1550.724	13.546	2.559	2.888	9.613
84	156	0.005	1242.592	2.014	11.094	-5.384	-10.574	130	202	0.009	1554.044	13.773	3.320	3.169	9.104
85	157	0.045	1252.364	2.161	9.773	-5.245	-8.987	131	203	0.038	1556.427	13.966	2.384	3.442	10.258
86	158	0.040	1263.107	2.451	10.742	-4.987	-9.620	132	204	0.010	1559.562	14.214	3.134	3.710	9.763
87	159	0.066	1272.480	2.681	9.373	-4.877	-7.962	133	205	0.038	1561.742	14.413	2.180	3.922	10.919
88	160	0.058	1282.813	2.937	10.333	-4.699	-8.626	134	206	0.002	1564.679	14.657	2.937	4.198	10.405
89	161	0.040	1291.643	3.251	8.829	-4.696	-6.835	135	207	0.022	1566.580	14.865	1.901	4.336	11.621
90	162	0.097	1301.651	3.335	10.009	-4.476	-7.733	136	208	0.	1569.275	15.091	2.695	4.567	11.071
91	163	0.144	1310.056	3.463	8.405	-4.315	-5.862	137	209	0.029	1570.374	15.236	1.098	4.190	12.857
92	164	0.156	1320.033	3.664	9.977	-4.011	-7.282	138	210	0.	1573.146	15.424	2.773	4.712	11.439
93	165	0.180	1328.351	3.851	8.318	-3.754	-5.353	139	211	0.140	1574.378	15.192	1.232	5.259	13.157
94	166	0.190	1338.112	4.087	9.761	-3.553	-6.600	140	212	0.160	1577.155	15.327	2.777	5.634	11.751
95	167	0.209	1346.248	4.279	8.137	-3.348	-4.745	141	213	0.174	1578.777	15.495	1.622	5.934	13.063
96	168	0.211	1355.686	4.548	9.438	-3.198	-5.847	142	214	0.184	1581.463	15.653	2.687	6.143	12.155
97	169	0.221	1363.566	4.781	7.880	-3.048	-4.031	143	215	0.193	1582.992	15.836	1.528	6.397	13.488
98	170	0.222	1372.618	5.047	9.052	-2.901	-4.977	144	216	0.196	1585.475	16.030	2.484	6.515	12.692
99	171	0.230	1380.169	5.271	7.551	-2.775	-3.231	145	217	0.202	1586.855	16.211	1.380	6.729	13.998
100	172	0.227	1388.757	5.564	8.588	-2.689	-4.036	146	218	0.203	1589.107	16.407	2.253	6.887	13.305
101	173	0.232	1395.963	5.799	7.206	-2.548	-2.369	147	219	0.208	1590.353	16.582	1.246	7.100	14.508
102	174	0.228	1404.121	6.090	8.158	-2.416	-3.079	148	220	0.209	1592.383	16.782	2.030	7.279	13.903
103	175	0.234	1410.946	6.309	6.824	-2.296	-1.460	149	221	0.216	1593.501	16.964	1.118	7.519	15.016
104	176	0.224	1418.718	6.631	7.772	-2.125	-2.171	150	222	0.210	1595.239	17.175	1.738	7.630	14.516
105	177	0.221	1425.203	6.909	6.485	-1.987	-0.575	151	223	0.212	1596.215	17.373	0.976	7.848	15.548
106	178	0.212	1432.505	7.206	7.302	-1.852	-1.122	152	224	0.209	1597.465	17.578	1.251	7.795	15.463
107	179	0.207	1438.594	7.489	6.089	-1.680	0.409	153	225	0.208	1598.030	17.776	0.565	7.780	16.364
108	180	0.198	1445.601	7.776	7.007	-1.386	-0.230	154	226	0.203	1599.044	18.001	1.014	7.956	16.116
109	181	0.193	1451.344	8.055	5.743	-1.162	1.332	155	227	0.199	1599.215	18.207	0.170	7.963	17.182
110	182	0.185	1458.053	8.338	6.710	-0.870	0.638	156	228	0.194	1600.193	18.423	0.978	8.362	16.592
111	183	0.180	1463.458	8.610	5.404	-0.646	2.235	157	229	0.190	1600.235	18.633	0.043	8.618	17.739
112	184	0.171	1469.908	8.895	6.450	-0.342	1.461	158	230	0.185	1601.044	18.849	0.809	8.916	17.179
113	185	0.164	1475.025	9.175	5.117	-0.071	3.076	159	231	0.181	1600.960	19.051	-0.084	9.213	18.292
114	186	0.154	1481.253	9.470	6.229	0.274	2.233	160	232	0.177	1601.608	19.253	0.648	9.479	17.764
115	187	0.145	1486.167	9.760	4.914	0.631	3.832	161	233	0.174	1601.365	19.458	-0.243	9.747	18.859
116	188	0.132	1492.196	10.053	6.028	1.005	2.988	162	234	0.171	1601.837	19.656	0.472	9.979	18.345
117	189	0.120	1496.901	10.350	4.705	1.364	4.590	163	235	0.168	1601.481	19.856	-0.356	10.270	19.372
118	190	0.103	1502.827	10.659	5.926	1.832	3.646	164	236	0.160	1601.690	20.077	0.209	10.400	19.001
119	191	0.098	1507.533	10.943	4.706	2.382	5.149	165	237	0.154	1601.175	20.292	-0.515	10.643	19.938
120	192	0.070	1513.235	11.298	5.702	2.757	4.401	166	238	0.146	1601.194	20.506	0.019	10.879	19.606
121	193	0.065	1517.961	11.572	4.726	3.312	5.642	167	239	0.134	1600.416	20.760	-0.778	11.077	20.611
122	194	0.041	1523.245	11.912	5.284	3.476	5.322	168	240	0.123	1600.395	20.966	-0.020	11.418	20.070
123	195	0.038	1527.770	12.160	4.525	3.771	6.311	169	241	0.103	1599.591	21.202	-0.804	11.855	21.063
124	196	0.008	1532.838	12.414	5.068	4.078	6.000	170	242	0.	1599.638	21.496	0.046	12.343	20.447
125	197	0.004	1537.273	12.644	4.435	4.465	6.826	171	243	0.035	1598.918	21.742	-0.720	12.866	21.391

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 73, TA.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
81	154	0.028	1206.864	-0.860	12.697	-2.469	-11.940	127	200	0.017	1555.845	11.178	3.016	2.920	9.720
82	155	0.009	1220.678	-0.610	13.815	-2.117	-12.799	128	201	0.010	1559.554	11.389	3.709	2.219	9.218
83	156	0.033	1231.236	-0.262	10.557	-3.659	-9.195	129	202	0.022	1562.365	11.641	2.811	2.499	10.366
84	157	0.022	1242.595	0.003	11.359	-5.562	-9.782	130	203	0.021	1565.902	11.859	3.538	2.768	9.833
85	158	0.050	1252.704	0.340	10.109	-5.386	-8.188	131	204	0.041	1568.542	12.115	2.640	3.070	10.967
86	159	0.048	1263.735	0.628	11.031	-5.138	-8.902	132	205	0.030	1571.879	12.317	3.336	3.313	10.432
87	160	0.065	1273.405	0.925	9.670	-5.094	-7.225	133	206	0.040	1574.301	12.559	2.423	3.545	11.617
88	161	0.059	1284.025	1.212	10.621	-4.926	-7.985	134	207	0.017	1577.418	12.739	3.117	3.776	11.080
89	162	0.043	1293.136	1.493	9.110	-4.958	-6.112	135	208	0.025	1579.564	12.984	2.145	3.940	12.353
90	163	0.075	1303.412	1.761	10.277	-4.760	-7.014	136	209	0.006	1582.449	13.173	2.885	4.132	11.789
91	164	0.129	1311.968	1.912	8.556	-4.718	-4.981	137	210	0.033	1583.803	13.429	1.354	3.793	13.580
92	165	0.141	1322.216	2.183	10.248	-4.395	-6.678	138	211	0.014	1586.752	13.606	2.949	4.273	12.138
93	166	0.168	1330.729	2.378	8.513	-4.159	-4.690	139	212	0.122	1588.123	13.745	1.371	4.690	13.992
94	167	0.176	1340.721	2.609	9.992	-3.943	-6.265	140	213	0.147	1591.057	13.902	2.934	5.040	12.439
95	168	0.195	1349.057	2.808	8.336	-3.739	-4.385	141	214	0.166	1592.836	14.059	1.779	5.355	13.547
96	169	0.198	1358.753	3.066	9.696	-3.566	-5.547	142	215	0.175	1595.697	14.233	2.861	5.574	12.412
97	170	0.208	1366.859	3.293	8.106	-3.405	-3.698	143	216	0.184	1597.385	14.393	1.688	5.808	13.767
98	171	0.212	1376.155	3.537	9.297	-3.278	-4.659	144	217	0.188	1600.070	14.595	2.685	5.965	12.934
99	172	0.221	1383.939	3.769	7.783	-3.142	-2.889	145	218	0.194	1601.630	14.776	1.560	6.180	14.239
100	173	0.217	1392.811	4.054	8.872	-3.055	-3.745	146	219	0.196	1604.079	14.971	2.448	6.338	13.542
101	174	0.223	1400.260	4.297	7.448	-2.934	-2.051	147	220	0.201	1605.504	15.151	1.426	6.565	14.759
102	175	0.218	1408.703	4.581	8.443	-2.785	-2.793	148	221	0.202	1607.734	15.351	2.230	6.738	14.139
103	176	0.224	1415.764	4.818	7.061	-2.695	-1.142	149	222	0.210	1608.972	15.471	1.238	6.906	15.328
104	177	0.214	1423.845	5.127	8.081	-2.481	-1.909	150	223	0.204	1610.980	15.742	2.008	7.085	14.729
105	178	0.214	1430.601	5.398	6.756	-2.331	-0.298	151	224	0.207	1612.146	15.931	1.166	7.314	15.788
106	179	0.202	1438.221	5.716	7.620	-2.161	-0.903	152	225	0.203	1613.612	16.147	1.466	7.253	15.676
107	180	0.199	1444.589	5.995	6.368	-2.000	0.651	153	226	0.203	1614.377	16.347	0.765	7.240	16.588
108	181	0.190	1451.893	6.292	7.305	-1.701	-0.018	154	227	0.197	1615.614	16.570	1.236	7.431	16.313
109	182	0.186	1457.909	6.565	6.016	-1.491	1.555	155	228	0.191	1616.002	16.787	0.388	7.452	17.379
110	183	0.178	1464.910	6.857	7.001	-1.210	0.841	156	229	0.188	1617.192	16.999	1.190	7.854	16.811
111	184	0.174	1470.586	7.128	5.675	-0.998	2.452	157	230	0.184	1617.441	17.205	0.249	8.138	17.937
112	185	0.165	1477.319	7.411	6.733	-0.692	1.661	158	231	0.179	1618.469	17.425	1.028	8.404	17.371
113	186	0.158	1482.704	7.679	5.385	-0.439	3.295	159	232	0.176	1618.589	17.630	0.120	8.692	18.488
114	187	0.148	1489.217	7.963	6.513	-0.091	2.453	160	233	0.172	1619.441	17.833	0.852	8.951	17.958
115	188	0.140	1494.401	8.234	5.185	0.257	4.079	161	234	0.170	1619.399	18.035	-0.041	9.196	19.055
116	189	0.126	1500.708	8.513	6.307	0.629	3.235	162	235	0.166	1620.071	18.233	0.671	9.421	18.542
117	190	0.113	1505.690	8.790	4.982	0.988	4.886	163	236	0.165	1619.909	18.428	-0.162	9.708	19.567
118	191	0.098	1511.899	9.072	6.209	1.461	3.975	164	237	0.155	1620.331	18.641	0.422	9.855	19.160
119	192	0.095	1516.854	9.320	4.954	2.008	5.535	165	238	0.151	1620.017	18.842	-0.314	10.097	20.150
120	193	0.069	1522.821	9.585	5.967	2.358	4.823	166	239	0.142	1620.244	19.050	0.227	10.336	19.811
121	194	0.065	1527.785	9.824	4.964	2.900	6.152	167	240	0.129	1619.682	19.267	-0.562	10.505	20.815
122	195	0.043	1533.299	10.053	5.514	3.067	5.843	168	241	0.118	1619.872	19.477	0.190	10.888	20.326
123	196	0.039	1538.055	10.285	4.756	3.371	6.938	169	242	0.096	1619.303	19.711	-0.569	11.351	21.313
124	197	0.015	1543.317	10.479	5.262	3.688	6.664	170	243	0.003	1619.527	19.889	0.224	11.803	21.079
125	198	0.009	1547.972	10.699	4.655	4.068	7.602	171	244	0.063	1619.022	20.104	-0.505	12.338	22.063
126	199	0.005	1552.829	10.918	4.857	4.110	7.641	172	245	0.065	1619.018	20.281	-0.005	12.581	21.667

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 74, W.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
83	157	0.021	1232.031	0.795	10.773	-3.988	-11.349	129	203	0.012	1574.953	12.588	3.004	1.991	8.330
84	158	0.002	1243.734	1.139	11.703	-5.849	-11.865	130	204	0.006	1578.726	12.824	3.774	2.266	7.848
85	159	0.015	1254.051	1.346	10.317	-5.742	-10.251	131	205	0.009	1581.528	12.986	2.802	2.509	9.030
86	160	0.003	1265.397	1.662	11.346	-5.490	-10.907	132	206	0.004	1585.135	13.257	3.607	2.797	8.519
87	161	0.011	1275.258	1.853	9.861	-5.402	-9.160	133	207	0.014	1587.716	13.415	2.580	2.993	9.716
88	162	0.002	1286.241	2.216	10.984	-5.161	-9.945	134	208	0.001	1591.134	13.716	3.419	3.278	9.163
89	163	0.026	1295.616	2.481	9.375	-5.159	-8.097	135	209	0.019	1593.455	13.892	2.321	3.419	10.383
90	164	0.	1306.205	2.793	10.589	-4.903	-8.995	136	210	0.	1596.601	14.152	3.145	3.627	9.827
91	165	0.066	1314.756	2.788	8.551	-5.181	-6.728	137	211	0.021	1598.107	14.304	1.507	3.232	11.600
92	166	0.	1325.257	3.041	10.501	-4.689	-8.309	138	212	0.	1601.332	14.580	3.225	3.762	10.206
93	167	0.146	1333.673	2.944	8.416	-4.678	-5.997	139	213	0.027	1602.714	14.591	1.382	4.045	12.181
94	168	0.161	1343.889	3.168	10.216	-4.439	-7.635	140	214	0.008	1605.601	14.543	2.887	4.159	10.991
95	169	0.182	1352.423	3.366	8.534	-4.223	-5.797	141	215	0.152	1607.326	14.490	1.726	4.653	12.351
96	170	0.189	1362.378	3.625	9.955	-4.029	-7.120	142	216	0.165	1610.369	14.673	3.043	4.919	10.969
97	171	0.201	1370.714	3.855	8.336	-3.829	-5.272	143	217	0.176	1612.222	14.837	1.853	5.150	12.316
98	172	0.203	1380.267	4.111	9.553	-3.714	-6.314	144	218	0.180	1615.087	15.017	2.865	5.329	11.464
99	173	0.214	1388.284	4.345	8.017	-3.577	-4.519	145	219	0.188	1616.838	15.208	1.752	5.552	12.761
100	174	0.210	1397.426	4.615	9.142	-3.487	-5.447	146	220	0.190	1619.481	15.403	2.643	5.711	12.027
101	175	0.217	1405.128	4.868	7.702	-3.337	-3.711	147	221	0.195	1621.090	15.586	1.609	5.941	13.248
102	176	0.212	1413.840	5.137	8.713	-3.212	-4.499	148	222	0.196	1623.518	15.784	2.427	6.115	12.600
103	177	0.217	1421.154	5.390	7.314	-3.104	-2.803	149	223	0.204	1624.927	15.955	1.409	6.279	13.809
104	178	0.207	1429.521	5.675	8.366	-2.896	-3.623	150	224	0.200	1627.152	16.171	2.225	6.473	13.160
105	179	0.208	1436.535	5.934	7.015	-2.706	-1.958	151	225	0.203	1628.505	16.359	1.354	6.709	14.242
106	180	0.196	1444.458	6.237	7.923	-2.555	-2.618	152	226	0.199	1630.183	16.571	1.677	6.649	14.098
107	181	0.193	1451.093	6.504	6.635	-2.405	-0.997	153	227	0.199	1631.145	16.767	0.962	6.635	15.036
108	182	0.184	1458.681	6.788	7.588	-2.119	-1.683	154	228	0.193	1632.599	16.985	1.454	6.838	14.740
109	183	0.180	1464.969	7.060	6.288	-1.920	-0.061	155	229	0.186	1633.220	17.218	0.621	6.895	15.803
110	184	0.171	1472.255	7.345	7.287	-1.641	-0.791	156	230	0.182	1634.595	17.403	1.375	7.256	15.301
111	185	0.168	1478.198	7.612	5.942	-1.441	0.852	157	231	0.178	1635.058	17.617	0.463	7.548	16.428
112	186	0.156	1485.216	7.898	7.019	-1.132	0.038	158	232	0.173	1636.295	17.826	1.238	7.808	15.871
113	187	0.150	1490.888	8.183	5.671	-0.865	1.691	159	233	0.171	1636.616	18.027	0.321	8.086	17.000
114	188	0.138	1497.698	8.482	6.811	-0.504	0.818	160	234	0.167	1637.672	18.231	1.056	8.333	16.466
115	189	0.129	1503.160	8.759	5.462	-0.159	2.403	161	235	0.164	1637.830	18.431	0.158	8.576	17.567
116	190	0.114	1509.794	9.086	6.634	0.246	1.530	162	236	0.160	1638.693	18.622	0.863	8.791	17.057
117	191	0.096	1515.092	9.402	5.298	0.630	3.222	163	237	0.159	1638.709	18.800	0.016	9.049	18.127
118	192	0.079	1521.606	9.707	6.514	1.115	2.355	164	238	0.149	1639.385	19.054	0.676	9.253	17.658
119	193	0.049	1526.861	10.008	5.255	1.666	3.912	165	239	0.146	1639.273	19.256	-0.112	9.497	18.661
120	194	0.049	1533.155	10.334	6.294	2.033	3.132	166	240	0.133	1639.715	19.471	0.442	9.730	18.299
121	195	0.049	1538.359	10.574	5.204	2.531	4.457	167	241	0.121	1639.415	19.733	-0.300	9.945	19.233
122	196	0.020	1544.210	10.911	5.851	2.680	4.046	168	242	0.099	1639.833	19.961	0.418	10.344	18.732
123	197	0.028	1549.198	11.144	4.988	2.942	5.115	169	243	0.023	1639.823	20.521	-0.010	11.113	19.585
124	198	0.006	1554.791	11.475	5.593	3.251	4.746	170	244	0.	1640.303	20.776	0.480	11.613	19.252
125	199	0.003	1559.688	11.716	4.896	3.623	5.547	171	245	0.026	1639.903	20.880	-0.400	12.016	20.236
126	200	0.000	1564.782	11.953	5.095	3.650	5.545	172	246	0.040	1639.977	20.959	0.074	12.044	20.026
127	201	0.012	1567.989	12.145	3.207	2.421	7.627	173	247	0.054	1639.505	21.100	-0.472	12.292	20.790
128	202	0.003	1571.948	12.394	3.959	1.742	7.188	174	248	0.052	1639.361	21.278	-0.144	12.330	20.649

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 75$, RE.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
85	160	0.041	1253.708	-0.343	10.690	-5.823	-9.712	131	206	0.038	1592.872	11.344	3.096	2.212	9.503
86	161	0.039	1265.315	-0.082	11.607	-5.575	-10.431	132	207	0.033	1596.650	11.514	3.778	2.452	8.972
87	162	0.045	1275.513	0.256	10.199	-5.486	-8.707	133	208	0.038	1599.515	11.799	2.865	2.678	10.158
88	163	0.041	1286.737	0.495	11.223	-5.293	-9.498	134	209	0.027	1603.056	11.921	3.541	2.882	9.633
89	164	0.039	1296.428	0.811	9.691	-5.272	-7.640	135	210	0.028	1605.645	12.190	2.589	3.049	10.904
90	165	0.039	1307.246	1.041	10.818	-5.075	-8.549	136	211	0.019	1608.925	12.324	3.280	3.212	10.363
91	166	0.062	1316.165	1.409	8.920	-5.265	-6.289	137	212	0.034	1610.756	12.649	1.831	2.897	12.130
92	167	0.047	1326.894	1.637	10.729	-4.813	-8.040	138	213	0.025	1614.112	12.780	3.356	3.368	10.690
93	168	0.066	1335.472	1.798	8.577	-4.792	-5.430	139	214	0.042	1615.809	13.095	1.697	3.711	12.668
94	169	0.068	1345.843	1.954	10.372	-4.668	-7.111	140	215	0.044	1618.895	13.294	3.085	3.848	11.358
95	170	0.164	1354.476	2.052	8.632	-4.549	-5.047	141	216	0.143	1620.556	13.230	1.662	4.138	13.034
96	171	0.170	1364.659	2.281	10.184	-4.357	-6.881	142	217	0.152	1623.756	13.386	3.199	4.404	11.497
97	172	0.187	1373.170	2.456	8.511	-4.182	-5.062	143	218	0.165	1625.768	13.546	2.013	4.637	12.629
98	173	0.188	1382.982	2.715	9.812	-4.065	-6.164	144	219	0.169	1628.817	13.730	3.049	4.825	11.491
99	174	0.204	1391.197	2.913	8.215	-3.957	-4.305	145	220	0.177	1630.726	13.888	1.909	5.046	12.839
100	175	0.198	1400.634	3.208	9.437	-3.816	-5.293	146	221	0.179	1633.556	14.075	2.830	5.191	12.104
101	176	0.208	1408.559	3.431	7.924	-3.675	-3.498	147	222	0.186	1635.335	14.245	1.779	5.410	13.353
102	177	0.200	1417.569	3.729	9.011	-3.537	-4.353	148	223	0.188	1637.954	14.436	2.619	5.581	12.700
103	178	0.206	1425.115	3.960	7.545	-3.440	-2.602	149	224	0.194	1639.529	14.602	1.575	5.730	13.941
104	179	0.195	1433.795	4.274	8.680	-3.203	-3.492	150	225	0.193	1641.965	14.813	2.436	5.936	13.277
105	180	0.200	1441.057	4.522	7.262	-3.002	-1.788	151	226	0.198	1643.498	14.993	1.533	6.231	14.376
106	181	0.185	1449.313	4.856	8.256	-2.827	-2.541	152	227	0.192	1645.399	15.216	1.901	6.123	14.191
107	182	0.183	1456.216	5.123	6.903	-2.680	-0.903	153	228	0.193	1646.556	15.411	1.157	6.115	15.149
108	183	0.174	1464.125	5.444	7.909	-2.391	-1.652	154	229	0.185	1648.241	15.642	1.685	6.334	14.815
109	184	0.172	1470.682	5.713	6.557	-2.202	-0.026	155	230	0.179	1649.113	15.893	0.872	6.441	15.837
110	185	0.163	1478.267	6.012	7.585	-1.921	-0.798	156	231	0.174	1650.704	16.109	1.591	6.795	15.326
111	186	0.160	1484.471	6.274	6.204	-1.733	0.839	157	232	0.170	1651.384	16.326	0.680	7.087	16.441
112	187	0.150	1491.796	6.580	7.325	-1.409	-0.020	158	233	0.166	1652.834	16.538	1.450	7.347	15.874
113	188	0.145	1497.734	6.847	5.938	-1.146	1.655	159	234	0.165	1653.356	16.739	0.522	7.620	17.000
114	189	0.130	1504.781	7.083	7.047	-0.833	0.803	160	235	0.161	1654.615	16.943	1.259	7.851	16.441
115	190	0.113	1510.541	7.381	5.760	-0.458	2.452	161	236	0.158	1654.968	17.137	0.353	8.083	17.554
116	191	0.093	1517.532	7.738	6.991	0.020	1.479	162	237	0.154	1656.054	17.360	1.086	8.318	17.015
117	192	0.081	1523.178	8.086	5.646	0.481	3.149	163	238	0.153	1656.261	17.552	0.207	8.567	18.097
118	193	0.069	1529.991	8.385	6.813	0.987	2.280	164	239	0.145	1657.152	17.767	0.891	8.786	17.604
119	194	0.052	1535.504	8.643	5.514	1.519	3.994	165	240	0.143	1657.231	17.958	0.079	9.027	18.635
120	195	0.053	1542.034	8.879	6.530	1.840	3.321	166	241	0.125	1657.866	18.151	0.634	9.240	18.270
121	196	0.052	1547.474	9.115	5.440	2.325	4.663	167	242	0.108	1657.784	18.368	-0.082	9.471	19.348
122	197	0.040	1553.531	9.321	6.057	2.415	4.243	168	243	0.052	1658.626	18.793	0.843	10.087	18.925
123	198	0.038	1558.755	9.557	5.224	2.675	5.451	169	244	0.034	1658.773	18.949	0.147	10.795	19.960
124	199	0.022	1564.452	9.661	5.697	2.859	5.178	170	245	0.027	1659.356	19.053	0.583	11.189	19.699
125	200	0.016	1569.545	9.857	5.093	3.195	6.175	171	246	0.037	1659.221	19.318	-0.135	11.623	20.700
126	201	0.012	1574.834	10.052	5.290	3.223	6.240	172	247	0.048	1659.512	19.535	0.292	11.690	20.331
127	202	0.022	1578.354	10.364	3.519	2.087	8.270	173	248	0.055	1659.228	19.723	-0.284	11.911	21.033
128	203	0.019	1582.500	10.552	4.146	1.376	7.780	174	249	0.053	1659.259	19.897	0.031	11.946	20.764
129	204	0.027	1585.792	10.840	3.292	1.652	8.907	175	250	0.052	1658.713	20.072	-0.546	12.013	21.508
130	205	0.028	1589.776	11.050	3.984	1.927	8.373	176	251	0.047	1658.492	20.236	-0.220	12.114	21.368

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 76, OS.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
86	162	0.002	1266.024	0.709	11.923	-6.005	-12.709	132	208	0.002	1608.890	12.240	4.050	1.869	6.797
87	163	0.003	1276.456	0.942	10.432	-5.890	-10.958	133	209	0.007	1611.906	12.392	3.016	2.083	8.036
88	164	0.001	1288.005	1.269	11.549	-5.687	-11.767	134	210	0.001	1615.767	12.711	3.861	2.336	7.440
89	165	0.016	1297.914	1.487	9.909	-5.638	-9.866	135	211	0.015	1618.505	12.860	2.738	2.494	8.741
90	166	0.001	1309.094	1.848	11.179	-5.443	-10.795	136	212	0.	1622.104	13.179	3.598	2.674	8.154
91	167	0.022	1318.071	1.906	8.978	-5.840	-8.379	137	213	0.014	1624.020	13.264	1.916	2.269	9.990
92	168	0.001	1329.259	2.365	11.188	-5.241	-10.175	138	214	0.	1627.694	13.582	3.675	2.799	8.520
93	169	0.017	1337.950	2.479	8.691	-5.101	-7.523	139	215	0.016	1629.470	13.661	1.776	3.068	10.565
94	170	0.002	1348.647	2.803	10.696	-4.906	-9.153	140	216	0.003	1632.808	13.914	3.338	3.181	9.303
95	171	0.009	1356.996	2.520	8.349	-4.972	-6.586	141	217	0.021	1634.470	13.914	1.662	3.461	11.145
96	172	0.006	1367.326	2.666	10.330	-4.858	-8.157	142	218	0.012	1637.615	13.859	3.144	3.719	9.976
97	173	0.180	1376.036	2.866	8.711	-4.682	-6.281	143	219	0.158	1639.525	13.757	1.910	3.904	11.431
98	174	0.181	1386.110	3.128	10.074	-4.563	-7.598	144	220	0.164	1642.782	13.966	3.257	4.118	10.225
99	175	0.195	1394.559	3.362	8.449	-4.450	-5.705	145	221	0.173	1644.878	14.152	2.096	4.361	11.549
100	176	0.190	1404.278	3.644	9.719	-4.284	-6.830	146	222	0.175	1647.906	14.349	3.028	4.524	10.763
101	177	0.197	1412.434	3.876	8.157	-4.145	-4.958	147	223	0.182	1649.871	14.536	1.966	4.738	12.029
102	178	0.192	1421.731	4.161	9.296	-3.991	-5.912	148	224	0.183	1652.687	14.733	2.816	4.911	11.332
103	179	0.195	1429.520	4.405	7.789	-3.903	-4.085	149	225	0.188	1654.459	14.930	1.772	5.073	12.567
104	180	0.188	1438.486	4.692	8.967	-3.649	-5.027	150	226	0.190	1657.091	15.127	2.633	5.279	11.876
105	181	0.194	1445.990	4.933	7.504	-3.459	-3.258	151	227	0.194	1658.807	15.309	1.716	5.585	12.952
106	182	0.180	1454.531	5.218	8.541	-3.285	-4.109	152	228	0.189	1660.922	15.524	2.115	5.476	12.681
107	183	0.179	1461.690	5.474	7.159	-3.140	-2.343	153	229	0.190	1662.273	15.718	1.351	5.473	13.716
108	184	0.170	1469.873	5.748	8.183	-2.880	-3.113	154	230	0.181	1664.167	15.926	1.894	5.689	13.350
109	185	0.168	1476.687	6.005	6.814	-2.701	-1.440	155	231	0.176	1665.247	16.134	1.080	5.808	14.465
110	186	0.158	1484.528	6.261	7.841	-2.448	-2.211	156	232	0.171	1667.042	16.338	1.794	6.148	13.975
111	187	0.155	1490.994	6.522	6.465	-2.270	-0.510	157	233	0.166	1667.925	16.541	0.883	6.410	15.112
112	188	0.142	1498.607	6.811	7.613	-1.944	-1.399	158	234	0.163	1669.573	16.740	1.648	6.683	14.575
113	189	0.136	1504.802	7.068	6.195	-1.691	0.301	159	235	0.162	1670.274	16.918	0.701	6.921	15.724
114	190	0.117	1512.211	7.430	7.409	-1.300	-0.677	160	236	0.156	1671.739	17.124	1.465	7.149	15.168
115	191	0.104	1518.228	7.687	6.017	-0.955	1.091	161	237	0.154	1672.286	17.319	0.547	7.375	16.299
116	192	0.050	1525.545	8.013	7.317	-0.448	0.096	162	238	0.149	1673.575	17.522	1.289	7.608	15.754
117	193	0.050	1531.488	8.311	5.944	0.033	1.721	163	239	0.147	1673.973	17.712	0.398	7.848	16.850
118	194	0.014	1538.716	8.726	7.228	0.627	0.674	164	240	0.139	1675.084	17.932	1.111	8.096	16.328
119	195	0.023	1544.573	9.068	5.857	1.186	2.153	165	241	0.138	1675.353	18.122	0.269	8.349	17.318
120	196	0.012	1551.354	9.320	6.781	1.453	1.437	166	242	0.002	1676.349	18.483	0.996	8.669	16.754
121	197	0.017	1556.992	9.518	5.638	1.836	2.797	167	243	0.004	1676.769	18.985	0.420	9.201	17.621
122	198	0.009	1563.423	9.892	6.431	1.973	2.273	168	244	0.002	1677.950	19.324	1.181	9.940	16.950
123	199	0.019	1568.847	10.092	5.424	2.193	3.395	169	245	0.017	1678.273	19.500	0.323	10.562	17.972
124	200	0.005	1574.937	10.485	6.089	2.432	2.995	170	246	0.	1679.138	19.782	0.865	11.009	17.644
125	201	0.003	1580.292	10.748	5.355	2.799	3.878	171	247	0.017	1679.061	19.840	-0.077	10.942	18.701
126	202	0.000	1585.841	11.007	5.549	2.755	3.899	172	248	0.008	1679.479	19.967	0.418	10.881	18.456
127	203	0.010	1589.498	11.144	3.657	1.516	6.002	173	249	0.039	1679.241	20.013	-0.238	11.043	19.306
128	204	0.002	1593.917	11.416	4.418	0.839	5.521	174	250	0.028	1679.439	20.180	0.198	11.167	19.145
129	205	0.008	1597.367	11.575	3.450	1.083	6.684	175	251	0.040	1679.078	20.365	-0.361	11.278	19.893
130	206	0.004	1601.592	11.816	4.225	1.349	6.171	176	252	0.018	1679.079	20.587	0.001	11.423	19.695
131	207	0.004	1604.840	11.968	3.248	1.592	7.356	177	253	0.024	1678.492	20.791	-0.587	11.556	20.432

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 77, IR.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
88	165	0.025	1287.266	-0.739	11.811	-6.344	-12.040	134	211	0.016	1626.463	10.697	4.039	1.519	7.191
89	166	0.030	1297.516	-0.398	10.250	-6.292	-10.188	135	212	0.022	1629.475	10.970	3.011	1.665	8.466
90	167	0.023	1308.910	-0.184	11.393	-6.122	-11.062	136	213	0.010	1633.227	11.123	3.752	1.876	7.916
91	168	0.045	1318.302	0.231	9.392	-6.421	-8.766	137	214	0.026	1635.432	11.412	2.205	1.492	9.717
92	169	0.028	1329.644	0.385	11.342	-5.896	-10.424	138	215	0.014	1639.253	11.558	3.820	2.033	8.276
93	170	0.044	1338.711	0.761	9.067	-5.749	-7.900	139	216	0.030	1641.328	11.858	2.076	2.277	10.273
94	171	0.041	1349.628	0.981	10.916	-5.561	-9.437	140	217	0.026	1644.833	12.024	3.504	2.425	9.015
95	172	0.069	1358.386	1.390	8.759	-5.380	-7.011	141	218	0.047	1646.808	12.338	1.976	2.704	10.762
96	173	0.068	1368.973	1.647	10.586	-5.166	-8.441	142	219	0.053	1650.174	12.559	3.366	2.984	9.627
97	174	0.160	1377.729	1.693	8.757	-5.041	-6.331	143	220	0.147	1652.225	12.700	2.051	3.374	11.194
98	175	0.159	1388.072	1.962	10.342	-4.883	-7.723	144	221	0.151	1655.645	12.862	3.420	3.594	10.082
99	176	0.170	1396.665	2.106	8.594	-4.800	-5.713	145	222	0.161	1657.887	13.009	2.242	3.824	11.415
100	177	0.168	1406.694	2.416	10.029	-4.583	-7.015	146	223	0.164	1661.118	13.212	3.231	4.006	10.529
101	178	0.176	1415.036	2.601	8.342	-4.456	-5.058	147	224	0.170	1663.236	13.365	2.118	4.215	11.810
102	179	0.171	1424.652	2.921	9.616	-4.277	-6.180	148	225	0.171	1666.243	13.556	3.007	4.392	11.035
103	180	0.175	1432.677	3.157	8.025	-4.176	-4.273	149	226	0.176	1668.185	13.726	1.942	4.554	12.287
104	181	0.170	1441.950	3.463	9.273	-3.915	-5.327	150	227	0.177	1670.977	13.886	2.792	4.728	11.586
105	182	0.176	1449.639	3.649	7.690	-3.770	-6.431	151	228	0.184	1672.821	14.013	1.844	4.997	12.723
106	183	0.166	1458.565	4.034	8.926	-3.525	-4.485	152	229	0.177	1675.207	14.284	2.386	4.947	12.322
107	184	0.167	1465.978	4.288	7.413	-3.374	-2.617	153	230	0.178	1676.735	14.461	1.528	4.942	13.437
108	185	0.159	1474.464	4.591	8.486	-3.144	-3.459	154	231	0.170	1678.930	14.763	2.196	5.237	12.953
109	186	0.159	1481.535	4.848	7.070	-2.976	-1.694	155	232	0.167	1680.235	14.988	1.305	5.384	14.124
110	187	0.150	1489.701	5.173	8.166	-2.719	-2.545	156	233	0.162	1682.254	15.212	2.019	5.718	13.613
111	188	0.148	1496.426	5.432	6.724	-2.552	-0.773	157	234	0.158	1683.365	15.440	1.111	5.957	14.801
112	189	0.139	1504.321	5.714	7.895	-2.241	-1.694	158	235	0.155	1685.215	15.642	1.850	6.216	14.280
113	190	0.122	1510.752	5.950	6.431	-2.014	0.142	159	236	0.154	1686.124	15.850	0.909	6.445	15.446
114	191	0.097	1518.536	6.325	7.784	-1.555	-0.889	160	237	0.150	1687.803	16.064	1.679	6.674	14.870
115	192	0.090	1524.859	6.631	6.323	-1.171	0.762	161	238	0.148	1688.547	16.261	0.744	6.897	16.041
116	193	0.074	1532.427	6.882	7.568	-0.649	-0.259	162	239	0.144	1690.041	16.466	1.494	7.131	15.474
117	194	0.069	1538.608	7.120	6.181	-0.228	1.320	163	240	0.143	1690.630	16.656	0.588	7.367	16.615
118	195	0.053	1545.943	7.227	7.335	0.116	0.358	164	241	0.132	1691.889	16.805	1.259	7.540	16.141
119	196	0.043	1552.009	7.436	6.066	0.536	1.825	165	242	0.125	1692.321	16.968	0.432	7.765	17.285
120	197	0.042	1559.007	7.652	6.997	0.721	1.056	166	243	0.078	1693.607	17.258	1.286	8.160	16.629
121	198	0.044	1564.913	7.922	5.907	1.114	2.381	167	244	0.033	1694.117	17.348	0.510	8.591	17.532
122	199	0.029	1571.459	8.036	6.546	1.130	1.978	168	245	0.029	1695.462	17.513	1.345	9.302	16.747
123	200	0.030	1577.150	8.302	5.690	1.381	3.050	169	246	0.027	1696.000	17.727	0.537	9.921	17.665
124	201	0.015	1583.388	8.451	6.238	1.562	2.732	170	247	0.012	1696.979	17.841	0.979	10.058	17.403
125	202	0.011	1588.957	8.665	5.570	1.907	3.663	171	248	0.029	1697.153	18.092	0.174	10.085	18.419
126	203	0.007	1594.718	8.877	5.761	1.971	3.714	172	249	0.038	1697.764	18.285	0.612	10.113	18.127
127	204	0.017	1598.655	9.157	3.937	0.816	5.779	173	250	0.048	1697.801	18.561	0.037	10.286	18.883
128	205	0.012	1603.268	9.352	4.613	0.139	5.293	174	251	0.046	1698.189	18.750	0.387	10.381	18.727
129	206	0.019	1606.981	9.614	3.712	0.332	6.441	175	252	0.047	1697.991	18.913	-0.197	10.468	19.483
130	207	0.018	1611.414	9.821	4.433	0.619	5.921	176	253	0.041	1698.141	19.062	0.150	10.588	19.313
131	208	0.024	1614.905	10.065	3.491	0.818	7.094	177	254	0.038	1697.707	19.215	-0.434	10.700	20.058
132	209	0.020	1619.160	10.270	4.255	1.089	6.537	178	255	0.025	1697.691	19.286	-0.016	10.904	19.811
133	210	0.025	1622.424	10.518	3.264	1.258	7.761	179	256	0.017	1697.168	19.432	-0.523	11.172	20.493

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 78, PT.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
90	168	0.005	1308.754	-0.156	11.689	-7.547	-12.326	136	214	0.	1644.367	11.140	4.006	0.305	6.684
91	169	0.060	1318.437	0.136	9.684	-7.772	-10.065	137	215	0.023	1646.746	11.314	2.379	-0.054	8.495
92	170	0.010	1330.029	0.385	11.592	-7.360	-11.686	138	216	0.000	1650.819	11.566	4.073	0.420	7.056
93	171	0.064	1339.408	0.697	9.379	-6.958	-9.195	139	217	0.029	1653.065	11.737	2.247	0.751	9.058
94	172	0.065	1350.593	0.965	11.185	-6.962	-10.743	140	218	0.014	1656.788	11.955	3.722	0.798	7.839
95	173	0.091	1359.749	1.362	9.156	-6.496	-8.443	141	219	0.068	1659.018	12.210	2.231	1.253	9.534
96	174	0.096	1370.616	1.644	10.868	-6.325	-10.007	142	220	0.084	1662.636	12.463	3.618	1.533	8.332
97	175	0.118	1379.566	1.837	8.950	-5.725	-7.836	143	221	0.115	1664.944	12.719	2.308	2.179	9.807
98	176	0.122	1390.169	2.098	10.603	-5.451	-9.350	144	222	0.125	1668.520	12.875	3.575	2.610	8.582
99	177	0.137	1398.896	2.231	8.727	-5.435	-7.249	145	223	0.142	1670.865	12.978	2.345	3.045	9.922
100	178	0.138	1409.196	2.501	10.299	-5.209	-8.669	146	224	0.144	1674.264	13.146	3.399	3.186	8.915
101	179	0.150	1417.690	2.654	8.494	-5.164	-6.616	147	225	0.154	1676.496	13.260	2.232	3.323	10.271
102	180	0.146	1427.622	2.970	9.932	-4.951	-7.887	148	226	0.155	1679.689	13.446	3.194	3.489	9.448
103	181	0.153	1435.840	3.163	8.219	-4.889	-5.889	149	227	0.163	1681.780	13.596	2.091	3.614	10.750
104	182	0.148	1445.426	3.476	9.585	-4.600	-7.055	150	228	0.164	1684.761	13.784	2.981	3.779	10.023
105	183	0.155	1453.298	3.658	7.872	-4.517	-5.059	151	229	0.175	1686.746	13.925	1.985	3.992	11.212
106	184	0.147	1462.578	4.013	9.281	-4.203	-6.233	152	230	0.164	1689.389	14.182	2.643	4.002	10.719
107	185	0.150	1470.223	4.245	7.644	-4.063	-4.320	153	231	0.166	1691.101	14.367	1.713	3.999	11.884
108	186	0.142	1479.058	4.594	8.835	-3.768	-5.280	154	232	0.156	1693.577	14.646	2.475	4.359	11.319
109	187	0.143	1486.374	4.839	7.316	-3.611	-3.453	155	233	0.155	1695.085	14.850	1.508	4.516	12.520
110	188	0.133	1494.871	5.169	8.497	-3.298	-4.400	156	234	0.148	1697.384	15.130	2.299	4.922	11.926
111	189	0.132	1501.845	5.419	6.974	-3.137	-2.536	157	235	0.147	1698.713	15.347	1.328	5.170	13.125
112	190	0.120	1510.111	5.791	8.267	-2.712	-3.568	158	236	0.143	1700.788	15.573	2.075	5.451	12.579
113	191	0.117	1516.865	6.113	6.753	-2.424	-1.755	159	237	0.143	1701.891	15.767	1.103	5.671	13.767
114	192	0.104	1524.839	6.302	7.974	-2.063	-2.707	160	238	0.138	1703.805	16.003	1.915	5.937	13.139
115	193	0.099	1531.385	6.526	6.547	-1.712	-0.935	161	239	0.136	1704.733	16.186	0.927	6.164	14.365
116	194	0.088	1539.145	6.719	7.760	-1.361	-1.885	162	240	0.130	1706.462	16.421	1.729	6.428	13.776
117	195	0.078	1545.519	6.911	6.374	-1.004	-0.183	163	241	0.129	1707.248	16.618	0.786	6.666	14.951
118	196	0.067	1553.052	7.109	7.533	-0.788	-1.051	164	242	0.120	1708.823	16.934	1.575	6.953	14.356
119	197	0.048	1559.280	7.271	6.228	-0.503	0.535	165	243	0.117	1709.454	17.133	0.631	7.186	15.516
120	198	0.048	1566.512	7.505	7.231	-0.500	-0.157	166	244	0.101	1710.867	17.259	1.413	7.488	14.962
121	199	0.048	1572.655	7.741	6.143	-0.213	1.165	167	245	0.091	1711.427	17.310	0.560	7.779	16.136
122	200	0.024	1579.417	7.958	6.763	-0.232	0.778	168	246	0.015	1712.883	17.420	1.456	8.239	15.550
123	201	0.030	1585.337	8.188	5.920	0.051	1.852	169	247	0.024	1713.600	17.600	0.717	8.536	16.538
124	202	0.007	1591.838	8.450	6.500	0.119	1.505	170	248	0.	1714.790	17.810	1.190	8.545	16.247
125	203	0.004	1597.649	8.692	5.812	0.507	2.391	171	249	0.027	1715.109	17.956	0.319	8.541	17.270
126	204	0.001	1603.652	8.934	6.002	0.420	2.419	172	250	0.041	1715.902	18.137	0.793	8.469	17.005
127	205	0.013	1607.779	9.124	4.127	-0.808	4.509	173	251	0.052	1716.133	18.332	0.231	8.777	17.753
128	206	0.004	1612.639	9.371	4.860	-1.497	4.038	174	252	0.050	1716.692	18.503	0.559	8.918	17.588
129	207	0.013	1616.552	9.571	3.913	-1.241	5.193	175	253	0.050	1716.671	18.680	-0.020	9.136	18.348
130	208	0.007	1621.217	9.803	4.665	-0.995	4.689	176	254	0.043	1716.983	18.842	0.312	9.250	18.190
131	209	0.013	1624.915	10.010	3.698	-0.747	5.871	177	255	0.039	1716.720	19.012	-0.264	9.347	18.950
132	210	0.007	1629.403	10.243	4.488	-0.484	5.320	178	256	0.017	1716.879	19.188	0.159	9.505	18.704
133	211	0.017	1632.872	10.448	3.469	-0.263	6.548	179	257	0.008	1716.545	19.377	-0.333	9.758	19.354
134	212	0.003	1637.158	10.695	4.286	-0.027	5.968	180	258	0.012	1716.467	19.543	-0.079	9.766	19.256
135	213	0.020	1640.361	10.886	3.203	0.160	7.243	181	259	0.014	1715.806	19.713	-0.660	9.774	20.014

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 79$, AU.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
91	170	0.046	1317.560	-0.877	9.970	-8.251	-10.207	137	216	0.026	1657.092	10.346	2.634	-0.678	8.362
92	171	0.030	1329.430	-0.599	11.870	-7.775	-11.960	138	217	0.013	1661.341	10.523	4.249	-0.181	6.900
93	172	0.046	1339.067	-0.341	9.637	-7.529	-9.340	139	218	0.031	1663.845	10.779	2.504	0.118	8.912
94	173	0.043	1350.523	-0.069	11.456	-7.416	-10.984	140	219	0.027	1667.770	10.982	3.925	0.222	7.634
95	174	0.065	1359.826	0.078	9.303	-7.180	-8.524	141	220	0.047	1670.186	11.167	2.416	0.562	9.389
96	175	0.064	1370.948	0.332	11.122	-6.974	-10.194	142	221	0.053	1673.969	11.332	3.783	0.841	8.133
97	176	0.085	1380.037	0.470	9.088	-6.645	-7.885	143	222	0.074	1676.319	11.375	2.350	1.216	9.755
98	177	0.091	1390.865	0.695	10.828	-6.403	-9.495	144	223	0.088	1680.004	11.485	3.686	1.535	8.527
99	178	0.111	1399.744	0.848	8.880	-6.280	-7.304	145	224	0.121	1682.396	11.532	2.392	1.876	9.969
100	179	0.113	1410.291	1.096	10.547	-6.075	-8.824	146	225	0.124	1685.984	11.721	3.588	2.044	8.802
101	180	0.128	1418.953	1.263	8.661	-6.008	-6.693	147	226	0.143	1688.354	11.859	2.370	2.173	10.188
102	181	0.125	1429.169	1.547	10.216	-5.820	-8.062	148	227	0.143	1691.748	12.059	3.394	2.335	9.365
103	182	0.136	1437.589	1.748	8.420	-5.742	-6.002	149	228	0.154	1694.002	12.221	2.253	2.470	10.709
104	183	0.132	1447.457	2.031	9.868	-5.490	-7.200	150	229	0.154	1697.176	12.415	3.174	2.637	10.061
105	184	0.136	1455.563	2.265	8.106	-5.410	-5.183	151	230	0.175	1699.326	12.579	2.150	2.846	11.295
106	185	0.133	1465.120	2.542	9.558	-5.125	-6.381	152	231	0.154	1702.203	12.814	2.878	2.931	10.849
107	186	0.138	1472.996	2.773	7.876	-4.939	-4.444	153	232	0.159	1704.114	13.012	1.911	2.998	11.930
108	187	0.128	1482.139	3.080	9.143	-4.722	-5.452	154	233	0.146	1706.822	13.246	2.709	3.321	11.336
109	188	0.131	1489.688	3.314	7.549	-4.585	-3.614	155	234	0.147	1708.528	13.443	1.705	3.498	12.457
110	189	0.120	1498.527	3.656	8.839	-4.233	-4.654	156	235	0.140	1711.055	13.671	2.527	3.830	11.829
111	190	0.118	1505.761	3.916	7.234	-4.069	-2.783	157	236	0.139	1712.585	13.872	1.529	4.055	13.000
112	191	0.107	1514.327	4.215	8.566	-3.669	-3.855	158	237	0.134	1714.875	14.088	2.291	4.326	12.430
113	192	0.104	1521.350	4.485	7.023	-3.371	-2.010	159	238	0.134	1716.162	14.272	1.287	4.502	13.621
114	193	0.090	1529.668	4.829	8.318	-2.948	-3.052	160	239	0.127	1718.315	14.509	2.153	4.805	12.946
115	194	0.085	1536.478	5.093	6.810	-2.569	-1.231	161	240	0.126	1719.456	14.723	1.141	5.037	14.150
116	195	0.070	1544.553	5.408	8.075	-2.278	-2.216	162	241	0.119	1721.416	14.954	1.960	5.318	13.522
117	196	0.067	1551.219	5.700	6.665	-1.935	-0.496	163	242	0.118	1722.397	15.149	0.981	5.555	14.706
118	197	0.053	1559.033	5.981	7.814	-1.688	-1.407	164	243	0.106	1724.187	15.364	1.791	5.851	14.071
119	198	0.044	1565.572	6.291	6.538	-1.331	0.198	165	244	0.098	1725.047	15.593	0.859	6.122	15.273
120	199	0.043	1573.037	6.526	7.466	-1.201	-0.458	166	245	0.062	1726.781	15.914	1.734	6.597	14.647
121	200	0.044	1579.413	6.759	6.376	-0.891	0.875	167	246	0.036	1727.650	16.223	0.869	7.034	15.919
122	201	0.030	1586.407	6.989	6.993	-0.895	0.461	168	247	0.031	1729.355	16.472	1.705	7.453	15.364
123	202	0.031	1592.561	7.223	6.154	-0.648	1.655	169	248	0.027	1730.254	16.654	0.899	7.842	16.367
124	203	0.014	1599.258	7.421	6.698	-0.496	1.318	170	249	0.008	1731.596	16.807	1.342	7.839	16.083
125	204	0.010	1605.288	7.639	6.030	-0.156	2.280	171	250	0.029	1732.124	17.015	0.528	7.830	17.133
126	205	0.006	1611.506	7.854	6.218	-0.177	2.332	172	251	0.039	1733.103	17.201	0.979	7.829	16.799
127	206	0.016	1615.894	8.115	4.388	-1.358	4.398	173	252	0.048	1733.498	17.365	0.395	8.050	17.527
128	207	0.011	1620.962	8.323	5.068	-2.051	3.911	174	253	0.046	1734.237	17.545	0.739	8.177	17.290
129	208	0.019	1625.123	8.571	4.161	-1.827	5.065	175	254	0.047	1734.391	17.719	0.154	8.295	18.024
130	209	0.017	1630.004	8.787	4.880	-1.560	4.545	176	255	0.041	1734.887	17.904	0.497	8.404	17.884
131	210	0.025	1633.941	9.026	3.937	-1.335	5.723	177	256	0.039	1734.800	18.081	-0.087	8.514	18.646
132	211	0.019	1638.638	9.235	4.698	-1.071	5.168	178	257	0.025	1735.117	18.238	0.317	8.681	18.441
133	212	0.026	1642.344	9.472	3.706	-0.856	6.393	179	258	0.016	1734.940	18.395	-0.177	8.938	19.208
134	213	0.014	1646.821	9.663	4.477	-0.634	5.820	180	259	0.017	1735.037	18.571	0.097	9.051	19.128
135	214	0.022	1650.268	9.907	3.447	-0.451	7.101	181	260	0.016	1734.548	18.742	-0.489	9.085	19.877
136	215	0.008	1654.458	10.091	4.190	-0.300	6.536	182	261	0.010	1734.355	18.894	-0.193	9.136	19.749

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 80, HG.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
93	173	0.022	1338.756	-0.311	9.811	-7.976	-10.454	139	219	0.018	1674.622	10.777	2.647	-0.419	7.802
94	174	0.009	1350.520	-0.003	11.763	-7.804	-12.148	140	220	0.007	1678.793	11.023	4.171	-0.321	6.480
95	175	0.022	1359.972	0.145	9.452	-7.731	-9.555	141	221	0.025	1681.319	11.133	2.526	-0.041	8.346
96	176	0.020	1371.369	0.421	11.397	-7.519	-11.237	142	222	0.020	1685.292	11.323	3.972	0.209	7.093
97	177	0.057	1380.587	0.550	9.218	-7.457	-8.791	143	223	0.048	1687.749	11.430	2.457	0.436	8.827
98	178	0.055	1391.658	0.794	11.071	-7.253	-10.454	144	224	0.053	1691.583	11.579	3.834	0.652	7.582
99	179	0.085	1400.685	0.941	9.027	-7.176	-8.140	145	225	0.084	1694.004	11.607	2.421	0.764	9.201
100	180	0.089	1411.477	1.185	10.792	-6.988	-9.758	146	226	0.103	1697.760	11.776	3.757	0.945	7.963
101	181	0.121	1420.324	1.372	8.848	-6.867	-7.581	147	227	0.152	1700.331	11.977	2.571	1.171	9.295
102	182	0.115	1430.804	1.636	10.480	-6.686	-9.116	148	228	0.154	1703.928	12.180	3.597	1.369	8.166
103	183	0.148	1439.475	1.886	8.670	-6.510	-7.042	149	229	0.169	1706.454	12.452	2.526	1.663	9.430
104	184	0.133	1449.597	2.140	10.122	-6.320	-8.419	150	230	0.171	1709.838	12.663	3.385	1.854	8.519
105	185	0.158	1457.957	2.395	8.360	-6.178	-6.357	151	231	0.186	1712.270	12.944	2.431	2.194	9.686
106	186	0.134	1467.769	2.649	9.812	-5.952	-7.638	152	232	0.170	1715.261	13.058	2.991	2.205	9.288
107	187	0.143	1475.905	2.909	8.135	-5.688	-5.663	153	233	0.173	1717.376	13.262	2.115	2.335	10.385
108	188	0.126	1485.292	3.153	9.387	-5.581	-6.767	154	234	0.156	1720.202	13.379	2.826	2.518	9.869
109	189	0.131	1493.090	3.402	7.798	-5.427	-4.792	155	235	0.154	1722.102	13.574	1.900	2.706	11.060
110	190	0.113	1502.196	3.669	9.106	-5.157	-5.903	156	236	0.143	1724.802	13.747	2.700	2.930	10.443
111	191	0.109	1509.689	3.928	7.493	-4.980	-3.916	157	237	0.142	1726.523	13.938	1.721	3.143	11.686
112	192	0.094	1518.557	4.230	8.868	-4.609	-5.023	158	238	0.134	1729.000	14.125	2.477	3.321	11.119
113	193	0.094	1525.833	4.483	7.276	-4.307	-3.073	159	239	0.135	1730.479	14.317	1.478	3.471	12.385
114	194	0.071	1534.465	4.797	8.632	-3.942	-4.199	160	240	0.125	1732.824	14.509	2.345	3.741	11.717
115	195	0.069	1541.555	5.077	7.091	-3.604	-2.261	161	241	0.124	1734.156	14.700	1.332	3.970	12.996
116	196	0.047	1549.940	5.387	8.385	-3.193	-3.324	162	242	0.114	1736.320	14.904	2.164	4.219	12.361
117	197	0.048	1556.844	5.625	6.904	-2.836	-1.491	163	243	0.112	1737.476	15.079	1.156	4.448	13.662
118	198	0.026	1564.988	5.954	8.143	-2.453	-2.507	164	244	0.090	1739.537	15.350	2.061	4.780	12.981
119	199	0.027	1571.797	6.225	6.809	-2.017	-0.868	165	245	0.016	1740.645	15.599	1.108	5.103	14.381
120	200	0.018	1579.505	6.468	7.709	-1.842	-1.541	166	246	0.013	1742.787	16.006	2.141	5.669	13.659
121	201	0.024	1586.085	6.672	6.580	-1.490	-0.165	167	247	0.009	1743.937	16.287	1.151	6.188	14.836
122	202	0.012	1593.434	7.027	7.348	-1.373	-0.706	168	248	0.006	1745.839	16.484	1.902	6.677	14.269
123	203	0.021	1599.793	7.233	6.360	-1.156	0.524	169	249	0.018	1746.897	16.643	1.058	7.175	15.295
124	204	0.006	1606.786	7.528	6.993	-0.926	0.110	170	250	0.	1748.475	16.879	1.578	7.297	14.944
125	205	0.004	1613.055	7.767	6.269	-0.577	1.078	171	251	0.019	1749.120	16.995	0.645	7.225	16.071
126	206	0.002	1619.510	8.004	6.455	-0.623	1.121	172	252	0.013	1750.242	17.139	1.122	7.158	15.759
127	207	0.011	1624.090	8.196	4.580	-1.854	3.223	173	253	0.040	1750.744	17.247	0.502	7.340	16.566
128	208	0.004	1629.406	8.444	5.316	-2.541	2.710	174	254	0.035	1751.633	17.396	0.888	7.436	16.265
129	209	0.010	1633.766	8.643	4.360	-2.308	3.896	175	255	0.041	1751.989	17.598	0.356	7.561	17.041
130	210	0.006	1638.881	8.877	5.115	-2.053	3.363	176	256	0.023	1752.664	17.777	0.676	7.677	16.806
131	211	0.008	1643.023	9.083	4.142	-1.824	4.561	177	257	0.026	1752.776	17.976	0.112	7.810	17.650
132	212	0.005	1647.955	9.317	4.932	-1.557	3.994	178	258	0.010	1753.366	18.249	0.590	8.088	17.337
133	213	0.010	1651.859	9.515	3.904	-1.351	5.243	179	259	0.006	1753.383	18.442	0.017	8.368	18.105
134	214	0.004	1656.587	9.766	4.728	-1.111	4.637	180	260	0.010	1753.643	18.605	0.260	8.469	18.036
135	215	0.016	1660.212	9.944	3.625	-0.955	5.961	181	261	0.012	1753.322	18.773	-0.321	8.481	18.787
136	216	0.	1664.672	10.214	4.460	-0.782	5.334	182	262	0.004	1753.321	18.966	-0.000	8.560	18.635
137	217	0.016	1667.459	10.367	2.787	-1.197	7.233	183	263	0.003	1752.734	19.142	-0.587	8.633	19.397
138	218	0.002	1671.974	10.633	4.516	-0.687	5.711	184	264	0.	1752.567	19.304	-0.167	8.810	19.147

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 81, TL.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
95	176	0.010	1359.349	-0.623	9.714	-8.013	-9.869	141	222	0.017	1691.602	10.283	2.719	-0.537	8.042
96	177	0.008	1371.013	-0.355	11.664	-7.805	-11.555	142	223	0.011	1695.794	10.502	4.191	-0.271	6.762
97	178	0.	1380.421	-0.166	9.408	-7.700	-9.033	143	224	0.026	1698.382	10.633	2.589	-0.098	8.585
98	179	0.017	1391.763	0.105	11.342	-7.480	-10.710	144	225	0.024	1702.422	10.839	4.040	0.159	7.321
99	180	0.044	1400.936	0.251	9.173	-7.396	-8.280	145	226	0.049	1704.940	10.937	2.518	0.327	9.057
100	181	0.042	1411.961	0.484	11.025	-7.199	-9.907	146	227	0.055	1708.844	11.084	3.903	0.544	7.805
101	182	0.067	1420.906	0.582	8.945	-7.133	-7.567	147	228	0.079	1711.312	10.981	2.468	0.621	9.441
102	183	0.067	1431.650	0.846	10.744	-6.936	-9.192	148	229	0.086	1715.101	11.173	3.789	0.822	8.199
103	184	0.091	1440.396	0.921	8.746	-6.852	-6.928	149	230	0.166	1717.575	11.121	2.474	0.925	9.687
104	185	0.087	1450.818	1.220	10.422	-6.646	-8.485	150	231	0.107	1721.173	11.335	3.598	1.130	8.818
105	186	0.099	1459.349	1.392	8.531	-6.535	-6.285	151	232	0.181	1723.767	11.497	2.594	1.470	10.018
106	187	0.094	1469.459	1.690	10.110	-6.293	-7.778	152	233	0.167	1726.979	11.718	3.212	1.508	9.726
107	188	0.106	1477.742	1.837	8.283	-6.116	-5.633	153	234	0.170	1729.289	11.913	2.310	1.668	10.710
108	189	0.093	1487.516	2.224	9.774	-5.900	-6.987	154	235	0.127	1732.380	12.178	3.091	1.882	10.142
109	190	0.099	1495.511	2.421	7.995	-5.780	-4.854	155	236	0.134	1734.462	12.360	2.082	2.054	11.233
110	191	0.083	1504.991	2.795	9.480	-5.443	-6.154	156	237	0.122	1737.426	12.625	2.964	2.309	10.543
111	192	0.086	1512.751	3.062	7.760	-5.232	-4.036	157	238	0.126	1739.337	12.814	1.910	2.514	11.721
112	193	0.065	1521.978	3.421	9.226	-4.844	-5.326	158	239	0.115	1742.082	13.081	2.745	2.731	11.087
113	194	0.070	1529.483	3.650	7.505	-4.573	-3.189	159	240	0.113	1743.758	13.280	1.677	2.879	12.292
114	195	0.038	1538.512	4.047	9.029	-4.110	-4.501	160	241	0.103	1746.369	13.545	2.611	3.199	11.545
115	196	0.049	1545.834	4.279	7.322	-3.811	-2.439	161	242	0.103	1747.899	13.743	1.529	3.442	12.814
116	197	0.017	1554.570	4.630	8.736	-3.392	-3.678	162	243	0.089	1750.356	14.036	2.457	3.746	12.077
117	198	0.028	1561.698	4.854	7.128	-3.074	-1.745	163	244	0.076	1751.736	14.260	1.380	3.985	13.571
118	199	0.011	1570.146	5.158	8.448	-2.702	-2.857	164	245	0.008	1754.244	14.707	2.508	4.533	12.633
119	200	0.019	1577.182	5.385	7.036	-2.332	-1.178	165	246	0.009	1755.663	15.018	1.419	4.971	14.069
120	201	0.011	1585.138	5.633	7.957	-2.190	-1.881	166	247	0.006	1757.990	15.204	2.327	5.508	13.348
121	202	0.013	1591.946	5.860	6.807	-1.921	-0.484	167	248	0.006	1759.325	15.388	1.335	5.984	14.526
122	203	0.009	1599.535	6.102	7.590	-1.797	-1.037	168	249	0.004	1761.410	15.571	2.084	6.334	13.959
123	204	0.017	1606.114	6.320	6.578	-1.594	0.209	169	250	0.015	1762.637	15.740	1.227	6.692	14.998
124	205	0.005	1613.351	6.565	7.237	-1.351	-0.237	170	251	0.	1764.408	15.933	1.771	6.758	14.616
125	206	0.004	1619.849	6.794	6.498	-1.007	0.750	171	252	0.016	1765.218	16.099	0.810	6.669	15.765
126	207	0.001	1626.531	7.021	6.682	-1.023	0.796	172	253	0.008	1766.528	16.286	1.310	6.636	15.436
127	208	0.010	1631.334	7.244	4.803	-2.249	2.902	173	254	0.024	1767.115	16.371	0.587	6.696	16.350
128	209	0.004	1636.879	7.473	5.545	-2.922	2.375	174	255	0.018	1768.247	16.615	1.132	6.849	15.961
129	210	0.008	1641.461	7.695	4.582	-2.728	3.572	175	256	0.030	1768.688	16.699	0.440	6.895	16.837
130	211	0.005	1646.802	7.921	5.340	-2.455	3.032	176	257	0.015	1769.644	16.980	0.956	7.112	16.477
131	212	0.006	1651.166	8.143	4.365	-2.252	4.235	177	258	0.021	1769.921	17.144	0.277	7.235	17.355
132	213	0.004	1656.319	8.364	5.153	-1.979	3.668	178	259	0.008	1770.705	17.339	0.785	7.523	17.005
133	214	0.008	1660.442	8.582	4.122	-1.794	4.920	179	260	0.005	1770.897	17.514	0.191	7.801	17.796
134	215	0.003	1665.391	8.803	4.949	-1.542	4.309	180	261	0.008	1771.326	17.683	0.429	7.914	17.734
135	216	0.014	1669.223	9.011	3.832	-1.416	5.648	181	262	0.011	1771.174	17.852	-0.152	7.939	18.481
136	217	0.	1673.910	9.238	4.686	-1.207	4.992	182	263	0.004	1771.349	18.027	0.175	8.016	18.321
137	218	0.013	1676.902	9.444	2.993	-1.661	6.907	183	264	0.003	1770.931	18.197	-0.417	8.088	19.093
138	219	0.002	1681.641	9.667	4.739	-1.112	5.373	184	265	0.	1770.933	18.366	0.001	8.283	18.845
139	220	0.015	1684.490	9.869	2.849	-0.897	7.489	185	266	0.007	1770.108	18.531	-0.825	8.221	19.828
140	221	0.005	1688.883	10.090	4.393	-0.753	6.143	186	267	0.001	1770.097	18.700	-0.011	8.539	19.187

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 82, PB.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
96	178	0.001	1370.606	-0.408	11.930	-8.209	-14.190	142	224	0.004	1706.185	10.391	4.412	-0.903	4.328
97	179	0.	1380.271	-0.151	9.665	-7.996	-11.664	143	225	0.011	1708.961	10.578	2.776	-0.653	6.149
98	180	0.003	1391.874	0.111	11.603	-7.790	-13.282	144	226	0.007	1713.215	10.792	4.254	-0.372	4.959
99	181	0.	1401.271	0.335	9.397	-7.611	-10.817	145	227	0.013	1715.866	10.926	2.652	-0.178	6.754
100	182	0.006	1412.556	0.595	11.285	-7.397	-12.355	146	228	0.005	1719.970	11.127	4.104	0.092	5.616
101	183	0.020	1421.676	0.770	9.120	-7.304	-9.930	147	229	0.044	1722.518	11.206	2.547	0.219	7.398
102	184	0.009	1432.685	1.035	11.009	-7.087	-11.397	148	230	0.046	1726.479	11.378	3.961	0.424	6.344
103	185	0.018	1441.550	1.154	8.865	-7.069	-9.034	149	231	0.178	1729.208	11.633	2.729	0.582	7.825
104	186	0.006	1452.282	1.464	10.732	-6.817	-10.282	150	232	0.183	1733.002	11.829	3.794	0.780	7.134
105	187	0.066	1460.898	1.549	8.616	-6.871	-8.149	151	233	0.194	1735.923	12.156	2.920	1.174	8.210
106	188	0.023	1471.327	1.868	10.428	-6.565	-9.419	152	234	0.182	1739.216	12.237	3.293	1.083	8.046
107	189	0.076	1479.746	2.004	8.419	-6.506	-7.337	153	235	0.186	1741.739	12.450	2.523	1.174	9.004
108	190	0.029	1489.874	2.358	10.128	-6.190	-8.645	154	236	0.163	1744.912	12.533	3.173	1.356	8.581
109	191	0.062	1498.055	2.544	8.181	-6.145	-6.592	155	237	0.158	1747.187	12.725	2.275	1.516	9.652
110	192	0.003	1507.932	2.942	9.878	-5.654	-7.958	156	238	0.140	1750.275	12.849	3.089	1.779	9.052
111	193	0.063	1515.869	3.118	7.937	-5.516	-5.946	157	239	0.139	1752.386	13.049	2.111	1.989	10.232
112	194	0.004	1525.511	3.533	9.642	-4.980	-7.334	158	240	0.122	1755.268	13.186	2.882	2.171	9.655
113	195	0.030	1533.228	3.745	7.717	-4.756	-5.385	159	241	0.119	1757.132	13.374	1.864	2.314	10.877
114	196	0.002	1542.613	4.101	9.384	-4.240	-6.767	160	242	0.091	1759.931	13.561	2.799	2.635	10.134
115	197	0.	1550.110	4.276	7.497	-4.018	-4.810	161	243	0.092	1761.650	13.752	1.720	2.877	11.379
116	198	0.003	1559.171	4.600	9.061	-3.589	-6.049	162	244	0.	1764.525	14.169	2.875	3.406	10.411
117	199	0.015	1566.507	4.808	7.336	-3.344	-4.221	163	245	0.036	1766.094	14.358	1.569	3.644	11.645
118	200	0.004	1575.222	5.076	8.715	-3.014	-5.317	164	246	0.	1768.950	14.706	2.856	4.335	10.546
119	201	0.012	1582.475	5.293	7.253	-2.664	-3.697	165	247	0.003	1770.556	14.893	1.606	4.785	11.703
120	202	0.005	1590.680	5.541	8.205	-2.603	-4.384	166	248	0.000	1773.069	15.079	2.513	5.237	10.954
121	203	0.006	1597.716	5.770	7.036	-2.376	-3.016	167	249	0.002	1774.586	15.260	1.517	5.645	12.127
122	204	0.005	1605.541	6.005	7.825	-2.260	-3.557	168	250	0.000	1776.853	15.443	2.267	5.771	11.553
123	205	0.013	1612.332	6.218	6.791	-2.049	-2.320	169	251	0.012	1778.241	15.604	1.389	6.009	12.606
124	206	0.003	1619.817	6.466	7.485	-1.912	-2.742	170	252	0.	1780.200	15.792	1.959	6.066	12.265
125	207	0.002	1626.544	6.695	6.727	-1.545	-1.818	171	253	0.012	1781.181	15.963	0.981	5.989	13.375
126	208	0.000	1633.454	6.923	6.910	-1.627	-1.782	172	254	0.003	1782.683	16.155	1.502	5.913	13.087
127	209	0.008	1638.472	7.138	5.018	-2.878	0.323	173	255	0.011	1783.426	16.311	0.743	6.012	13.997
128	210	0.002	1644.251	7.372	5.779	-3.553	-0.163	174	256	0.009	1784.743	16.496	1.317	6.206	13.674
129	211	0.006	1649.051	7.590	4.800	-3.334	1.012	175	257	0.015	1785.338	16.650	0.595	6.299	14.550
130	212	0.002	1654.619	7.817	5.568	-3.082	0.499	176	258	0.008	1786.493	16.849	1.155	6.565	14.266
131	213	0.002	1659.205	8.039	4.586	-2.856	1.688	177	259	0.016	1786.928	17.007	0.435	6.645	15.048
132	214	0.001	1664.579	8.260	5.374	-2.597	1.133	178	260	0.004	1787.910	17.205	0.982	6.951	14.703
133	215	0.004	1668.917	8.475	4.338	-2.402	2.382	179	261	0.003	1788.277	17.380	0.367	7.206	15.431
134	216	0.000	1674.088	8.698	5.172	-2.161	1.787	180	262	0.006	1788.873	17.547	0.596	7.212	15.362
135	217	0.011	1678.119	8.896	4.031	-2.035	3.122	181	263	0.009	1788.887	17.713	0.014	7.209	16.129
136	218	0.	1683.027	9.118	4.908	-1.855	2.518	182	264	0.002	1789.242	17.893	0.355	7.304	15.971
137	219	0.010	1686.231	9.329	3.204	-2.275	4.386	183	265	0.001	1788.995	18.064	-0.247	7.379	16.711
138	220	0.	1691.197	9.555	4.965	-1.770	2.896	184	266	0.	1789.153	18.221	0.158	7.537	16.471
139	221	0.011	1694.243	9.753	3.047	-1.510	4.974	185	267	0.006	1788.501	18.393	-0.652	7.472	17.465
140	222	0.002	1698.862	9.979	4.619	-1.407	3.679	186	268	0.	1788.656	18.559	0.155	7.794	16.839
141	223	0.011	1701.773	10.171	2.911	-1.144	5.557	187	269	0.005	1787.891	18.726	-0.766	8.019	17.905

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 83, BI.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
98	181	0.039	1389.672	-2.202	11.862	-9.636	-12.816	144	227	0.041	1721.838	8.624	4.447	-2.250	5.339
99	182	0.057	1399.419	-1.852	9.747	-9.297	-10.432	145	228	0.059	1724.804	8.938	2.966	-1.873	7.030
100	183	0.060	1410.964	-1.592	11.545	-9.094	-11.579	146	229	0.067	1729.133	9.163	4.329	-1.584	5.895
101	184	0.238	1420.506	-1.170	9.542	-8.725	-9.436	147	230	0.091	1732.041	9.523	2.908	-1.194	7.574
102	185	0.081	1431.734	-0.951	11.228	-8.522	-10.265	148	231	0.098	1736.251	9.772	4.210	-0.888	6.916
103	186	0.245	1441.217	-0.333	9.484	-7.984	-8.527	149	232	0.179	1739.354	10.146	3.103	-0.253	8.239
104	187	0.097	1451.967	-0.315	10.750	-7.978	-9.266	150	233	0.186	1743.350	10.348	3.996	-0.046	7.639
105	188	0.214	1461.125	0.227	9.158	-7.566	-7.687	151	234	0.197	1746.480	10.557	3.130	0.610	8.734
106	189	0.104	1471.626	0.299	10.501	-7.486	-8.632	152	235	0.184	1749.961	10.745	3.481	0.493	8.589
107	190	0.128	1480.447	0.701	8.821	-7.197	-7.039	153	236	0.189	1752.711	10.972	2.750	0.649	9.506
108	191	0.102	1490.680	0.806	10.233	-7.074	-8.089	154	237	0.155	1756.057	11.144	3.346	0.783	9.095
109	192	0.109	1499.192	1.138	8.512	-6.845	-6.347	155	238	0.153	1758.545	11.358	2.488	0.961	10.060
110	193	0.092	1509.141	1.208	9.949	-6.670	-7.478	156	239	0.137	1761.836	11.560	3.291	1.161	9.435
111	194	0.092	1517.395	1.525	8.254	-6.411	-5.710	157	240	0.137	1764.141	11.755	2.305	1.384	10.527
112	195	0.074	1527.061	1.550	9.666	-6.225	-6.905	158	241	0.124	1767.227	11.959	3.086	1.505	9.925
113	196	0.077	1535.063	1.834	8.001	-5.984	-5.075	159	242	0.123	1769.282	12.150	2.055	1.650	11.092
114	197	0.053	1544.518	1.905	9.455	-5.755	-6.278	160	243	0.110	1772.246	12.316	2.964	1.870	10.381
115	198	0.057	1552.339	2.229	7.821	-5.439	-4.487	161	244	0.110	1774.154	12.504	1.908	2.101	11.540
116	199	0.038	1561.504	2.333	9.165	-5.303	-5.593	162	245	0.094	1776.957	12.432	2.803	2.293	10.824
117	200	0.039	1569.122	2.616	7.619	-5.007	-3.824	163	246	0.088	1778.713	12.619	1.756	2.520	11.967
118	201	0.028	1577.996	2.774	8.874	-4.870	-4.845	164	247	0.037	1781.476	12.526	2.763	2.826	11.126
119	202	0.027	1585.513	3.038	7.518	-4.480	-3.219	165	248	0.023	1783.241	12.685	1.765	3.210	12.168
120	203	0.024	1593.918	3.238	8.404	-4.523	-3.880	166	249	0.023	1785.930	12.861	2.689	3.392	11.456
121	204	0.026	1601.202	3.486	7.284	-4.275	-2.509	167	250	0.018	1787.623	13.037	1.693	3.665	12.643
122	205	0.018	1609.229	3.688	8.027	-4.204	-3.030	168	251	0.016	1790.065	13.212	2.442	3.780	12.087
123	206	0.023	1616.292	3.960	7.063	-3.948	-1.811	169	252	0.020	1791.683	13.442	1.618	4.063	13.100
124	207	0.012	1623.944	4.127	7.651	-3.887	-2.193	170	253	0.008	1793.774	13.573	2.091	4.069	12.778
125	208	0.009	1630.889	4.345	6.945	-3.520	-1.215	171	254	0.021	1794.988	13.806	1.214	4.056	13.872
126	209	0.006	1638.013	4.559	7.124	-3.633	-1.155	172	255	0.020	1796.641	13.958	1.653	3.938	13.574
127	210	0.014	1643.306	4.834	5.294	-4.838	0.913	173	256	0.037	1797.635	14.209	0.994	4.122	14.427
128	211	0.010	1649.281	5.030	5.975	-5.544	0.420	174	257	0.031	1799.105	14.363	1.471	4.283	14.081
129	212	0.015	1654.335	5.284	5.054	-5.294	1.590	175	258	0.038	1799.976	14.638	0.870	4.566	14.871
130	213	0.013	1660.111	5.492	5.776	-5.063	1.070	176	259	0.025	1801.193	14.700	1.217	4.651	14.633
131	214	0.015	1664.930	5.724	4.819	-4.827	2.262	177	260	0.027	1801.831	14.903	0.638	4.848	15.469
132	215	0.013	1670.516	5.937	5.587	-4.580	1.708	178	261	0.016	1802.926	15.015	1.094	4.987	15.177
133	216	0.017	1675.093	6.177	4.577	-4.368	2.946	179	262	0.013	1803.452	15.175	0.527	5.236	15.957
134	217	0.011	1680.459	6.371	5.366	-4.155	2.362	180	263	0.014	1804.234	15.361	0.782	5.234	15.888
135	218	0.018	1684.763	6.644	4.304	-3.974	3.663	181	264	0.014	1804.430	15.544	0.197	5.239	16.635
136	219	0.008	1689.835	6.807	5.071	-3.851	3.074	182	265	0.009	1804.924	15.682	0.493	5.303	16.505
137	220	0.019	1693.310	7.078	3.475	-4.209	4.928	183	266	0.008	1804.842	15.846	-0.082	5.373	17.277
138	221	0.010	1698.435	7.239	5.125	-3.769	3.450	184	267	0.004	1805.184	16.031	0.343	5.540	17.029
139	222	0.021	1701.759	7.516	3.324	-3.439	5.509	185	268	0.012	1804.713	16.211	-0.472	5.486	18.000
140	223	0.016	1706.547	7.685	4.788	-3.389	4.208	186	269	0.007	1805.013	16.357	0.300	5.785	17.387
141	224	0.026	1709.730	7.958	3.183	-3.055	6.053	187	270	0.012	1804.436	16.546	-0.577	6.033	18.453
142	225	0.025	1714.327	8.142	4.597	-2.851	4.809	188	271	0.011	1804.557	16.702	0.120	6.165	17.903
143	226	0.040	1717.391	8.430	3.064	-2.506	6.562	189	272	0.013	1803.866	16.882	-0.690	6.407	18.887

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 84, PO.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
100	184	0.248	1410.287	-0.677	11.684	-9.882	-12.770	146	230	0.147	1738.832	9.699	4.587	-2.677	4.573
101	185	0.256	1420.686	0.180	10.399	-8.881	-11.252	147	231	0.179	1742.384	10.344	3.552	-1.777	5.863
102	186	0.248	1431.908	0.174	11.222	-8.944	-11.798	148	232	0.183	1746.810	10.559	4.425	-1.456	5.226
103	187	0.260	1441.919	0.701	10.011	-8.053	-10.362	149	233	0.199	1750.206	10.852	3.396	-0.607	6.469
104	188	0.235	1452.656	0.689	10.737	-8.324	-10.796	150	234	0.195	1754.432	11.082	4.226	-0.342	5.909
105	189	0.222	1462.212	1.086	9.556	-7.634	-9.451	151	235	0.202	1757.768	11.288	3.336	0.264	6.941
106	190	0.180	1472.625	0.999	10.413	-7.952	-10.136	152	236	0.193	1761.435	11.474	3.667	0.138	6.822
107	191	0.178	1481.808	1.362	9.184	-7.385	-8.769	153	237	0.194	1764.369	11.658	2.934	0.152	7.737
108	192	0.143	1492.063	1.383	10.254	-7.559	-9.602	154	238	0.176	1767.822	11.766	3.453	0.311	7.417
109	193	0.147	1500.880	1.688	8.818	-7.161	-7.978	155	239	0.168	1770.488	11.943	2.666	0.454	8.374
110	194	0.120	1510.902	1.762	10.022	-7.266	-8.930	156	240	0.154	1773.885	12.049	3.397	0.678	7.826
111	195	0.114	1519.374	1.979	8.471	-6.976	-7.201	157	241	0.149	1776.369	12.229	2.484	0.887	8.919
112	196	0.095	1529.205	2.144	9.831	-7.023	-8.327	158	242	0.141	1779.591	12.365	3.222	1.021	8.367
113	197	0.094	1537.457	2.394	8.252	-6.708	-6.586	159	243	0.142	1781.845	12.563	2.253	1.164	9.513
114	198	0.065	1547.069	2.552	9.612	-6.737	-7.727	160	244	0.130	1784.911	12.665	3.067	1.348	8.892
115	199	0.063	1555.128	2.790	8.059	-6.395	-6.041	161	245	0.128	1786.999	12.845	2.088	1.572	10.038
116	200	0.019	1564.516	3.012	9.387	-6.392	-7.166	162	246	0.116	1789.898	12.941	2.899	1.672	9.412
117	201	0.035	1572.368	3.246	7.852	-6.037	-5.498	163	247	0.114	1791.820	13.106	1.922	1.874	10.543
118	202	0.010	1581.512	3.517	9.144	-5.953	-6.539	164	248	0.	1794.627	13.150	2.807	1.806	9.840
119	203	0.020	1589.255	3.742	7.743	-5.546	-5.009	165	249	0.006	1796.604	13.363	1.978	2.215	10.751
120	204	0.010	1597.910	3.992	8.655	-5.607	-5.694	166	250	0.002	1799.483	13.553	2.879	2.238	9.839
121	205	0.013	1605.416	4.215	7.506	-5.354	-4.338	167	251	0.004	1801.370	13.747	1.886	2.519	10.880
122	206	0.008	1613.699	4.470	8.282	-5.276	-4.863	168	252	0.002	1804.000	13.935	2.631	2.636	10.306
123	207	0.017	1620.968	4.676	7.269	-5.043	-3.658	169	253	0.015	1805.769	14.086	1.769	2.888	11.343
124	208	0.005	1628.892	4.948	7.924	-4.944	-4.055	170	254	0.	1808.077	14.303	2.308	2.929	11.019
125	209	0.003	1636.075	5.186	7.183	-4.552	-3.130	171	255	0.016	1809.432	14.445	1.355	2.896	12.125
126	210	0.001	1643.437	5.424	7.362	-4.675	-3.088	172	256	0.007	1811.280	14.639	1.848	2.784	11.844
127	211	0.009	1648.919	5.613	5.482	-5.920	-0.989	173	257	0.028	1812.404	14.769	1.124	2.928	12.731
128	212	0.002	1655.143	5.862	6.224	-6.606	-1.475	174	258	0.019	1814.065	14.959	1.661	3.087	12.496
129	213	0.008	1660.398	6.063	5.255	-6.369	-0.300	175	259	0.037	1815.043	15.068	0.979	3.322	13.325
130	214	0.004	1666.409	6.298	6.010	-6.138	-0.811	176	260	0.015	1816.517	15.324	1.474	3.480	13.058
131	215	0.004	1671.442	6.512	5.033	-5.905	0.378	177	261	0.022	1817.320	15.489	0.803	3.687	13.793
132	216	0.002	1677.256	6.740	5.815	-5.657	-0.174	178	262	0.007	1818.627	15.701	1.306	3.839	13.477
133	217	0.006	1682.038	6.945	4.782	-5.462	1.073	179	263	0.004	1819.340	15.887	0.713	4.116	14.199
134	218	0.001	1687.644	7.185	5.606	-5.230	0.484	180	264	0.008	1820.283	16.050	0.944	4.078	14.131
135	219	0.014	1692.126	7.363	4.482	-5.085	1.807	181	265	0.010	1820.646	16.216	0.363	4.074	14.894
136	220	0.	1697.455	7.621	5.329	-4.928	1.215	182	266	0.003	1821.336	16.412	0.689	4.168	14.746
137	221	0.013	1701.103	7.793	3.648	-5.311	3.079	183	267	0.002	1821.430	16.589	0.095	4.248	15.492
138	222	0.	1706.486	8.051	5.383	-4.837	1.596	184	268	0.	1821.930	16.746	0.500	4.393	15.254
139	223	0.015	1709.973	8.214	3.487	-4.554	3.665	185	269	0.007	1821.618	16.905	-0.312	4.328	16.255
140	224	0.003	1715.001	8.454	5.029	-4.490	2.386	186	270	0.	1822.107	17.094	0.489	4.658	15.621
141	225	0.018	1718.354	8.623	3.352	-4.184	4.242	187	271	0.006	1821.677	17.241	-0.430	4.881	16.693
142	226	0.009	1723.171	8.844	4.818	-3.986	3.042	188	272	0.003	1821.971	17.415	0.294	5.020	16.151
143	227	0.036	1726.395	9.004	3.224	-3.673	4.831	189	273	0.006	1821.436	17.569	-0.536	5.250	17.141
144	228	0.034	1731.052	9.213	4.657	-3.428	3.723	190	274	0.005	1821.606	17.736	0.171	5.457	16.610
145	229	0.074	1734.246	9.441	3.194	-3.010	5.424	191	275	0.006	1820.960	17.895	-0.647	5.680	17.590

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 85, AT.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
101	186	0.275	1419.327	-1.359	10.675	-8.388	-10.746	147	232	0.187	1751.253	8.869	3.788	-1.846	6.336
102	187	0.271	1430.774	-1.133	11.448	-8.485	-11.265	148	233	0.190	1755.892	9.082	4.639	-1.536	5.750
103	188	0.274	1441.077	-0.841	10.303	-7.723	-9.874	149	234	0.213	1759.558	9.352	3.666	-0.778	6.928
104	189	0.259	1451.978	-0.678	10.900	-8.051	-10.219	150	235	0.200	1763.927	9.495	4.368	-0.619	6.481
105	190	0.238	1461.707	-0.505	9.729	-7.806	-8.820	151	236	0.205	1767.474	9.707	3.548	-0.174	7.464
106	191	0.202	1472.257	-0.368	10.550	-8.005	-9.431	152	237	0.197	1771.323	9.888	3.849	-0.322	7.373
107	192	0.190	1481.678	-0.131	9.421	-7.743	-8.113	153	238	0.198	1774.457	10.088	3.133	-0.318	8.264
108	193	0.156	1492.120	0.058	10.443	-7.801	-8.944	154	239	0.182	1778.079	10.257	3.623	-0.177	7.971
109	194	0.156	1501.190	0.309	9.069	-7.552	-7.447	155	240	0.171	1780.928	10.440	2.849	-0.078	8.911
110	195	0.133	1511.391	0.488	10.201	-7.585	-8.346	156	241	0.159	1784.506	10.621	3.577	0.154	8.328
111	196	0.131	1520.095	0.721	8.704	-7.392	-6.719	157	242	0.153	1787.176	10.806	2.670	0.336	9.378
112	197	0.114	1530.088	0.884	9.993	-7.348	-7.768	158	243	0.147	1790.575	10.984	3.400	0.445	8.818
113	198	0.109	1538.560	1.103	8.472	-7.130	-6.127	159	244	0.146	1793.021	11.176	2.445	0.585	9.937
114	199	0.090	1548.305	1.236	9.745	-7.051	-7.182	160	245	0.137	1796.255	11.343	3.234	0.733	9.335
115	200	0.083	1556.567	1.438	8.262	-6.791	-5.563	161	246	0.135	1798.528	11.529	2.273	0.951	10.445
116	201	0.064	1566.088	1.572	9.521	-6.725	-6.603	162	247	0.126	1801.580	11.682	3.053	1.039	9.845
117	202	0.063	1574.191	1.823	8.103	-6.443	-5.027	163	248	0.124	1803.684	11.864	2.104	1.235	10.937
118	203	0.041	1583.464	1.952	9.273	-6.335	-5.972	164	249	0.112	1806.572	11.946	2.888	1.320	10.322
119	204	0.034	1591.433	2.178	7.969	-5.984	-4.473	165	250	0.099	1808.540	11.936	1.967	1.531	11.384
120	205	0.030	1600.296	2.386	8.863	-5.995	-5.138	166	251	0.030	1811.467	11.983	2.927	1.695	10.569
121	206	0.037	1608.053	2.637	7.757	-5.755	-3.802	167	252	0.018	1813.523	12.154	2.057	1.987	11.417
122	207	0.019	1616.527	2.829	8.474	-5.685	-4.260	168	253	0.015	1816.330	12.330	2.807	2.104	10.864
123	208	0.024	1624.054	3.086	7.527	-5.442	-3.101	169	254	0.021	1818.313	12.544	1.983	2.395	11.874
124	209	0.010	1632.162	3.270	8.108	-5.362	-3.461	170	255	0.002	1820.775	12.698	2.462	2.415	11.563
125	210	0.007	1639.566	3.492	7.404	-5.021	-2.510	171	256	0.022	1822.341	12.909	1.566	2.363	12.649
126	211	0.004	1647.147	3.710	7.581	-5.091	-2.454	172	257	0.021	1824.353	13.073	2.011	2.284	12.372
127	212	0.013	1652.885	3.967	5.738	-6.298	-0.380	173	258	0.042	1825.778	13.374	1.425	2.495	13.140
128	213	0.008	1659.316	4.173	6.430	-6.992	-0.867	174	259	0.040	1827.586	13.521	1.808	2.650	12.931
129	214	0.014	1664.815	4.417	5.499	-6.786	0.300	175	260	0.043	1828.793	13.750	1.207	2.864	13.707
130	215	0.011	1671.038	4.629	6.223	-6.538	-0.213	176	261	0.031	1830.331	13.814	1.538	2.931	13.555
131	216	0.014	1676.300	4.858	5.262	-6.330	0.976	177	262	0.030	1831.321	14.000	0.990	3.050	14.274
132	217	0.012	1682.329	5.072	6.029	-6.077	0.425	178	263	0.016	1832.756	14.129	1.435	3.267	14.004
133	218	0.016	1687.345	5.307	5.016	-5.879	1.662	179	264	0.011	1833.632	14.293	0.876	3.506	14.750
134	219	0.009	1693.150	5.507	5.805	-5.661	1.082	180	265	0.013	1834.758	14.475	1.126	3.537	14.682
135	220	0.018	1697.887	5.761	4.737	-5.501	2.382	181	266	0.014	1835.299	14.653	0.541	3.552	15.433
136	221	0.004	1703.400	5.945	5.513	-5.354	1.802	182	267	0.007	1836.140	14.804	0.841	3.611	15.303
137	222	0.020	1707.299	6.196	3.899	-5.759	3.649	183	268	0.005	1836.402	14.972	0.262	3.676	16.066
138	223	0.007	1712.856	6.370	5.556	-5.274	2.186	184	269	0.001	1837.090	15.160	0.688	3.871	15.813
139	224	0.023	1716.605	6.632	3.749	-5.000	4.231	185	270	0.011	1836.945	15.327	-0.145	3.808	16.798
140	225	0.015	1721.814	6.812	5.209	-4.916	2.956	186	271	0.004	1837.588	15.481	0.643	4.109	16.185
141	226	0.032	1725.430	7.077	3.617	-4.623	4.772	187	272	0.011	1837.340	15.663	-0.248	4.332	17.255
142	227	0.033	1730.444	7.273	5.013	-4.398	3.566	188	273	0.009	1837.794	15.823	0.454	4.486	16.709
143	228	0.060	1733.992	7.597	3.548	-4.033	5.239	189	274	0.012	1837.434	15.998	-0.360	4.703	17.693
144	229	0.081	1738.887	7.836	4.895	-3.735	4.222	190	275	0.011	1837.767	16.161	0.333	4.916	17.159
145	230	0.155	1742.623	8.377	3.736	-3.063	5.751	191	276	0.012	1837.290	16.330	-0.478	5.128	18.136
146	231	0.163	1747.465	8.633	4.842	-2.668	5.053	192	277	0.010	1837.510	16.487	0.220	5.344	17.599

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 86, RN.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
103	189	0.278	1440.976	-0.101	10.556	-8.005	-11.615	149	235	0.218	1769.625	10.067	3.922	-1.054	5.127
104	190	0.268	1452.104	0.126	11.128	-8.098	-11.962	150	236	0.207	1774.156	10.229	4.531	-0.949	4.756
105	191	0.298	1462.044	0.337	9.940	-8.170	-10.466	151	237	0.210	1777.914	10.439	3.758	-0.587	5.711
106	192	0.228	1472.782	0.525	10.739	-8.168	-10.944	152	238	0.204	1781.939	10.615	4.025	-0.788	5.646
107	193	0.207	1482.394	0.716	9.611	-8.113	-9.537	153	239	0.203	1785.268	10.811	3.329	-0.795	6.518
108	194	0.178	1492.960	0.840	10.566	-7.960	-10.473	154	240	0.192	1789.057	10.977	3.789	-0.673	6.253
109	195	0.172	1502.262	1.072	9.302	-7.841	-9.181	155	241	0.180	1792.052	11.123	2.995	-0.613	7.217
110	196	0.152	1512.594	1.203	10.332	-7.764	-10.014	156	242	0.171	1795.772	11.266	3.720	-0.346	6.667
111	197	0.149	1521.538	1.443	8.944	-7.638	-8.449	157	243	0.162	1798.611	11.435	2.839	-0.172	7.723
112	198	0.129	1531.650	1.562	10.113	-7.547	-9.381	158	244	0.157	1802.175	11.600	3.564	-0.005	7.155
113	199	0.123	1540.340	1.780	8.690	-7.329	-7.801	159	245	0.156	1804.807	11.786	2.632	0.143	8.271
114	200	0.105	1550.222	1.917	9.882	-7.278	-8.794	160	246	0.148	1808.190	11.936	3.383	0.304	7.715
115	201	0.096	1558.702	2.135	8.480	-7.050	-7.239	161	247	0.146	1810.643	12.115	2.453	0.503	8.811
116	202	0.076	1568.381	2.294	9.679	-6.983	-8.251	162	248	0.139	1813.838	12.258	3.195	0.632	8.249
117	203	0.069	1576.709	2.518	8.328	-6.715	-6.766	163	249	0.137	1816.112	12.428	2.274	0.818	9.330
118	204	0.045	1586.178	2.714	9.469	-6.633	-7.710	164	250	0.124	1819.141	12.569	3.029	0.948	8.763
119	205	0.034	1594.375	2.942	8.197	-6.288	-6.250	165	251	0.120	1821.253	12.714	2.112	1.139	9.798
120	206	0.027	1603.469	3.173	9.094	-6.338	-6.954	166	252	0.019	1824.158	12.691	2.905	1.237	9.180
121	207	0.038	1611.485	3.432	8.016	-6.065	-5.644	167	253	0.008	1826.412	12.888	2.253	1.513	9.928
122	208	0.013	1620.171	3.644	8.686	-6.034	-6.091	168	254	0.004	1829.405	13.075	2.993	1.627	9.082
123	209	0.023	1627.918	3.864	7.747	-5.793	-4.972	169	255	0.019	1831.556	13.242	2.150	1.891	10.103
124	210	0.006	1636.274	4.112	8.356	-5.719	-5.337	170	256	0.	1834.208	13.433	2.653	1.913	9.799
125	211	0.004	1643.910	4.344	7.636	-5.353	-4.413	171	257	0.020	1835.943	13.601	1.734	1.879	10.885
126	212	0.001	1651.723	4.576	7.812	-5.464	-4.364	172	258	0.014	1838.136	13.783	2.193	1.764	10.623
127	213	0.011	1657.666	4.780	5.943	-6.704	-2.271	173	259	0.043	1839.735	13.957	1.599	2.008	11.393
128	214	0.003	1664.333	5.017	6.667	-7.399	-2.759	174	260	0.041	1841.718	14.132	1.983	2.143	11.239
129	215	0.010	1670.043	5.228	5.710	-7.171	-1.583	175	261	0.044	1843.104	14.310	1.386	2.404	12.009
130	216	0.005	1676.493	5.456	6.451	-6.945	-2.093	176	262	0.030	1844.812	14.481	1.709	2.453	11.869
131	217	0.007	1681.972	5.672	5.478	-6.722	-0.903	177	263	0.029	1845.977	14.656	1.165	2.639	12.607
132	218	0.004	1688.225	5.896	6.253	-6.479	-1.453	178	264	0.010	1847.600	14.844	1.623	2.788	12.278
133	219	0.010	1693.450	6.105	5.226	-6.286	-0.208	179	265	0.006	1848.658	15.026	1.058	3.042	12.990
134	220	0.002	1699.487	6.336	6.036	-6.065	-0.792	180	266	0.010	1849.950	15.192	1.292	3.028	12.925
135	221	0.017	1704.419	6.532	4.933	-5.914	0.521	181	267	0.012	1850.660	15.361	0.710	3.026	13.683
136	222	0.	1710.166	6.766	5.746	-5.773	-0.060	182	268	0.004	1851.685	15.545	1.025	3.107	13.544
137	223	0.017	1714.260	6.960	4.094	-6.162	1.797	183	269	0.002	1852.121	15.719	0.436	3.180	14.297
138	224	0.000	1720.053	7.198	5.794	-5.697	0.327	184	270	0.	1852.961	15.870	0.840	3.330	14.064
139	225	0.020	1723.987	7.382	3.933	-5.411	2.383	185	271	0.008	1852.990	16.045	0.029	3.265	15.049
140	226	0.006	1729.420	7.606	5.433	-5.361	1.120	186	272	0.	1853.812	16.225	0.822	3.587	14.427
141	227	0.031	1733.228	7.797	3.808	-5.040	2.939	187	273	0.008	1853.720	16.380	-0.092	3.807	15.508
142	228	0.033	1738.448	8.004	5.221	-4.848	1.788	188	274	0.004	1854.345	16.551	0.624	3.943	14.961
143	229	0.141	1742.326	8.334	3.878	-4.322	3.445	189	275	0.008	1854.144	16.710	-0.201	4.172	15.951
144	230	0.152	1747.591	8.704	5.265	-3.875	2.629	190	276	0.007	1854.643	16.875	0.499	4.376	15.421
145	231	0.178	1751.736	9.113	4.144	-2.954	3.991	191	277	0.008	1854.326	17.037	-0.316	4.596	16.401
146	232	0.184	1756.807	9.341	5.071	-2.540	3.321	192	278	0.006	1854.713	17.204	0.387	4.812	15.864
147	233	0.200	1760.859	9.606	4.053	-1.681	4.557	193	279	0.009	1854.274	17.361	-0.439	5.019	16.852
148	234	0.201	1765.703	9.811	4.844	-1.424	4.002	194	280	0.001	1854.544	17.536	0.270	5.226	16.310

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 87, FR.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
105	192	0.321	1461.056	-0.988	10.261	-8.316	-10.242	151	238	0.214	1786.802	8.888	3.960	-1.051	6.235
106	193	0.326	1472.074	-0.708	11.018	-8.198	-10.774	152	239	0.209	1791.004	9.065	4.201	-1.218	6.193
107	194	0.325	1481.704	-0.689	9.630	-8.297	-9.239	153	240	0.208	1794.527	9.259	3.524	-1.242	7.067
108	195	0.331	1492.299	-0.661	10.595	-8.253	-9.954	154	241	0.197	1798.486	9.429	3.959	-1.132	6.816
109	196	0.181	1501.797	-0.464	9.499	-8.175	-8.584	155	242	0.184	1801.656	9.605	3.170	-1.096	7.776
110	197	0.164	1512.307	-0.287	10.509	-8.109	-9.368	156	243	0.178	1805.552	9.780	3.896	-0.823	7.181
111	198	0.159	1521.487	-0.051	9.180	-7.998	-7.859	157	244	0.170	1808.548	9.937	2.996	-0.675	8.276
112	199	0.144	1531.756	0.106	10.270	-7.929	-8.741	158	245	0.164	1812.296	10.120	3.748	-0.505	7.690
113	200	0.137	1540.645	0.305	8.889	-7.744	-7.189	159	246	0.162	1815.123	10.315	2.827	-0.348	8.775
114	201	0.123	1550.680	0.458	10.034	-7.704	-8.122	160	247	0.156	1818.671	10.481	3.549	-0.199	8.228
115	202	0.115	1559.348	0.646	8.668	-7.508	-6.580	161	248	0.153	1821.305	10.662	2.633	-0.011	9.308
116	203	0.092	1569.161	0.780	9.813	-7.439	-7.514	162	249	0.147	1824.659	10.821	3.355	0.110	8.765
117	204	0.078	1577.686	0.977	8.525	-7.176	-6.042	163	250	0.146	1827.122	11.010	2.463	0.299	9.820
118	205	0.064	1587.343	1.165	9.657	-7.040	-7.010	164	251	0.136	1830.269	11.128	3.147	0.394	9.316
119	206	0.043	1595.733	1.358	8.390	-6.753	-5.569	165	252	0.136	1832.556	11.303	2.287	0.577	10.340
120	207	0.043	1605.059	1.590	9.326	-6.700	-6.328	166	253	0.118	1835.557	11.399	3.001	0.690	9.834
121	208	0.045	1613.297	1.812	8.239	-6.431	-5.012	167	254	0.018	1837.705	11.293	2.148	0.870	10.773
122	209	0.020	1622.164	1.993	8.867	-6.426	-5.409	168	255	0.011	1840.876	11.471	3.172	1.115	9.919
123	210	0.027	1630.154	2.236	7.990	-6.194	-4.331	169	256	0.022	1843.224	11.669	2.348	1.406	10.698
124	211	0.008	1638.715	2.441	8.561	-6.107	-4.671	170	257	0.	1846.045	11.837	2.821	1.420	10.409
125	212	0.005	1646.576	2.666	7.861	-5.773	-3.752	171	258	0.024	1847.976	12.033	1.931	1.367	11.472
126	213	0.002	1654.613	2.890	8.036	-5.844	-3.701	172	259	0.028	1850.346	12.210	2.370	1.276	11.220
127	214	0.013	1660.792	3.126	6.179	-7.070	-1.619	173	260	0.048	1852.175	12.440	1.829	1.538	11.961
128	215	0.005	1667.677	3.344	6.885	-7.765	-2.103	174	261	0.046	1854.330	12.612	2.155	1.682	11.817
129	216	0.013	1673.618	3.575	5.941	-7.563	-0.935	175	262	0.047	1855.899	12.795	1.569	1.826	12.577
130	217	0.008	1680.286	3.793	6.669	-7.324	-1.443	176	263	0.040	1857.801	12.989	1.903	1.920	12.420
131	218	0.012	1685.990	4.018	5.703	-7.120	-0.257	177	264	0.035	1859.096	13.119	1.294	2.007	13.193
132	219	0.008	1692.460	4.235	6.470	-6.873	-0.804	178	265	0.015	1860.865	13.265	1.769	2.238	12.912
133	220	0.015	1697.912	4.462	5.452	-6.683	0.432	179	266	0.008	1862.092	13.435	1.227	2.476	13.591
134	221	0.004	1704.158	4.671	6.246	-6.466	-0.144	180	267	0.012	1863.561	13.611	1.469	2.510	13.523
135	222	0.019	1709.323	4.904	5.165	-6.317	1.154	181	268	0.013	1864.447	13.786	0.885	2.519	14.278
136	223	0.	1715.275	5.109	5.952	-6.171	0.582	182	269	0.005	1865.636	13.951	1.190	2.583	14.145
137	224	0.021	1719.597	5.338	4.323	-6.585	2.420	183	270	0.003	1866.243	14.122	0.607	2.648	14.900
138	225	0.002	1725.587	5.534	5.990	-6.108	0.973	184	271	0.	1867.257	14.296	1.014	2.822	14.664
139	226	0.026	1729.757	5.771	4.170	-5.837	3.003	185	272	0.010	1867.457	14.467	0.200	2.760	15.641
140	227	0.012	1735.384	5.965	5.627	-5.766	1.761	186	273	0.000	1868.445	14.633	0.989	3.060	15.025
141	228	0.052	1739.453	6.226	4.069	-5.446	3.523	187	274	0.009	1868.523	14.803	0.078	3.283	16.100
142	229	0.131	1744.989	6.541	5.536	-5.119	2.443	188	275	0.006	1869.312	14.968	0.789	3.430	15.559
143	230	0.160	1749.438	7.112	4.449	-4.287	3.890	189	276	0.010	1869.281	15.138	-0.031	3.647	16.545
144	231	0.171	1754.944	7.353	5.506	-3.795	3.144	190	277	0.009	1869.945	15.302	0.663	3.856	16.015
145	232	0.188	1759.345	7.609	4.401	-2.942	4.495	191	278	0.011	1869.795	15.469	-0.150	4.066	16.992
146	233	0.195	1764.634	7.828	5.290	-2.548	3.867	192	279	0.008	1870.344	15.630	0.548	4.281	16.458
147	234	0.210	1768.923	8.063	4.288	-1.995	5.083	193	280	0.011	1870.071	15.797	-0.273	4.486	17.442
148	235	0.210	1773.970	8.267	5.047	-1.790	4.560	194	281	0.002	1870.497	15.953	0.426	4.692	16.905
149	236	0.223	1778.130	8.505	4.160	-1.419	5.645	195	282	0.013	1870.050	16.123	-0.447	4.842	17.941
150	237	0.213	1782.842	8.687	4.713	-1.345	5.301	196	283	0.	1870.274	16.281	0.223	4.971	17.430

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 88, RA.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
106	194	0.316	1471.683	-0.391	11.165	-8.716	-12.261	152	240	0.213	1800.812	9.808	4.398	-1.639	4.465
107	195	0.313	1481.563	-0.142	9.879	-8.776	-10.706	153	241	0.212	1804.520	9.992	3.708	-1.689	5.344
108	196	0.209	1492.431	0.133	10.869	-8.646	-11.452	154	242	0.203	1808.650	10.164	4.130	-1.584	5.123
109	197	0.193	1502.156	0.359	9.725	-8.532	-10.115	155	243	0.194	1811.951	10.294	3.301	-1.612	6.119
110	198	0.177	1512.845	0.538	10.688	-8.410	-11.096	156	244	0.187	1816.042	10.490	4.091	-1.310	5.508
111	199	0.170	1522.233	0.746	9.388	-8.324	-9.595	157	245	0.179	1819.203	10.655	3.161	-1.144	6.602
112	200	0.154	1532.674	0.918	10.441	-8.215	-10.430	158	246	0.172	1823.115	10.820	3.913	-0.951	6.037
113	201	0.146	1541.775	1.130	9.101	-8.058	-8.919	159	247	0.169	1826.117	10.994	3.002	-0.789	7.118
114	202	0.131	1551.985	1.306	10.210	-7.960	-9.824	160	248	0.163	1829.830	11.159	3.713	-0.640	6.587
115	203	0.122	1560.864	1.517	8.879	-7.771	-8.326	161	249	0.160	1832.642	11.337	2.812	-0.460	7.658
116	204	0.106	1570.861	1.700	9.997	-7.656	-9.267	162	250	0.154	1836.159	11.500	3.518	-0.326	7.133
117	205	0.090	1579.550	1.865	8.689	-7.446	-7.795	163	251	0.153	1838.803	11.681	2.644	-0.135	8.166
118	206	0.075	1589.381	2.038	9.831	-7.295	-8.780	164	252	0.142	1842.114	11.845	3.311	-0.020	7.681
119	207	0.049	1597.948	2.216	8.567	-7.055	-7.343	165	253	0.141	1844.608	12.052	2.494	0.201	8.635
120	208	0.050	1607.503	2.445	9.555	-6.969	-8.163	166	254	0.124	1847.695	12.138	3.087	0.259	8.216
121	209	0.050	1615.973	2.676	8.470	-6.697	-6.913	167	255	0.114	1850.013	12.308	2.318	0.465	9.091
122	210	0.023	1625.040	2.876	9.067	-6.723	-7.281	168	256	0.010	1853.140	12.263	3.127	0.687	8.415
123	211	0.030	1633.262	3.108	8.221	-6.518	-6.261	169	257	0.024	1855.671	12.447	2.531	0.965	9.026
124	212	0.007	1642.042	3.327	8.780	-6.424	-6.590	170	258	0.	1858.666	12.621	2.994	0.965	8.604
125	213	0.004	1650.129	3.553	8.087	-6.084	-5.674	171	259	0.026	1860.783	12.807	2.117	0.932	9.660
126	214	0.001	1658.390	3.778	8.261	-6.179	-5.622	172	260	0.039	1863.353	13.007	2.570	0.850	9.391
127	215	0.013	1664.791	3.999	6.401	-7.414	-3.537	173	261	0.052	1865.365	13.190	2.012	1.127	10.126
128	216	0.004	1671.900	4.223	7.109	-8.118	-4.019	174	262	0.050	1867.693	13.363	2.328	1.262	10.014
129	217	0.013	1678.061	4.444	6.162	-7.900	-2.848	175	263	0.050	1869.439	13.541	1.747	1.410	10.768
130	218	0.007	1684.951	4.664	6.889	-7.677	-3.352	176	264	0.042	1871.506	13.705	2.067	1.493	10.623
131	219	0.012	1690.873	4.884	5.923	-7.464	-2.164	177	265	0.038	1872.995	13.899	1.488	1.596	11.363
132	220	0.006	1697.562	5.102	6.688	-7.227	-2.708	178	266	0.015	1874.901	14.036	1.907	1.794	11.117
133	221	0.016	1703.231	5.319	5.669	-7.035	-1.470	179	267	0.007	1876.302	14.210	1.401	2.030	11.801
134	222	0.002	1709.694	5.537	6.463	-6.825	-2.044	180	268	0.012	1877.942	14.381	1.640	2.047	11.735
135	223	0.019	1715.074	5.751	5.380	-6.671	-0.745	181	269	0.013	1878.999	14.553	1.057	2.046	12.492
136	224	0.	1721.234	5.960	6.160	-6.547	-1.307	182	270	0.004	1880.361	14.724	1.361	2.115	12.361
137	225	0.022	1725.777	6.180	4.543	-6.937	0.524	183	271	0.002	1881.138	14.895	0.778	2.183	13.116
138	226	0.	1731.978	6.391	6.201	-6.482	-0.916	184	272	0.	1882.315	15.058	1.177	2.335	12.888
139	227	0.028	1736.363	6.606	4.385	-6.192	1.110	185	273	0.009	1882.688	15.231	0.372	2.271	13.863
140	228	0.012	1742.194	6.810	5.831	-6.154	-0.119	186	274	0.	1883.841	15.396	1.154	2.586	13.252
141	229	0.135	1746.649	7.196	4.456	-5.632	1.551	187	275	0.009	1884.089	15.565	0.247	2.803	14.327
142	230	0.155	1752.546	7.557	5.897	-5.168	0.728	188	276	0.005	1885.044	15.731	0.955	2.937	13.788
143	231	0.180	1757.306	7.868	4.760	-4.217	2.147	189	277	0.010	1885.178	15.896	0.134	3.162	14.776
144	232	0.189	1763.058	8.113	5.752	-3.686	1.420	190	278	0.008	1886.005	16.060	0.827	3.366	14.250
145	233	0.203	1767.719	8.374	4.661	-2.903	2.734	191	279	0.010	1886.019	16.224	0.014	3.580	15.228
146	234	0.207	1773.224	8.589	5.505	-2.663	2.143	192	280	0.007	1886.730	16.387	0.711	3.793	14.697
147	235	0.216	1777.747	8.824	4.524	-2.283	3.327	193	281	0.011	1886.620	16.549	-0.111	3.998	15.682
148	236	0.216	1782.992	9.023	5.245	-2.109	2.822	194	282	0.001	1887.209	16.712	0.589	4.201	15.146
149	237	0.225	1787.361	9.231	4.368	-1.794	3.899	195	283	0.013	1886.921	16.871	-0.288	4.352	16.186
150	238	0.216	1792.255	9.413	4.894	-1.743	3.592	196	284	0.	1887.300	17.027	0.379	4.462	15.681
151	239	0.217	1796.414	9.612	4.159	-1.506	4.505	197	285	0.009	1886.464	17.190	-0.836	4.242	17.057

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 89, AC.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
108	197	0.322	1491.259	-1.172	11.062	-9.110	-11.219	154	243	0.209	1817.287	8.637	4.297	-2.012	5.650
109	198	0.203	1500.966	-1.190	9.707	-9.033	-9.635	155	244	0.205	1820.767	8.817	3.480	-2.055	6.654
110	199	0.186	1511.856	-0.989	10.890	-8.738	-10.464	156	245	0.193	1825.022	8.981	4.255	-1.759	6.069
111	200	0.179	1521.462	-0.771	9.606	-8.630	-9.002	157	246	0.186	1828.369	9.167	3.347	-1.582	7.140
112	201	0.166	1532.073	-0.601	10.611	-8.529	-9.810	158	247	0.179	1832.453	9.338	4.083	-1.394	6.562
113	202	0.157	1541.379	-0.396	9.306	-8.403	-8.307	159	248	0.175	1835.635	9.518	3.182	-1.208	7.628
114	203	0.145	1551.756	-0.230	10.377	-8.295	-9.188	160	249	0.170	1839.517	9.687	3.883	-1.073	7.101
115	204	0.136	1560.811	-0.053	9.056	-8.129	-7.681	161	250	0.167	1842.510	9.869	2.993	-0.907	8.160
116	205	0.120	1570.973	0.112	10.162	-8.002	-8.580	162	251	0.162	1846.187	10.027	3.676	-0.780	7.650
117	206	0.106	1579.818	0.268	8.845	-7.824	-7.094	163	252	0.160	1849.012	10.209	2.825	-0.588	8.671
118	207	0.094	1589.823	0.442	10.005	-7.633	-8.079	164	253	0.150	1852.461	10.347	3.449	-0.493	8.241
119	208	0.092	1598.558	0.609	8.735	-7.423	-6.623	165	254	0.147	1855.129	10.521	2.668	-0.288	9.149
120	209	0.066	1608.278	0.775	9.720	-7.360	-7.383	166	255	0.134	1858.321	10.626	3.192	-0.243	8.795
121	210	0.063	1616.977	1.004	8.699	-7.051	-6.157	167	256	0.122	1860.772	10.759	2.451	-0.079	9.696
122	211	0.026	1626.219	1.178	9.242	-7.135	-6.475	168	257	0.104	1863.915	10.775	3.142	0.063	9.132
123	212	0.031	1634.670	1.408	8.452	-6.922	-5.486	169	258	0.024	1866.487	10.816	2.573	0.488	9.850
124	213	0.007	1643.673	1.630	9.002	-6.787	-5.814	170	259	0.	1869.660	10.995	3.173	0.489	9.285
125	214	0.004	1651.986	1.857	8.313	-6.463	-4.960	171	260	0.026	1871.962	11.179	2.302	0.442	10.315
126	215	0.001	1660.471	2.081	8.486	-6.539	-4.910	172	261	0.046	1874.709	11.356	2.747	0.369	10.075
127	216	0.013	1667.098	2.308	6.627	-7.773	-2.831	173	262	0.059	1876.924	11.559	2.215	0.653	10.836
128	217	0.004	1674.430	2.531	7.332	-8.477	-3.306	174	263	0.057	1879.424	11.732	2.500	0.784	10.736
129	218	0.013	1680.816	2.755	6.386	-8.271	-2.144	175	264	0.054	1881.346	11.907	1.922	0.877	11.490
130	219	0.007	1687.927	2.976	7.110	-8.045	-2.641	176	265	0.045	1883.575	12.069	2.229	0.950	11.355
131	220	0.013	1694.071	3.198	6.145	-7.841	-1.461	177	266	0.040	1885.236	12.241	1.661	1.042	12.086
132	221	0.006	1700.978	3.417	6.907	-7.603	-1.971	178	267	0.016	1887.320	12.419	2.085	1.224	11.828
133	222	0.018	1706.868	3.637	5.890	-7.417	-0.770	179	268	0.007	1888.895	12.593	1.575	1.504	12.466
134	223	0.002	1713.547	3.853	6.679	-7.208	-1.301	180	269	0.012	1890.709	12.767	1.814	1.549	12.388
135	224	0.020	1719.145	4.071	5.598	-7.061	-0.050	181	270	0.013	1891.939	12.940	1.230	1.552	13.146
136	225	0.	1725.518	4.284	6.373	-6.934	-0.596	182	271	0.004	1893.472	13.111	1.533	1.616	13.016
137	226	0.023	1730.280	4.503	4.761	-7.338	1.214	183	272	0.002	1894.421	13.283	0.949	1.679	13.764
138	227	0.	1736.690	4.712	6.410	-6.879	-0.200	184	273	0.	1895.768	13.453	1.347	1.837	13.536
139	228	0.030	1741.293	4.930	4.603	-6.599	1.796	185	274	0.009	1896.311	13.624	0.543	1.773	14.509
140	229	0.128	1747.418	5.224	6.125	-6.464	0.588	186	275	0.	1897.633	13.791	1.322	2.081	13.902
141	230	0.162	1752.492	5.842	5.073	-5.560	2.021	187	276	0.009	1898.049	13.961	0.416	2.297	14.971
142	231	0.175	1758.670	6.124	6.178	-5.009	1.228	188	277	0.005	1899.171	14.127	1.122	2.431	14.435
143	232	0.193	1763.695	6.389	5.025	-4.053	2.635	189	278	0.010	1899.472	14.295	0.301	2.654	15.420
144	233	0.200	1769.671	6.613	5.976	-3.614	1.954	190	279	0.009	1900.465	14.460	0.993	2.858	14.896
145	234	0.214	1774.584	6.865	4.913	-3.150	3.234	191	280	0.011	1900.645	14.625	0.180	3.068	15.872
146	235	0.216	1780.292	7.068	5.708	-2.947	2.658	192	281	0.007	1901.519	14.789	0.875	3.280	15.343
147	236	0.223	1785.032	7.285	4.741	-2.607	3.830	193	282	0.011	1901.573	14.953	0.053	3.483	16.324
148	237	0.222	1790.477	7.484	5.444	-2.453	3.333	194	283	0.001	1902.324	15.115	0.752	3.686	15.791
149	238	0.229	1795.064	7.704	4.587	-2.154	4.388	195	284	0.013	1902.199	15.278	-0.125	3.833	16.824
150	239	0.221	1800.136	7.881	5.072	-2.129	4.107	196	285	0.	1902.738	15.438	0.539	3.946	16.326
151	240	0.221	1804.494	8.081	4.358	-1.930	5.010	197	286	0.009	1902.064	15.600	-0.674	3.719	17.694
152	241	0.218	1809.081	8.269	4.586	-2.057	4.978	198	287	0.	1902.546	15.759	0.482	3.977	16.756
153	242	0.215	1812.990	8.470	3.909	-2.107	5.846	199	288	0.347	1902.291	16.440	-0.255	4.722	17.699

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 90, TH.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
110	200	0.201	1511.678	-0.178	11.069	-9.048	-12.133	156	246	0.201	1834.727	9.705	4.418	-2.217	4.448
111	201	0.188	1521.481	0.019	9.803	-8.970	-10.708	157	247	0.194	1838.232	9.863	3.505	-2.013	5.498
112	202	0.177	1532.290	0.216	10.809	-8.850	-11.503	158	248	0.186	1842.480	10.027	4.248	-1.856	4.927
113	203	0.167	1541.785	0.406	9.496	-8.743	-9.984	159	249	0.181	1845.836	10.201	3.355	-1.662	5.976
114	204	0.154	1552.348	0.592	10.563	-8.621	-10.850	160	250	0.177	1849.888	10.371	4.053	-1.522	5.474
115	205	0.144	1561.610	0.799	9.262	-8.460	-9.381	161	251	0.172	1853.055	10.544	3.166	-1.357	6.537
116	206	0.130	1571.941	0.968	10.331	-8.339	-10.266	162	252	0.168	1856.901	10.714	3.846	-1.224	6.030
117	207	0.116	1580.962	1.144	9.021	-8.197	-8.793	163	253	0.166	1859.920	10.908	3.619	-1.017	7.032
118	208	0.099	1591.153	1.330	10.191	-8.003	-9.794	164	254	0.156	1863.496	11.035	3.576	-0.958	6.649
119	209	0.095	1600.113	1.555	8.960	-7.732	-8.419	165	255	0.151	1866.333	11.204	2.837	-0.765	7.521
120	210	0.068	1610.038	1.760	9.925	-7.638	-9.195	166	256	0.141	1869.686	11.365	3.353	-0.723	7.168
121	211	0.064	1618.962	1.985	8.924	-7.282	-8.091	167	257	0.127	1872.264	11.492	2.578	-0.639	8.086
122	212	0.042	1628.402	2.183	9.440	-7.396	-8.408	168	258	0.115	1875.555	11.640	3.290	-0.436	7.493
123	213	0.038	1637.076	2.406	8.674	-7.192	-7.492	169	259	0.029	1878.163	11.676	2.609	-0.145	8.304
124	214	0.009	1646.244	2.571	9.168	-7.092	-7.769	170	260	0.	1881.495	11.834	3.331	0.060	7.601
125	215	0.005	1654.779	2.793	8.535	-6.778	-6.921	171	261	0.033	1884.002	12.040	2.507	0.035	8.507
126	216	0.001	1663.485	3.014	8.706	-6.852	-6.864	172	262	0.058	1886.977	12.269	2.976	0.017	8.207
127	217	0.014	1670.342	3.244	6.857	-8.082	-4.797	173	263	0.062	1889.378	12.454	2.401	0.300	9.005
128	218	0.005	1677.890	3.459	7.547	-8.796	-5.264	174	264	0.061	1892.054	12.629	2.676	0.406	8.913
129	219	0.017	1684.504	3.687	6.614	-8.582	-4.101	175	265	0.057	1894.148	12.802	2.094	0.488	9.672
130	220	0.011	1691.828	3.901	7.324	-8.367	-4.596	176	265	0.049	1896.540	12.965	2.392	0.552	9.535
131	221	0.038	1698.224	4.153	6.397	-8.132	-3.445	177	267	0.044	1898.366	13.130	1.826	0.632	10.226
132	222	0.013	1705.315	4.337	7.091	-7.930	-3.906	178	268	0.028	1900.578	13.258	2.212	0.777	10.002
133	223	0.038	1711.464	4.595	6.148	-7.705	-2.760	179	269	0.010	1902.314	13.419	1.736	1.025	10.662
134	224	0.004	1718.312	4.765	6.849	-7.544	-3.230	180	270	0.014	1904.303	13.594	1.988	1.107	10.555
135	225	0.022	1724.140	4.995	5.828	-7.386	-2.005	181	271	0.015	1905.705	13.766	1.403	1.109	11.312
136	226	0.	1730.712	5.193	6.572	-7.278	-2.533	182	272	0.005	1907.403	13.931	1.697	1.166	11.190
137	227	0.029	1735.707	5.428	4.996	-7.662	-0.749	183	273	0.003	1908.521	14.100	1.119	1.227	11.946
138	228	0.	1742.307	5.616	6.599	-7.223	-2.127	184	274	0.	1910.038	14.270	1.516	1.382	11.722
139	229	0.123	1747.224	5.931	4.917	-6.848	-0.244	185	275	0.011	1910.752	14.441	0.714	1.319	12.682
140	230	0.152	1753.731	6.312	6.507	-6.542	-1.156	186	276	0.	1912.238	14.605	1.486	1.628	12.086
141	231	0.175	1759.116	6.624	5.385	-5.542	0.294	187	277	0.010	1912.824	14.775	0.586	1.841	13.149
142	232	0.191	1765.547	6.877	6.431	-4.942	-0.480	188	278	0.007	1914.110	14.938	1.286	1.973	12.624
143	233	0.205	1770.843	7.148	5.295	-4.102	0.905	189	279	0.012	1914.579	15.107	0.469	2.195	13.610
144	234	0.209	1777.035	7.364	6.192	-3.806	0.250	190	280	0.011	1915.735	15.270	1.156	2.396	13.087
145	235	0.217	1782.168	7.584	5.133	-3.433	1.526	191	281	0.013	1916.080	15.435	0.345	2.607	14.063
146	236	0.220	1788.080	7.788	5.912	-3.273	0.971	192	282	0.009	1917.115	15.595	1.035	2.814	13.538
147	237	0.225	1793.028	7.995	4.948	-2.986	2.145	193	283	0.013	1917.333	15.760	0.218	3.019	14.521
148	238	0.225	1798.669	8.193	5.642	-2.849	1.662	194	284	0.002	1918.241	15.916	0.908	3.215	13.993
149	239	0.230	1803.460	8.396	4.791	-2.582	2.710	195	285	0.014	1918.282	16.083	0.041	3.367	15.024
150	240	0.223	1808.722	8.586	5.261	-2.566	2.449	196	286	0.	1918.976	16.238	0.694	3.472	14.522
151	241	0.222	1813.276	8.782	4.555	-2.379	3.338	197	287	0.305	1918.520	16.456	-0.456	3.304	15.994
152	242	0.220	1818.054	8.973	4.777	-2.496	3.312	198	288	0.303	1919.208	16.662	0.688	3.612	15.594
153	243	0.217	1822.154	9.165	4.101	-2.554	4.179	199	289	0.296	1919.191	16.900	-0.017	4.432	16.458
154	244	0.212	1826.639	9.352	4.484	-2.468	3.984	200	290	0.278	1919.787	17.106	0.596	4.705	16.006
155	245	0.212	1830.309	9.542	3.670	-2.506	4.983								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 91, PA.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
111	202	0.199	1520.004	-1.477	10.014	-9.257	-10.140	156	247	0.207	1842.948	8.221	4.555	-2.634	4.928
112	203	0.185	1531.018	-1.271	11.014	-9.132	-10.923	157	248	0.200	1846.625	8.393	3.677	-2.437	5.992
113	204	0.177	1540.716	-1.069	9.697	-9.041	-9.429	158	249	0.192	1851.029	8.549	4.404	-2.288	5.445
114	205	0.167	1551.447	-0.901	10.731	-8.922	-10.259	159	250	0.186	1854.580	8.745	3.551	-2.084	6.471
115	206	0.156	1560.893	-0.717	9.447	-8.781	-8.782	160	251	0.182	1858.809	8.920	4.228	-1.939	5.933
116	207	0.143	1571.386	-0.555	10.493	-8.664	-9.647	161	252	0.178	1862.149	9.094	3.340	-1.781	6.993
117	208	0.133	1580.576	-0.386	9.190	-8.530	-8.152	162	253	0.175	1866.169	9.268	4.021	-1.643	6.497
118	209	0.114	1590.912	-0.241	10.335	-8.357	-9.088	163	254	0.171	1869.363	9.443	3.194	-1.442	7.500
119	210	0.105	1600.061	-0.052	9.149	-8.052	-7.750	164	255	0.163	1873.072	9.576	3.709	-1.409	7.155
120	211	0.082	1610.088	0.050	10.027	-8.030	-8.428	165	256	0.156	1876.072	9.738	2.999	-1.235	8.026
121	212	0.072	1619.212	0.250	9.124	-7.641	-7.336	166	257	0.149	1879.567	9.881	3.495	-1.189	7.687
122	213	0.050	1628.801	0.399	9.590	-7.772	-7.586	167	258	0.135	1882.265	10.001	2.698	-1.159	8.646
123	214	0.042	1637.692	0.616	8.891	-7.580	-6.667	168	259	0.126	1885.685	10.130	3.420	-0.931	8.047
124	215	0.006	1647.075	0.831	9.383	-7.439	-6.942	169	260	0.108	1888.313	10.150	2.629	-0.754	9.007
125	216	0.002	1655.838	1.060	8.763	-7.127	-6.139	170	261	0.093	1891.726	10.231	3.412	-0.484	8.377
126	217	0.	1664.763	1.278	8.924	-7.205	-6.084	171	262	0.073	1894.402	10.400	2.676	-0.380	9.243
127	218	0.014	1671.844	1.501	7.081	-8.437	-4.014	172	263	0.071	1897.601	10.624	3.199	-0.354	8.879
128	219	0.001	1679.620	1.731	7.777	-9.146	-4.481	173	264	0.068	1900.184	10.806	2.583	-0.072	9.671
129	220	0.016	1686.450	1.946	6.829	-8.944	-3.326	174	265	0.067	1903.038	10.984	2.853	0.034	9.577
130	221	0.005	1693.997	2.169	7.548	-8.728	-3.808	175	266	0.063	1905.292	11.144	2.255	0.073	10.351
131	222	0.046	1700.627	2.403	6.630	-8.484	-2.680	176	267	0.056	1907.809	11.269	2.517	0.090	10.263
132	223	0.	1707.921	2.606	7.294	-8.301	-3.087	177	268	0.049	1909.798	11.432	1.989	0.157	10.969
133	224	0.043	1714.300	2.836	6.379	-8.066	-1.960	178	269	0.039	1912.194	11.615	2.395	0.324	10.734
134	225	0.	1721.353	3.040	7.053	-7.921	-2.418	179	270	0.006	1914.075	11.761	1.882	0.545	11.413
135	226	0.023	1727.396	3.256	6.043	-7.767	-1.234	180	271	0.013	1916.234	11.932	2.159	0.619	11.277
136	227	0.	1734.176	3.465	6.781	-7.666	-1.742	181	272	0.014	1917.810	12.104	1.575	0.620	12.037
137	228	0.034	1739.397	3.690	5.221	-8.043	0.017	182	273	0.002	1919.685	12.282	1.875	0.681	11.908
138	229	0.	1746.198	3.891	6.801	-7.616	-1.313	183	274	0.000	1920.977	12.456	1.292	0.743	12.650
139	230	0.158	1751.792	4.568	5.594	-6.783	0.174	184	275	0.	1922.651	12.614	1.674	0.884	12.436
140	231	0.174	1758.628	4.897	6.836	-6.358	-0.683	185	276	0.010	1923.542	12.790	0.891	0.826	13.399
141	232	0.185	1764.285	5.169	5.657	-5.303	0.742	186	277	0.	1925.190	12.952	1.649	1.127	12.808
142	233	0.204	1770.965	5.418	6.680	-4.749	-0.029	187	278	0.009	1925.951	13.127	0.760	1.345	13.864
143	234	0.215	1776.503	5.660	5.538	-4.284	1.371	188	279	0.003	1927.406	13.297	1.456	1.479	13.334
144	235	0.219	1782.911	5.876	6.408	-4.054	0.711	189	280	0.010	1928.039	13.460	0.632	1.695	14.318
145	236	0.223	1788.268	6.101	5.357	-3.722	1.965	190	281	0.008	1929.361	13.626	1.322	1.894	13.801
146	237	0.227	1794.390	6.310	6.122	-3.576	1.404	191	282	0.012	1929.870	13.790	0.510	2.103	14.775
147	238	0.230	1799.549	6.521	5.159	-3.330	2.566	192	283	0.006	1931.071	13.957	1.201	2.311	14.251
148	239	0.229	1805.388	6.719	5.839	-3.199	2.086	193	284	0.012	1931.451	14.118	0.380	2.511	15.229
149	240	0.233	1810.388	6.928	5.000	-2.939	3.123	194	285	0.	1932.523	14.283	1.072	2.709	14.704
150	241	0.226	1815.832	7.111	5.444	-2.939	2.876	195	286	0.309	1932.715	14.433	0.192	2.847	15.739
151	242	0.226	1820.583	7.307	4.751	-2.776	3.766	196	287	0.308	1933.731	14.755	1.016	3.111	15.284
152	243	0.223	1825.551	7.497	4.967	-2.880	3.745	197	288	0.304	1934.019	15.499	0.288	3.525	16.177
153	244	0.220	1829.841	7.686	4.290	-2.949	4.616	198	289	0.301	1934.867	15.659	0.848	3.833	15.791
154	245	0.217	1834.510	7.871	4.669	-2.866	4.430	199	290	0.295	1935.011	15.820	0.144	4.652	16.670
155	246	0.217	1838.393	8.084	3.883	-2.892	5.407	200	291	0.279	1935.755	15.968	0.744	4.914	16.252

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 92, U .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
113	205	0.185	1540.405	-0.311	9.900	-9.371	-11.029	157	249	0.204	1855.692	9.066	3.856	-2.912	4.403
114	206	0.177	1551.328	-0.118	10.923	-9.256	-11.872	158	250	0.199	1860.269	9.240	4.577	-2.753	3.871
115	207	0.165	1560.957	0.064	9.629	-9.123	-10.388	159	251	0.193	1863.960	9.379	3.690	-2.568	4.937
116	208	0.152	1571.642	0.256	10.685	-9.001	-11.252	160	252	0.188	1868.359	9.550	4.399	-2.416	4.400
117	209	0.143	1581.042	0.465	9.399	-8.864	-9.821	161	253	0.182	1871.884	9.735	3.525	-2.247	5.447
118	210	0.121	1591.528	0.617	10.487	-8.708	-10.727	162	254	0.180	1876.081	9.911	4.196	-2.103	4.908
119	211	0.110	1600.878	0.817	9.350	-8.379	-9.470	163	255	0.175	1879.445	10.082	3.365	-1.904	5.946
120	212	0.086	1611.093	1.005	10.215	-8.355	-10.171	164	256	0.170	1883.315	10.243	3.870	-1.881	5.604
121	213	0.074	1620.433	1.222	9.340	-7.975	-9.182	165	257	0.160	1886.472	10.400	3.157	-1.743	6.483
122	214	0.053	1630.242	1.441	9.809	-8.091	-9.498	166	258	0.154	1890.128	10.561	3.656	-1.663	6.084
123	215	0.044	1639.350	1.658	9.108	-7.906	-8.623	167	259	0.143	1892.950	10.685	2.822	-1.679	7.082
124	216	0.011	1648.917	1.842	9.567	-7.780	-8.903	168	260	0.132	1896.538	10.853	3.588	-1.443	6.480
125	217	0.005	1657.897	2.058	8.980	-7.474	-8.182	169	261	0.116	1899.321	11.007	2.783	-1.239	7.399
126	218	0.001	1667.047	2.284	9.150	-7.492	-8.160	170	262	0.097	1902.862	11.137	3.542	-0.987	6.749
127	219	0.016	1674.357	2.513	7.310	-8.717	-6.118	171	263	0.076	1905.698	11.296	2.836	-0.760	7.548
128	220	0.006	1682.341	2.721	7.984	-9.439	-6.514	172	264	0.073	1909.073	11.472	3.375	-0.716	7.125
129	221	0.022	1689.407	2.958	7.067	-9.230	-5.401	173	265	0.068	1911.832	11.648	2.759	-0.465	7.877
130	222	0.018	1697.164	3.167	7.757	-9.020	-5.797	174	266	0.068	1914.861	11.824	3.029	-0.411	7.758
131	223	0.050	1704.052	3.425	6.887	-8.747	-4.697	175	267	0.064	1917.290	11.998	2.429	-0.383	8.535
132	224	0.041	1711.557	3.636	7.506	-8.566	-5.016	176	268	0.057	1919.985	12.176	2.694	-0.364	8.430
133	225	0.046	1718.152	3.853	6.595	-8.367	-3.936	177	269	0.051	1922.145	12.347	2.160	-0.298	9.145
134	226	0.007	1725.379	4.027	7.227	-8.231	-4.343	178	270	0.041	1924.706	12.512	2.561	-0.129	8.888
135	227	0.026	1731.652	4.257	6.273	-8.106	-3.229	179	271	0.015	1926.729	12.654	2.023	0.068	9.573
136	228	0.	1738.632	4.455	6.979	-7.976	-3.731	180	272	0.017	1929.064	12.830	2.335	0.191	9.416
137	229	0.095	1744.102	4.705	5.471	-8.333	-2.072	181	273	0.016	1930.811	13.001	1.747	0.202	10.134
138	230	0.142	1751.183	4.986	7.081	-7.823	-3.008	182	274	0.005	1932.845	13.160	2.034	0.247	10.007
139	231	0.173	1757.162	5.370	5.979	-6.840	-1.547	183	275	0.003	1934.305	13.327	1.460	0.304	10.727
140	232	0.190	1764.244	5.617	7.082	-6.357	-2.327	184	276	0.	1936.158	13.507	1.854	0.460	10.491
141	233	0.204	1770.154	5.869	5.909	-5.365	-0.859	185	277	0.012	1937.215	13.674	1.057	0.399	11.466
142	234	0.210	1777.091	6.126	6.937	-4.935	-1.663	186	278	0.	1939.033	13.842	1.817	0.700	10.898
143	235	0.218	1782.839	6.336	5.748	-4.572	-0.263	187	279	0.012	1939.958	14.007	0.925	0.911	11.929
144	236	0.221	1789.450	6.540	6.611	-4.392	-0.900	188	280	0.008	1941.574	14.168	1.616	1.041	11.437
145	237	0.224	1795.011	6.743	5.561	-4.126	0.357	189	281	0.014	1942.379	14.340	0.805	1.260	12.411
146	238	0.227	1801.333	6.943	6.322	-3.997	-0.197	190	282	0.013	1943.863	14.502	1.484	1.459	11.917
147	239	0.230	1806.692	7.143	5.359	-3.771	0.970	191	283	0.017	1944.540	14.670	0.677	1.666	12.890
148	240	0.229	1812.729	7.341	6.037	-3.646	0.497	192	284	0.011	1945.897	14.826	1.357	1.868	12.482
149	241	0.233	1817.926	7.538	5.197	-3.397	1.534	193	285	0.015	1946.445	14.994	0.547	2.070	13.636
150	242	0.227	1823.566	7.734	5.641	-3.398	1.293	194	286	0.002	1947.671	15.148	1.227	2.262	13.336
151	243	0.226	1828.513	7.930	4.947	-3.242	2.177	195	287	0.304	1948.232	15.517	0.561	2.605	14.300
152	244	0.224	1833.675	8.124	5.162	-3.342	2.158	196	288	0.301	1949.413	15.683	1.181	2.878	13.901
153	245	0.221	1838.158	8.317	4.483	-3.414	3.029	197	289	0.297	1949.876	15.857	0.462	3.299	14.788
154	246	0.218	1843.018	8.508	4.860	-3.331	2.843	198	290	0.291	1950.898	16.031	1.023	3.627	14.396
155	247	0.218	1847.094	8.701	4.076	-3.356	3.817	199	291	0.283	1951.224	16.213	0.326	4.409	15.256
156	248	0.210	1851.835	8.887	4.742	-3.098	3.345	200	292	0.271	1952.174	16.420	0.951	4.672	14.808

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 93, NP.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
115	208	0.179	1559.607	-1.349	9.821	-9.404	-9.903	158	251	0.205	1868.114	7.845	4.756	-3.129	4.217
116	209	0.167	1570.438	-1.204	10.830	-9.304	-10.717	159	252	0.199	1871.977	8.017	3.862	-2.944	5.292
117	210	0.156	1580.019	-1.022	9.581	-9.169	-9.268	160	253	0.195	1876.549	8.190	4.572	-2.775	4.760
118	211	0.136	1590.626	-0.903	10.607	-9.055	-10.092	161	254	0.188	1880.206	8.322	3.657	-2.669	5.854
119	212	0.120	1600.139	-0.739	9.513	-8.732	-8.829	162	255	0.186	1884.608	8.528	4.402	-2.495	5.281
120	213	0.099	1610.469	-0.624	10.330	-8.738	-9.459	163	256	0.181	1888.136	8.691	3.528	-2.307	6.315
121	214	0.084	1619.962	-0.471	9.493	-8.394	-8.431	164	257	0.178	1892.172	8.857	4.036	-2.292	5.995
122	215	0.065	1629.945	-0.297	9.983	-8.438	-8.711	165	258	0.169	1895.430	8.958	3.258	-2.228	6.952
123	216	0.051	1639.232	-0.119	9.286	-8.275	-7.807	166	259	0.163	1899.250	9.122	3.820	-2.118	6.556
124	217	0.026	1648.932	0.015	9.701	-8.164	-8.010	167	260	0.158	1902.235	9.286	2.986	-2.132	7.561
125	218	0.015	1658.105	0.208	9.173	-7.882	-7.232	168	261	0.146	1905.937	9.399	3.701	-1.926	7.016
126	219	0.008	1667.456	0.409	9.351	-7.914	-7.163	169	262	0.127	1908.829	9.509	2.893	-1.731	7.982
127	220	0.023	1675.044	0.687	7.588	-9.089	-5.161	170	263	0.112	1912.464	9.602	3.635	-1.516	7.370
128	221	0.019	1683.224	0.883	8.180	-9.834	-5.577	171	264	0.092	1915.416	9.718	2.952	-1.193	8.207
129	222	0.039	1690.585	1.177	7.361	-9.554	-4.521	172	265	0.086	1918.926	9.853	3.510	-1.095	7.800
130	223	0.043	1698.572	1.408	7.987	-9.343	-4.981	173	266	0.074	1921.837	10.005	2.910	-0.860	8.589
131	224	0.064	1705.759	1.707	7.187	-8.986	-3.958	174	267	0.074	1925.043	10.181	3.206	-0.853	8.446
132	225	0.057	1713.434	1.877	7.676	-8.858	-4.222	175	268	0.068	1927.632	10.342	2.590	-0.847	9.238
133	226	0.057	1720.254	2.102	6.820	-8.668	-3.161	176	269	0.064	1930.507	10.522	2.875	-0.826	9.124
134	227	0.047	1727.641	2.261	7.386	-8.576	-3.513	177	270	0.058	1932.811	10.666	2.304	-0.777	9.867
135	228	0.034	1734.119	2.466	6.478	-8.476	-2.394	178	271	0.049	1935.519	10.814	2.709	-0.585	9.629
136	229	0.020	1741.248	2.616	7.129	-8.400	-2.822	179	272	0.038	1937.697	10.968	2.178	-0.396	10.331
137	230	0.141	1747.393	3.290	6.145	-8.298	-1.587	180	273	0.029	1940.163	11.099	2.466	-0.326	10.195
138	231	0.172	1754.833	3.650	7.440	-7.638	-2.586	181	274	0.022	1942.069	11.258	1.906	-0.301	10.967
139	232	0.189	1761.135	3.973	6.302	-6.557	-1.168	182	275	0.016	1944.249	11.404	2.180	-0.281	10.875
140	233	0.207	1768.512	4.268	7.377	-5.981	-1.990	183	276	0.011	1945.867	11.562	1.618	-0.238	11.626
141	234	0.216	1774.646	4.492	6.134	-5.441	-0.516	184	277	0.005	1947.899	11.740	2.032	-0.081	11.394
142	235	0.218	1781.794	4.703	7.148	-5.128	-1.294	185	278	0.020	1949.148	11.933	1.249	-0.124	12.337
143	236	0.223	1787.768	4.929	5.974	-4.811	0.082	186	279	0.012	1951.105	12.072	1.957	0.158	11.781
144	237	0.225	1794.586	5.135	6.817	-4.674	-0.554	187	280	0.021	1952.229	12.271	1.124	0.392	12.804
145	238	0.226	1800.353	5.342	5.767	-4.445	0.698	188	281	0.022	1954.008	12.433	1.779	0.522	12.290
146	239	0.230	1806.880	5.547	6.527	-4.326	0.141	189	282	0.027	1954.997	12.618	0.990	0.752	13.247
147	240	0.232	1812.443	5.751	5.563	-4.120	1.304	190	283	0.028	1956.648	12.785	1.650	0.946	12.738
148	241	0.231	1818.678	5.949	6.234	-4.007	0.833	191	284	0.311	1957.597	13.057	0.950	1.263	13.602
149	242	0.234	1824.077	6.151	5.400	-3.767	1.864	192	285	0.308	1959.298	13.401	1.701	1.643	13.101
150	243	0.228	1829.907	6.341	5.830	-3.776	1.631	193	286	0.307	1960.225	13.780	0.926	2.060	14.043
151	244	0.227	1835.050	6.537	5.142	-3.634	2.514	194	287	0.303	1961.750	14.079	1.525	2.384	13.607
152	245	0.226	1840.404	6.729	5.354	-3.723	2.496	195	288	0.299	1962.532	14.299	0.782	2.786	14.519
153	246	0.223	1845.078	6.921	4.674	-3.800	3.369	196	289	0.296	1963.881	14.468	1.349	3.063	14.118
154	247	0.221	1850.129	7.111	5.051	-3.717	3.185	197	290	0.293	1964.511	14.636	0.630	3.501	15.005
155	248	0.220	1854.397	7.304	4.269	-3.738	4.157	198	291	0.286	1965.697	14.799	1.186	3.671	14.615
156	249	0.214	1859.312	7.477	4.915	-3.493	3.703	199	292	0.279	1966.200	14.976	0.503	3.886	15.490
157	250	0.208	1863.358	7.666	4.046	-3.330	4.755	200	293	0.268	1967.322	15.147	1.122	4.160	15.044

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 94, PU.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
116	210	0.176	1569.969	-0.469	11.031	-9.654	-12.268	159	253	0.203	1880.526	8.550	4.040	-3.460	3.805
117	211	0.162	1579.751	-0.268	9.782	-9.501	-10.839	160	254	0.200	1885.278	8.729	4.751	-3.287	3.276
118	212	0.144	1590.528	-0.098	10.777	-9.409	-11.676	161	255	0.194	1889.107	8.901	3.829	-3.148	4.374
119	213	0.123	1600.227	0.088	9.699	-9.110	-10.450	162	256	0.191	1893.669	9.060	4.562	-2.985	3.811
120	214	0.102	1610.749	0.280	10.522	-9.074	-11.169	163	257	0.183	1897.385	9.248	3.716	-2.795	4.833
121	215	0.086	1620.452	0.490	9.703	-8.721	-10.218	164	258	0.182	1901.600	9.427	4.215	-2.776	4.438
122	216	0.067	1630.642	0.697	10.190	-8.746	-10.548	165	259	0.174	1905.023	9.593	3.423	-2.717	5.434
123	217	0.051	1640.140	0.908	9.498	-8.588	-9.711	166	260	0.170	1909.013	9.764	3.991	-2.597	5.040
124	218	0.016	1650.091	1.159	9.951	-8.447	-9.997	167	261	0.165	1912.170	9.935	3.157	-2.597	6.049
125	219	0.006	1659.511	1.406	9.420	-8.135	-9.316	168	262	0.154	1916.029	10.092	3.859	-2.394	5.509
126	220	0.001	1669.101	1.645	9.590	-8.111	-9.292	169	263	0.133	1919.052	10.222	3.023	-2.193	6.467
127	221	0.018	1676.865	1.820	7.763	-9.327	-7.260	170	264	0.116	1922.840	10.376	3.788	-1.993	5.788
128	222	0.007	1685.281	2.057	8.416	-10.061	-7.649	171	265	0.094	1925.944	10.528	3.104	-1.672	6.583
129	223	0.033	1692.808	2.224	7.527	-9.844	-6.559	172	266	0.088	1929.643	10.717	3.699	-1.514	6.066
130	224	0.041	1701.018	2.446	8.210	-9.618	-6.957	173	267	0.076	1932.706	10.869	3.063	-1.287	6.854
131	225	0.066	1708.430	2.671	7.411	-9.273	-5.932	174	268	0.076	1936.088	11.045	3.382	-1.280	6.663
132	226	0.060	1716.310	2.876	7.881	-9.149	-6.115	175	269	0.069	1938.848	11.216	2.761	-1.278	7.461
133	227	0.059	1723.345	3.090	7.034	-9.002	-5.049	176	270	0.066	1941.896	11.388	3.047	-1.261	7.326
134	228	0.044	1730.943	3.302	7.598	-8.910	-5.401	177	271	0.059	1944.366	11.555	2.470	-1.220	8.071
135	229	0.030	1737.643	3.525	6.701	-8.804	-4.307	178	272	0.048	1947.246	11.726	2.880	-1.034	7.842
136	230	0.	1745.023	3.775	7.380	-8.651	-4.851	179	273	0.029	1949.576	11.878	2.330	-0.864	8.514
137	231	0.153	1751.464	4.072	6.441	-8.483	-3.352	180	274	0.022	1952.254	12.091	2.678	-0.747	8.336
138	232	0.185	1759.185	4.352	7.721	-7.742	-4.124	181	275	0.018	1954.342	12.273	2.088	-0.682	9.052
139	233	0.202	1765.739	4.604	6.554	-6.658	-2.676	182	276	0.007	1956.711	12.462	2.369	-0.649	8.931
140	234	0.218	1773.348	4.835	7.608	-6.131	-3.497	183	277	0.003	1958.511	12.644	1.800	-0.595	9.652
141	235	0.223	1779.717	5.072	6.370	-5.740	-2.033	184	278	0.	1960.703	12.804	2.192	-0.437	9.421
142	236	0.222	1787.068	5.274	7.351	-5.471	-2.803	185	279	0.014	1962.103	12.955	1.400	-0.497	10.397
143	237	0.225	1793.249	5.481	6.181	-5.199	-1.433	186	280	0.	1964.251	13.146	2.148	-0.202	9.828
144	238	0.226	1800.269	5.683	7.019	-5.117	-2.064	187	281	0.014	1965.515	13.286	1.265	0.005	10.857
145	239	0.227	1806.238	5.885	5.969	-4.896	-0.811	188	282	0.010	1967.462	13.454	1.946	0.134	10.368
146	240	0.230	1812.965	6.085	6.727	-4.781	-1.366	189	283	0.018	1968.603	13.606	1.142	0.351	11.483
147	241	0.232	1818.728	6.285	5.763	-4.579	-0.199	190	284	0.018	1970.416	13.769	1.813	0.547	11.181
148	242	0.231	1825.159	6.481	6.431	-4.469	-0.667	191	285	0.309	1971.617	14.019	1.200	0.943	12.202
149	243	0.234	1830.756	6.678	5.597	-4.231	0.366	192	286	0.305	1973.485	14.187	1.868	1.327	11.725
150	244	0.229	1836.781	6.873	6.025	-4.243	0.136	193	287	0.304	1974.574	14.349	1.089	1.739	12.676
151	245	0.228	1842.118	7.068	5.337	-4.103	1.017	194	288	0.299	1976.268	14.518	1.694	2.075	12.235
152	246	0.226	1847.665	7.261	5.547	-4.196	1.002	195	289	0.296	1977.217	14.685	0.949	2.477	13.154
153	247	0.224	1852.531	7.453	4.866	-4.277	1.877	196	290	0.291	1978.734	14.853	1.518	2.768	12.752
154	248	0.222	1857.772	7.644	5.241	-4.197	1.693	197	291	0.289	1979.530	15.018	0.796	3.002	13.634
155	249	0.222	1862.233	7.835	4.460	-4.220	2.665	198	292	0.278	1980.907	15.210	1.377	3.199	13.216
156	250	0.217	1867.330	8.018	5.097	-3.983	2.220	199	293	0.272	1981.583	15.383	0.676	3.413	14.120
157	251	0.212	1871.549	8.191	4.219	-3.840	3.283	200	294	0.262	1982.888	15.566	1.305	3.695	13.657
158	252	0.208	1876.486	8.372	4.938	-3.644	2.724								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 95, AM.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
118	213	0.160	1588.994	-1.533	10.925	-9.738	-11.157	160	255	0.206	1892.699	7.421	4.928	-3.710	3.550
119	214	0.133	1598.797	-1.430	9.803	-9.517	-9.854	161	256	0.202	1896.697	7.591	3.999	-3.574	4.664
120	215	0.117	1609.452	-1.298	10.654	-9.469	-10.526	162	257	0.199	1901.435	7.766	4.738	-3.409	4.108
121	216	0.094	1619.312	-1.140	9.860	-9.123	-9.531	163	258	0.189	1905.255	7.871	3.820	-3.246	5.208
122	217	0.078	1629.646	-0.996	10.334	-9.118	-9.806	164	259	0.191	1909.675	8.075	4.419	-3.229	4.784
123	218	0.060	1639.312	-0.828	9.666	-8.946	-8.925	165	260	0.184	1913.271	8.249	3.597	-3.160	5.792
124	219	0.029	1649.412	-0.678	10.101	-8.828	-9.140	166	261	0.184	1917.436	8.423	4.165	-3.031	5.398
125	220	0.014	1659.027	-0.484	9.614	-8.500	-8.431	167	262	0.180	1920.756	8.586	3.319	-2.969	6.425
126	221	0.006	1668.822	-0.279	9.796	-8.405	-8.371	168	263	0.172	1924.736	8.707	3.980	-2.809	5.942
127	222	0.024	1676.849	-0.016	8.027	-9.551	-6.369	169	264	0.156	1927.845	8.793	3.109	-2.685	6.983
128	223	0.019	1685.467	0.186	8.618	-10.284	-6.773	170	265	0.131	1931.745	8.905	3.899	-2.487	6.350
129	224	0.045	1693.279	0.470	7.812	-10.061	-5.739	171	266	0.105	1934.927	8.983	3.182	-2.197	7.198
130	225	0.056	1701.715	0.697	8.436	-9.804	-6.163	172	267	0.097	1938.777	9.134	3.851	-1.981	6.678
131	226	0.074	1709.413	0.983	7.698	-9.467	-5.210	173	268	0.082	1941.968	9.262	3.191	-1.743	7.509
132	227	0.073	1717.513	1.203	8.100	-9.354	-5.398	174	269	0.082	1945.527	9.440	3.559	-1.694	7.309
133	228	0.069	1724.759	1.415	7.246	-9.295	-4.331	175	270	0.074	1948.440	9.591	2.912	-1.692	8.132
134	229	0.082	1732.554	1.611	7.794	-9.176	-4.666	176	271	0.072	1951.654	9.759	3.215	-1.683	8.002
135	230	0.036	1739.390	1.747	6.836	-9.159	-3.487	177	272	0.066	1954.305	9.940	2.651	-1.622	8.740
136	231	0.288	1747.330	2.307	7.940	-8.605	-4.391	178	273	0.058	1957.308	10.062	3.003	-1.494	8.562
137	232	0.278	1754.278	2.814	6.948	-8.135	-3.044	179	274	0.041	1959.807	10.231	2.499	-1.299	9.239
138	233	0.233	1762.281	3.096	8.003	-7.262	-3.868	180	275	0.031	1962.612	10.358	2.805	-1.203	9.108
139	234	0.240	1769.068	3.328	6.787	-6.620	-2.407	181	276	0.022	1964.859	10.517	2.247	-1.134	9.836
140	235	0.227	1776.902	3.554	7.834	-6.226	-3.241	182	277	0.015	1967.380	10.670	2.521	-1.078	9.741
141	236	0.228	1783.483	3.765	6.581	-5.947	-1.805	183	278	0.009	1969.341	10.830	1.961	-1.023	10.484
142	237	0.226	1791.034	3.966	7.551	-5.773	-2.570	184	279	0.000	1971.717	11.014	2.376	-0.827	10.248
143	238	0.227	1797.422	4.173	6.388	-5.519	-1.207	185	280	0.020	1973.296	11.193	1.579	-0.866	11.198
144	239	0.228	1804.645	4.376	7.223	-5.444	-1.839	186	281	0.010	1975.590	11.339	2.294	-0.604	10.647
145	240	0.229	1810.817	4.579	6.172	-5.247	-0.587	187	282	0.021	1977.047	11.532	1.457	-0.396	11.668
146	241	0.231	1817.746	4.781	6.929	-5.135	-1.144	188	283	0.308	1979.304	11.842	2.257	-0.095	11.016
147	242	0.233	1823.710	4.982	5.964	-4.938	0.022	189	284	0.308	1980.815	12.211	1.511	0.291	11.970
148	243	0.232	1830.339	5.180	6.629	-4.836	-0.443	190	285	0.304	1983.036	12.620	2.221	0.734	11.422
149	244	0.234	1836.134	5.379	5.796	-4.604	0.586	191	286	0.304	1984.427	12.811	1.391	1.135	12.426
150	245	0.230	1842.353	5.572	6.218	-4.620	0.361	192	287	0.300	1986.468	12.983	2.041	1.525	11.939
151	246	0.229	1847.885	5.767	5.532	-4.487	1.238	193	288	0.300	1987.720	13.146	1.252	1.828	12.898
152	247	0.228	1853.626	5.961	5.741	-4.577	1.224	194	289	0.294	1989.588	13.320	1.868	1.995	12.443
153	248	0.225	1858.683	6.152	5.057	-4.662	2.100	195	290	0.293	1990.704	13.487	1.116	2.184	13.368
154	249	0.224	1864.115	6.343	5.433	-4.584	1.916	196	291	0.286	1992.382	13.648	1.678	2.337	12.969
155	250	0.224	1868.768	6.535	4.653	-4.505	2.887	197	292	0.283	1993.341	13.811	0.959	2.514	13.860
156	251	0.221	1874.049	6.719	5.281	-4.375	2.450	198	293	0.273	1994.921	14.014	1.580	2.745	13.404
157	252	0.217	1878.428	6.880	4.380	-4.264	3.539	199	294	0.269	1995.762	14.179	0.842	2.956	14.319
158	253	0.214	1883.549	7.062	5.120	-4.059	2.986	200	295	0.261	1997.228	14.340	1.466	3.236	13.860
159	254	0.209	1887.771	7.245	4.222	-3.882	4.070								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 96, CM.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
120	216	0.121	1608.999	-0.453	10.855	-9.824	-12.119	161	257	0.204	1904.761	8.063	4.182	-4.060	3.281
121	217	0.096	1619.058	-0.254	10.059	-9.465	-11.207	162	258	0.201	1909.681	8.246	4.920	-3.892	2.721
122	218	0.079	1629.604	-0.042	10.546	-9.440	-11.592	163	259	0.193	1913.676	8.421	3.995	-3.726	3.823
123	219	0.060	1639.490	0.178	9.886	-9.257	-10.765	164	260	0.195	1918.281	8.607	4.605	-3.683	3.373
124	220	0.022	1649.814	0.401	10.324	-9.123	-11.049	165	261	0.187	1922.052	8.781	3.771	-3.627	4.402
125	221	0.007	1659.669	0.642	9.855	-8.766	-10.427	166	262	0.189	1926.399	8.962	4.347	-3.496	3.973
126	222	0.001	1669.698	0.875	10.029	-8.688	-10.419	167	263	0.185	1929.895	9.140	3.497	-3.422	5.023
127	223	0.021	1677.911	1.062	8.213	-9.895	-8.393	168	264	0.180	1934.046	9.310	4.151	-3.262	4.536
128	224	0.009	1686.757	1.291	8.846	-10.639	-8.778	169	265	0.168	1937.312	9.467	3.266	-3.153	5.601
129	225	0.045	1694.769	1.491	8.012	-10.390	-7.738	170	266	0.136	1941.343	9.598	4.031	-2.981	4.993
130	226	0.056	1703.420	1.705	8.651	-10.156	-8.100	171	267	0.108	1944.673	9.746	3.330	-2.674	5.807
131	227	0.075	1711.333	1.920	7.913	-9.771	-7.100	172	268	0.099	1948.694	9.917	4.021	-2.441	5.032
132	228	0.074	1719.646	2.133	8.313	-9.667	-7.245	173	269	0.083	1952.054	10.086	3.359	-2.185	5.838
133	229	0.069	1727.105	2.345	7.459	-9.620	-6.164	174	270	0.083	1955.789	10.261	3.735	-2.149	5.571
134	230	0.088	1735.120	2.567	8.016	-9.485	-6.542	175	271	0.074	1958.874	10.434	3.085	-2.127	6.408
135	231	0.036	1742.157	2.767	7.037	-9.483	-5.205	176	272	0.072	1962.262	10.608	3.389	-2.120	6.240
136	232	0.274	1750.452	3.122	8.295	-8.785	-5.897	177	273	0.066	1965.087	10.782	2.824	-2.057	6.976
137	233	0.272	1757.631	3.353	7.179	-8.308	-4.407	178	274	0.057	1968.264	10.956	3.177	-1.927	6.778
138	234	0.241	1765.878	3.597	8.247	-7.440	-5.269	179	275	0.041	1970.937	11.130	2.673	-1.723	7.447
139	235	0.242	1772.879	3.811	7.001	-6.881	-3.799	180	276	0.028	1973.912	11.301	2.975	-1.628	7.272
140	236	0.230	1780.896	3.994	8.017	-6.585	-4.608	181	277	0.019	1976.339	11.480	2.426	-1.532	7.986
141	237	0.231	1787.682	4.199	6.786	-6.353	-3.185	182	278	0.008	1979.043	11.663	2.704	-1.506	7.857
142	238	0.228	1795.433	4.398	7.751	-6.210	-3.945	183	279	0.003	1981.183	11.842	2.140	-1.454	8.580
143	239	0.229	1802.023	4.601	6.591	-5.989	-2.587	184	280	0.	1983.711	11.994	2.529	-1.294	8.356
144	240	0.230	1809.447	4.802	7.423	-5.916	-3.216	185	281	0.016	1985.455	12.159	1.743	-1.351	9.319
145	241	0.230	1815.820	5.003	6.373	-5.724	-1.964	186	282	0.	1987.933	12.343	2.478	-1.065	8.816
146	242	0.232	1822.949	5.203	7.129	-5.615	-2.519	187	283	0.016	1989.538	12.491	1.605	-0.860	10.101
147	243	0.234	1829.113	5.403	6.164	-5.420	-1.352	188	284	0.302	1992.003	12.699	2.465	-0.543	9.629
148	244	0.233	1835.938	5.599	6.825	-5.322	-1.811	189	285	0.303	1993.676	12.861	1.673	-0.135	10.670
149	245	0.235	1841.932	5.797	5.994	-5.091	-0.784	190	286	0.299	1996.070	13.034	2.395	0.314	10.112
150	246	0.231	1848.341	5.988	6.409	-5.113	-1.000	191	287	0.299	1997.624	13.197	1.554	0.726	11.127
151	247	0.230	1854.067	6.182	5.726	-4.983	-0.127	192	288	0.295	1999.836	13.368	2.212	1.124	10.631
152	248	0.229	1860.000	6.375	5.933	-5.075	-0.140	193	289	0.296	2001.249	13.528	1.413	1.337	11.604
153	249	0.226	1865.249	6.566	5.248	-5.164	0.737	194	290	0.291	2003.289	13.701	2.041	1.509	11.136
154	250	0.225	1870.872	6.757	5.624	-5.088	0.551	195	291	0.289	2004.568	13.864	1.279	1.699	12.058
155	251	0.225	1875.716	6.949	4.844	-5.109	1.523	196	292	0.281	2006.418	14.037	1.850	1.855	11.642
156	252	0.222	1881.185	7.136	5.468	-4.883	1.090	197	293	0.278	2007.542	14.201	1.124	2.030	12.584
157	253	0.218	1885.752	7.323	4.567	-4.776	2.176	198	294	0.269	2009.299	14.378	1.757	2.270	12.116
158	254	0.215	1891.058	7.509	5.306	-4.567	1.622	199	295	0.265	2010.306	14.544	1.008	2.482	13.040
159	255	0.210	1895.467	7.696	4.409	-4.377	2.702	200	296	0.258	2011.951	14.723	1.645	2.749	12.565
160	256	0.207	1900.579	7.880	5.113	-4.202	2.150								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 97, BK.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
121	218	0.105	1617.229	-1.828	10.161	-9.863	-10.604	161	258	0.209	1911.619	6.858	4.359	-4.447	3.330
122	219	0.092	1627.942	-1.662	10.713	-9.804	-10.931	162	259	0.207	1916.716	7.035	5.097	-4.278	2.797
123	220	0.068	1637.982	-1.508	10.040	-9.625	-10.035	163	260	0.201	1920.872	7.196	4.156	-4.121	3.922
124	221	0.038	1648.460	-1.354	10.477	-9.481	-10.241	164	261	0.204	1925.672	7.390	4.800	-4.058	3.461
125	222	0.012	1658.496	-1.173	10.037	-9.110	-9.590	165	262	0.200	1929.589	7.537	3.917	-3.961	4.528
126	223	0.004	1668.736	-0.962	10.239	-8.972	-9.551	166	263	0.200	1934.136	7.737	4.547	-3.834	4.081
127	224	0.025	1677.197	-0.714	8.461	-10.125	-7.549	167	264	0.196	1937.800	7.904	3.664	-3.767	5.145
128	225	0.019	1686.249	-0.508	9.053	-10.868	-7.938	168	265	0.195	1942.130	8.084	4.331	-3.601	4.659
129	226	0.057	1694.538	-0.231	8.289	-10.606	-6.954	169	266	0.190	1945.553	8.241	3.423	-3.497	5.747
130	227	0.070	1703.451	0.031	8.913	-10.311	-7.371	170	267	0.189	1949.698	8.355	4.144	-3.333	5.206
131	228	0.085	1711.618	0.286	8.168	-9.955	-6.414	171	268	0.122	1952.943	8.270	3.246	-3.197	6.283
132	229	0.088	1720.159	0.513	8.540	-9.852	-6.578	172	269	0.109	1957.109	8.415	4.166	-2.930	5.571
133	230	0.078	1727.796	0.692	7.638	-9.911	-5.475	173	270	0.091	1960.577	8.524	3.468	-2.644	6.442
134	231	0.288	1736.169	1.049	8.373	-9.639	-5.984	174	271	0.091	1964.500	8.711	3.922	-2.573	6.168
135	232	0.284	1743.772	1.615	7.603	-9.282	-4.962	175	272	0.079	1967.720	8.846	3.220	-2.543	7.046
136	233	0.265	1752.441	1.989	8.669	-8.408	-5.823	176	273	0.079	1971.281	9.018	3.561	-2.542	6.888
137	234	0.267	1759.827	2.196	7.386	-7.858	-4.342	177	274	0.071	1974.259	9.172	2.979	-2.475	7.644
138	235	0.244	1768.297	2.419	8.471	-7.328	-5.218	178	275	0.066	1977.602	9.338	3.343	-2.347	7.456
139	236	0.244	1775.505	2.626	7.207	-7.068	-3.772	179	276	0.046	1980.402	9.464	2.800	-2.199	8.173
140	237	0.235	1783.714	2.818	8.209	-6.862	-4.570	180	277	0.038	1983.543	9.630	3.141	-2.060	8.008
141	238	0.235	1790.705	3.023	6.991	-6.658	-3.157	181	278	0.022	1986.118	9.779	2.575	-1.984	8.737
142	239	0.232	1798.654	3.221	7.949	-6.543	-3.914	182	279	0.014	1988.980	9.938	2.863	-1.927	8.633
143	240	0.231	1805.448	3.425	6.794	-6.330	-2.562	183	280	0.007	1991.285	10.102	2.305	-1.869	9.366
144	241	0.232	1813.074	3.627	7.625	-6.256	-3.191	184	281	0.	1993.991	10.279	2.706	-1.684	9.139
145	242	0.232	1819.647	3.828	6.574	-6.070	-1.940	185	282	0.301	1995.966	10.512	1.975	-1.670	10.030
146	243	0.234	1826.979	4.030	7.332	-5.960	-2.498	186	283	0.298	1998.856	10.924	2.890	-1.156	9.261
147	244	0.236	1833.345	4.231	6.365	-5.767	-1.332	187	284	0.299	2000.849	11.311	1.993	-0.742	10.326
148	245	0.235	1840.365	4.427	7.021	-5.676	-1.788	188	285	0.295	2003.564	11.561	2.715	-0.321	9.769
149	246	0.236	1846.558	4.627	6.193	-5.447	-0.765	189	286	0.296	2005.400	11.725	1.837	0.058	10.814
150	247	0.232	1853.158	4.817	6.600	-5.476	-0.974	190	287	0.293	2007.969	11.898	2.568	0.369	10.247
151	248	0.231	1859.078	5.010	5.920	-5.352	-0.104	191	288	0.294	2009.684	12.060	1.715	0.574	11.264
152	249	0.230	1865.203	5.203	6.125	-5.444	-0.116	192	289	0.290	2012.070	12.234	2.386	0.739	10.755
153	250	0.228	1870.641	5.392	5.438	-5.539	0.764	193	290	0.291	2013.642	12.394	1.572	0.920	11.732
154	251	0.227	1876.457	5.584	5.816	-5.464	0.577	194	291	0.284	2015.844	12.555	2.202	1.081	11.263
155	252	0.227	1881.492	5.775	5.035	-5.486	1.549	195	292	0.283	2017.278	12.710	1.434	1.262	12.190
156	253	0.224	1887.146	5.961	5.654	-5.265	1.122	196	293	0.275	2019.344	12.925	2.066	1.460	11.717
157	254	0.222	1891.898	6.146	4.752	-5.165	2.211	197	294	0.273	2020.632	13.090	1.288	1.633	12.653
158	255	0.220	1897.386	6.328	5.489	-4.957	1.663	198	295	0.265	2022.564	13.265	1.932	1.887	12.168
159	256	0.215	1901.947	6.480	4.561	-4.776	2.778	199	296	0.262	2023.734	13.427	1.170	2.098	13.085
160	257	0.212	1907.259	6.680	5.312	-4.584	2.212	200	297	0.256	2025.545	13.594	1.812	2.329	12.600

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 98, CF.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
123	221	0.067	1637.436	-0.546	10.271	-9.916	-11.813	162	260	0.207	1924.011	7.295	5.281	-4.863	1.564
124	222	0.036	1648.123	-0.336	10.687	-9.776	-12.095	163	261	0.201	1928.350	7.479	4.339	-4.705	2.679
125	223	0.009	1658.402	-0.094	10.278	-9.383	-11.521	164	262	0.205	1933.334	7.662	4.984	-4.642	2.211
126	224	0.001	1668.865	0.129	10.463	-9.244	-11.531	165	263	0.201	1937.434	7.845	4.100	-4.537	3.308
127	225	0.024	1677.529	0.332	8.664	-10.435	-9.517	166	264	0.200	1942.162	8.026	4.728	-4.414	2.863
128	226	0.013	1686.802	0.553	9.273	-11.191	-9.892	167	265	0.196	1946.007	8.208	3.845	-4.340	3.897
129	227	0.056	1695.297	0.759	8.495	-10.909	-8.904	168	266	0.194	1950.518	8.388	4.511	-4.176	3.401
130	228	0.069	1704.421	0.971	9.125	-10.631	-9.229	169	267	0.190	1954.121	8.568	3.603	-4.069	4.482
131	229	0.084	1712.798	1.180	8.376	-10.266	-8.246	170	268	0.188	1958.444	8.746	4.323	-3.897	3.926
132	230	0.087	1721.539	1.381	8.741	-10.176	-8.336	171	269	0.122	1961.898	8.955	3.454	-3.709	4.970
133	231	0.077	1729.403	1.607	7.864	-10.225	-7.239	172	270	0.109	1966.237	9.128	4.339	-3.401	4.177
134	232	0.288	1738.028	1.859	8.625	-9.913	-7.706	173	271	0.090	1969.886	9.308	3.649	-3.083	4.844
135	233	0.285	1745.836	2.063	7.808	-9.564	-6.212	174	272	0.090	1973.983	9.483	4.097	-3.006	4.496
136	234	0.268	1754.702	2.261	8.867	-8.713	-7.037	175	273	0.078	1977.386	9.666	3.403	-2.963	5.364
137	235	0.269	1762.297	2.470	7.594	-8.155	-5.542	176	274	0.078	1981.120	9.840	3.735	-2.963	5.168
138	236	0.248	1770.950	2.653	8.653	-7.797	-6.394	177	275	0.070	1984.276	10.016	3.155	-2.893	5.925
139	237	0.246	1778.361	2.856	7.411	-7.565	-4.957	178	276	0.065	1987.792	10.190	3.517	-2.765	5.714
140	238	0.238	1786.765	3.051	8.404	-7.408	-5.749	179	277	0.045	1990.768	10.366	2.976	-2.614	6.419
141	239	0.237	1793.957	3.252	7.192	-7.217	-4.345	180	278	0.036	1994.072	10.529	3.304	-2.487	6.219
142	240	0.233	1802.104	3.450	8.147	-7.087	-5.097	181	279	0.021	1996.830	10.713	2.758	-2.402	6.933
143	241	0.233	1809.100	3.652	6.996	-6.877	-3.756	182	280	0.010	1999.868	10.888	3.038	-2.339	6.796
144	242	0.233	1816.925	3.852	7.825	-6.802	-4.386	183	281	0.004	2002.347	11.062	2.479	-2.287	7.575
145	243	0.233	1823.699	4.051	6.773	-6.620	-3.132	184	282	0.	2005.214	11.223	2.867	-2.124	7.369
146	244	0.235	1831.230	4.251	7.532	-6.512	-3.693	185	283	0.298	2007.335	11.369	2.121	-2.143	8.636
147	245	0.237	1837.795	4.450	6.564	-6.320	-2.517	186	284	0.296	2010.393	11.537	3.058	-1.614	8.059
148	246	0.236	1845.011	4.645	7.216	-6.233	-2.956	187	285	0.297	2012.551	11.702	2.158	-1.199	9.131
149	247	0.237	1851.401	4.843	6.390	-6.007	-1.940	188	286	0.294	2015.432	11.869	2.882	-0.795	8.571
150	248	0.233	1858.191	5.034	6.791	-6.042	-2.142	189	287	0.294	2017.433	12.032	2.001	-0.400	9.626
151	249	0.232	1864.305	5.227	6.114	-5.922	-1.290	190	288	0.292	2020.165	12.197	2.733	-0.132	9.058
152	250	0.231	1870.623	5.419	6.318	-6.014	-1.302	191	289	0.293	2022.043	12.359	1.877	0.072	10.073
153	251	0.228	1876.251	5.610	5.629	-6.111	-0.422	192	290	0.289	2024.592	12.522	2.549	0.227	9.571
154	252	0.228	1882.258	5.802	6.007	-6.037	-0.614	193	291	0.290	2026.325	12.683	1.733	0.406	10.547
155	253	0.227	1887.485	5.993	5.226	-6.059	0.359	194	292	0.284	2028.685	12.841	2.360	0.554	10.067
156	254	0.225	1893.326	6.181	5.842	-5.841	-0.067	195	293	0.283	2030.278	13.001	1.594	0.735	11.046
157	255	0.223	1898.267	6.369	4.941	-5.745	1.020	196	294	0.275	2032.503	13.159	2.224	0.918	10.576
158	256	0.221	1903.942	6.556	5.675	-5.537	0.472	197	295	0.273	2033.949	13.317	1.447	1.086	11.525
159	257	0.216	1908.688	6.742	4.746	-5.358	1.583	198	296	0.266	2036.036	13.472	2.087	1.323	11.047
160	258	0.213	1914.166	6.907	5.478	-5.187	1.029	199	297	0.263	2037.362	13.629	1.327	1.525	11.970
161	259	0.210	1918.730	7.112	4.564	-5.031	2.119	200	298	0.257	2039.323	13.778	1.960	1.729	11.495

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 99$, ES.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
125	224	0.011	1656.551	-1.851	10.453	-9.726	-10.707	163	262	0.210	1934.762	6.412	4.515	-5.151	2.647
126	225	0.001	1667.229	-1.635	10.678	-9.526	-10.705	164	263	0.214	1939.959	6.625	5.197	-5.052	2.146
127	226	0.027	1676.127	-1.401	8.898	-10.664	-8.708	165	264	0.213	1944.242	6.808	4.283	-4.925	3.222
128	227	0.022	1685.610	-1.191	9.483	-11.420	-9.082	166	265	0.211	1949.122	6.960	4.880	-4.845	2.801
129	228	0.068	1694.410	-0.887	8.799	-11.082	-8.182	167	266	0.207	1953.137	7.130	4.015	-4.747	3.874
130	229	0.081	1703.769	-0.652	9.359	-10.775	-8.552	168	267	0.205	1957.821	7.303	4.684	-4.610	3.390
131	230	0.092	1712.421	-0.377	8.651	-10.412	-7.644	169	268	0.200	1961.588	7.466	3.767	-4.507	4.490
132	231	0.099	1721.382	-0.157	8.961	-10.364	-7.754	170	269	0.200	1966.086	7.642	4.498	-4.339	3.945
133	232	0.290	1729.539	0.137	8.157	-10.374	-6.746	171	270	0.197	1969.632	7.734	3.546	-4.217	5.076
134	233	0.279	1738.841	0.813	9.302	-9.612	-7.744	172	271	0.192	1973.947	7.710	4.315	-4.046	4.489
135	234	0.277	1746.883	1.047	8.041	-9.209	-6.305	173	272	0.099	1977.696	7.811	3.749	-3.542	5.333
136	235	0.267	1755.973	1.270	9.090	-8.492	-7.148	174	273	0.097	1981.967	7.984	4.271	-3.437	5.033
137	236	0.268	1763.774	1.477	7.801	-8.293	-5.672	175	274	0.084	1985.506	8.120	3.539	-3.366	5.942
138	237	0.253	1772.621	1.671	8.847	-8.115	-6.510	176	275	0.085	1989.418	8.297	3.912	-3.377	5.759
139	238	0.249	1780.234	1.873	7.613	-7.888	-5.097	177	276	0.076	1992.724	8.448	3.306	-3.291	6.537
140	239	0.243	1788.830	2.064	8.596	-7.763	-5.881	178	277	0.074	1996.405	8.613	3.681	-3.171	6.345
141	240	0.241	1796.225	2.267	7.395	-7.575	-4.487	179	278	0.051	1999.508	8.740	3.103	-3.046	7.098
142	241	0.237	1804.561	2.457	8.336	-7.448	-5.228	180	279	0.043	2002.980	8.909	3.473	-2.917	6.918
143	242	0.236	1811.757	2.657	7.196	-7.243	-3.897	181	280	0.023	2005.881	9.051	2.901	-2.815	7.664
144	243	0.237	1819.784	2.858	8.027	-7.165	-4.529	182	281	0.299	2009.140	9.272	3.259	-2.698	7.484
145	244	0.236	1826.755	3.057	6.972	-6.988	-3.273	183	282	0.299	2011.801	9.454	2.661	-2.612	8.197
146	245	0.238	1834.496	3.265	7.740	-6.873	-3.845	184	283	0.294	2015.189	9.975	3.388	-2.086	7.626
147	246	0.239	1841.272	3.477	6.776	-6.670	-2.676	185	284	0.292	2017.670	10.335	2.481	-1.910	8.616
148	247	0.238	1848.678	3.668	7.406	-6.596	-3.107	186	285	0.291	2020.899	10.506	3.230	-1.386	8.033
149	248	0.239	1855.267	3.866	6.588	-6.373	-2.095	187	286	0.292	2023.221	10.670	2.321	-1.040	9.106
150	249	0.235	1862.233	4.041	6.966	-6.428	-2.276	188	287	0.288	2026.276	10.844	3.055	-0.875	8.538
151	250	0.234	1868.538	4.233	6.305	-6.315	-1.431	189	288	0.289	2028.441	11.009	2.165	-0.703	9.591
152	251	0.233	1875.047	4.424	6.509	-6.406	-1.441	190	289	0.287	2031.333	11.168	2.892	-0.525	9.028
153	252	0.230	1880.862	4.610	5.815	-6.511	-0.556	191	290	0.288	2033.381	11.338	2.047	-0.315	10.043
154	253	0.231	1887.061	4.803	6.199	-6.437	-0.749	192	291	0.284	2036.090	11.498	2.709	-0.174	9.536
155	254	0.230	1892.477	4.993	5.416	-6.459	0.225	193	292	0.286	2037.969	11.645	1.880	-0.009	10.508
156	255	0.229	1898.505	5.178	6.028	-6.247	-0.196	194	293	0.279	2040.541	11.857	2.572	0.176	10.016
157	256	0.228	1903.631	5.365	5.127	-6.155	0.894	195	294	0.279	2042.296	12.018	1.755	0.359	10.948
158	257	0.226	1909.489	5.547	5.858	-5.951	0.352	196	295	0.273	2044.692	12.190	2.396	0.553	10.467
159	258	0.223	1914.413	5.724	4.923	-5.780	1.474	197	296	0.271	2046.300	12.351	1.608	0.728	11.406
160	259	0.221	1920.067	5.901	5.654	-5.614	0.931	198	297	0.265	2048.550	12.514	2.250	0.911	10.921
161	260	0.218	1924.792	6.062	4.725	-5.450	2.047	199	298	0.263	2050.035	12.673	1.485	1.108	11.835
162	261	0.214	1930.247	6.236	5.455	-5.307	1.505	200	299	0.258	2052.148	12.825	2.113	1.289	11.362

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 100, FM.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
126	226	0.001	1666.636	-0.593	10.895	-9.782	-12.628	164	264	0.212	1946.682	6.723	5.360	-5.624	1.018
127	227	0.026	1675.745	-0.382	9.109	-10.951	-10.629	165	265	0.210	1951.141	6.898	4.458	-5.505	2.100
128	228	0.018	1685.445	-0.165	9.700	-11.714	-10.989	166	266	0.207	1956.228	7.106	5.087	-5.401	1.656
129	229	0.065	1694.434	-0.025	8.989	-11.389	-10.065	167	267	0.203	1960.429	7.292	4.201	-5.300	2.725
130	230	0.077	1703.995	0.225	9.560	-11.102	-10.351	168	268	0.201	1965.295	7.474	4.866	-5.162	2.242
131	231	0.090	1712.845	0.425	8.851	-10.747	-9.400	169	269	0.196	1969.249	7.661	3.954	-5.054	3.335
132	232	0.095	1722.010	0.629	9.165	-10.706	-9.482	170	270	0.195	1973.925	7.840	4.677	-4.887	2.790
133	233	0.292	1730.315	0.775	8.304	-10.778	-8.394	171	271	0.193	1977.654	8.022	3.728	-4.762	3.917
134	234	0.284	1739.795	0.954	9.480	-10.039	-9.316	172	272	0.118	1982.247	8.300	4.593	-4.492	3.228
135	235	0.282	1748.042	1.159	8.247	-9.656	-7.797	173	273	0.095	1986.218	8.522	3.971	-3.975	3.928
136	236	0.271	1757.320	1.347	9.278	-9.003	-8.614	174	274	0.094	1990.665	8.698	4.447	-3.867	3.401
137	237	0.271	1765.329	1.554	8.009	-8.802	-7.104	175	275	0.082	1994.395	8.889	3.729	-3.786	4.291
138	238	0.257	1774.355	1.734	9.027	-8.642	-7.910	176	276	0.082	1998.478	9.061	4.084	-3.799	4.090
139	239	0.252	1782.166	1.932	7.811	-8.426	-6.417	177	277	0.074	2001.967	9.243	3.489	-3.713	4.862
140	240	0.246	1790.956	2.126	8.790	-8.289	-7.179	178	278	0.070	2005.823	9.418	3.856	-3.592	4.652
141	241	0.244	1798.551	2.326	7.595	-8.105	-5.759	179	279	0.049	2009.116	9.608	3.293	-3.455	5.385
142	242	0.239	1807.078	2.517	8.527	-7.983	-6.482	180	280	0.041	2012.763	9.783	3.648	-3.324	5.153
143	243	0.238	1814.472	2.715	7.394	-7.780	-5.126	181	281	0.022	2015.842	9.960	3.079	-3.221	5.884
144	244	0.238	1822.700	2.916	8.228	-7.699	-5.753	182	282	0.011	2019.215	10.075	3.374	-3.151	5.748
145	245	0.237	1829.868	3.113	7.168	-7.526	-4.498	183	283	0.004	2022.033	10.232	2.817	-3.092	6.496
146	246	0.239	1837.814	3.318	7.946	-7.406	-5.072	184	284	0.294	2025.503	10.314	3.470	-2.661	6.017
147	247	0.240	1844.789	3.516	6.975	-7.205	-3.922	185	285	0.293	2028.150	10.481	2.647	-2.492	7.106
148	248	0.239	1852.390	3.711	7.601	-7.136	-4.365	186	286	0.292	2031.545	10.645	3.394	-1.964	6.542
149	249	0.240	1859.174	3.907	6.784	-6.916	-3.345	187	287	0.292	2034.032	10.811	2.487	-1.598	7.612
150	250	0.236	1866.325	4.092	7.151	-6.981	-3.518	188	288	0.290	2037.250	10.973	3.218	-1.438	7.035
151	251	0.235	1872.823	4.285	6.498	-6.873	-2.641	189	289	0.290	2039.579	11.138	2.329	-1.267	8.106
152	252	0.234	1879.523	4.477	6.701	-6.963	-2.645	190	290	0.289	2042.641	11.308	3.063	-1.086	7.538
153	253	0.231	1885.529	4.668	6.006	-7.071	-1.754	191	291	0.289	2044.843	11.462	2.202	-0.885	8.562
154	254	0.231	1891.920	4.859	6.390	-6.998	-1.937	192	292	0.286	2047.695	11.605	2.852	-0.766	8.062
155	255	0.230	1897.527	5.050	5.607	-7.019	-0.963	193	293	0.288	2049.775	11.806	2.081	-0.562	9.046
156	256	0.229	1903.743	5.238	6.216	-6.810	-1.378	194	294	0.281	2052.462	11.920	2.686	-0.425	8.558
157	257	0.228	1909.059	5.428	5.316	-6.721	-0.284	195	295	0.281	2054.376	12.080	1.915	-0.244	9.556
158	258	0.226	1915.104	5.615	6.045	-6.517	-0.820	196	296	0.275	2056.923	12.231	2.547	-0.056	9.085
159	259	0.223	1920.216	5.803	5.111	-6.346	0.307	197	297	0.273	2058.688	12.388	1.765	0.115	10.052
160	260	0.220	1926.057	5.990	5.841	-6.181	-0.227	198	298	0.267	2061.088	12.538	2.400	0.290	9.583
161	261	0.216	1930.970	6.177	4.913	-6.014	0.893	199	299	0.264	2062.727	12.692	1.639	0.483	10.515
162	262	0.212	1936.627	6.380	5.657	-5.835	0.341	200	300	0.259	2064.988	12.840	2.261	0.657	10.069
163	263	0.207	1941.322	6.560	4.696	-5.703	1.494								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 101, MD.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
128	229	0.027	1683.587	-1.859	9.913	-11.937	-10.218	165	266	0.207	1957.101	5.961	4.644	-5.956	1.841
129	230	0.073	1692.861	-1.573	9.274	-11.561	-9.365	166	267	0.206	1962.371	6.144	5.270	-5.882	1.411
130	231	0.086	1702.663	-1.332	9.801	-11.243	-9.724	167	268	0.203	1966.755	6.326	4.383	-5.782	2.483
131	232	0.094	1711.746	-1.100	9.083	-10.959	-8.813	168	269	0.202	1971.801	6.506	5.046	-5.616	2.014
132	233	0.103	1721.139	-0.872	9.393	-10.926	-8.921	169	270	0.198	1975.933	6.684	4.132	-5.499	3.115
133	234	0.281	1729.697	-0.618	8.558	-11.019	-7.889	170	271	0.198	1980.788	6.863	4.855	-5.328	2.574
134	235	0.270	1739.462	-0.333	9.766	-10.215	-8.984	171	272	0.196	1984.693	7.039	3.905	-5.190	3.710
135	236	0.269	1747.924	-0.118	8.461	-9.911	-7.903	172	273	0.192	1989.363	7.116	4.670	-5.018	3.150
136	237	0.257	1757.442	0.122	9.518	-9.694	-8.875	173	274	0.102	1993.284	7.066	3.920	-4.643	4.223
137	238	0.263	1765.663	0.334	8.221	-9.515	-7.329	174	275	0.099	1997.904	7.238	4.620	-4.339	3.916
138	239	0.245	1774.966	0.611	9.303	-9.302	-8.208	175	276	0.085	2001.786	7.391	3.882	-4.206	4.831
139	240	0.244	1782.994	0.829	8.028	-9.075	-6.703	176	277	0.087	2006.047	7.568	4.261	-4.215	4.643
140	241	0.237	1792.009	1.054	9.015	-8.907	-7.509	177	278	0.078	2009.693	7.725	3.646	-4.108	5.429
141	242	0.236	1799.813	1.263	7.804	-8.716	-6.042	178	279	0.077	2013.718	7.895	4.025	-3.995	5.236
142	243	0.233	1808.564	1.486	8.750	-8.561	-6.786	179	280	0.054	2017.134	8.018	3.416	-3.885	6.018
143	244	0.233	1816.164	1.692	7.600	-8.356	-5.427	180	281	0.047	2020.943	8.180	3.809	-3.757	5.835
144	245	0.233	1824.588	1.888	8.423	-8.268	-6.050	181	282	0.024	2024.181	8.339	3.238	-3.622	6.583
145	246	0.233	1831.960	2.092	7.372	-8.092	-4.803	182	283	0.290	2027.746	8.531	3.565	-3.529	6.432
146	247	0.235	1840.084	2.270	8.124	-7.994	-5.356	183	284	0.293	2030.737	8.704	2.991	-3.439	7.153
147	248	0.236	1847.242	2.453	7.158	-7.808	-4.200	184	285	0.287	2034.474	8.971	3.737	-2.961	6.573
148	249	0.236	1855.046	2.657	7.804	-7.744	-4.654	185	286	0.286	2037.305	9.154	2.831	-2.791	7.282
149	250	0.237	1862.024	2.850	6.978	-7.543	-3.630	186	287	0.285	2040.862	9.317	3.557	-2.622	6.490
150	251	0.233	1869.399	3.074	7.375	-7.574	-3.836	187	288	0.286	2043.502	9.470	2.640	-2.463	7.451
151	252	0.232	1876.096	3.273	6.697	-7.466	-2.951	188	289	0.283	2046.902	9.653	3.400	-2.292	6.857
152	253	0.231	1882.993	3.469	6.897	-7.535	-2.954	189	290	0.283	2049.397	9.818	2.495	-2.119	7.928
153	254	0.228	1889.200	3.671	6.207	-7.633	-2.068	190	291	0.280	2052.623	9.981	3.226	-1.949	7.362
154	255	0.228	1895.782	3.862	6.581	-7.560	-2.242	191	292	0.281	2054.975	10.132	2.352	-1.762	8.401
155	256	0.228	1901.582	4.056	5.801	-7.574	-1.269	192	293	0.277	2058.039	10.344	3.065	-1.589	7.851
156	257	0.226	1907.993	4.249	6.410	-7.363	-1.685	193	294	0.278	2060.237	10.462	2.198	-1.438	8.883
157	258	0.224	1913.502	4.443	5.509	-7.270	-0.587	194	295	0.273	2063.150	10.688	2.913	-1.235	8.329
158	259	0.222	1919.740	4.636	6.238	-7.060	-1.117	195	296	0.273	2065.225	10.849	2.075	-1.039	9.334
159	260	0.219	1925.048	4.832	5.307	-6.879	0.009	196	297	0.267	2067.958	11.035	2.733	-0.878	8.837
160	261	0.216	1931.081	5.024	6.033	-6.704	-0.490	197	298	0.266	2069.888	11.200	1.930	-0.703	9.809
161	262	0.213	1936.185	5.216	5.105	-6.522	0.634	198	299	0.260	2072.460	11.372	2.572	-0.527	9.328
162	263	0.210	1942.033	5.407	5.848	-6.328	0.083	199	300	0.258	2074.274	11.547	1.814	-0.321	10.263
163	264	0.206	1946.917	5.595	4.884	-6.170	1.224	200	301	0.254	2076.721	11.733	2.447	-0.124	9.794
164	265	0.209	1952.458	5.776	5.540	-6.084	0.774								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 102, NO.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
130	232	0.080	1702.151	-0.512	9.994	-11.590	-11.444	166	268	0.195	1968.455	6.084	5.455	-6.522	0.394
131	233	0.091	1711.435	-0.311	9.284	-11.295	-10.481	167	269	0.192	1973.033	6.278	4.578	-6.403	1.453
132	234	0.097	1721.026	-0.113	9.591	-11.264	-10.563	168	270	0.191	1978.266	6.465	5.233	-6.257	0.982
133	235	0.085	1729.696	-0.001	8.670	-11.444	-9.412	169	271	0.187	1982.580	6.647	4.314	-6.144	2.083
134	236	0.136	1739.239	-0.224	9.543	-11.067	-10.113	170	272	0.183	1987.621	6.833	5.041	-5.969	1.542
135	237	0.263	1747.785	-0.139	8.546	-10.825	-8.766	171	273	0.132	1991.730	7.038	4.110	-5.813	2.654
136	238	0.242	1757.551	0.109	9.766	-10.539	-9.781	172	274	0.120	1996.725	7.361	4.994	-5.496	1.926
137	239	0.229	1765.976	0.313	8.425	-10.361	-8.278	173	275	0.097	2001.037	7.753	4.312	-4.912	2.729
138	240	0.233	1775.509	0.543	9.533	-10.106	-9.159	174	276	0.096	2005.834	7.930	4.797	-4.708	2.362
139	241	0.237	1783.718	0.723	8.209	-9.906	-7.640	175	277	0.083	2009.907	8.121	4.073	-4.606	3.257
140	242	0.228	1792.989	0.979	9.271	-9.662	-8.502	176	278	0.084	2014.339	8.292	4.432	-4.621	3.043
141	243	0.229	1800.995	1.182	8.007	-9.465	-7.028	177	279	0.075	2018.171	8.478	3.832	-4.519	3.812
142	244	0.227	1809.955	1.391	8.959	-9.296	-7.782	178	280	0.072	2022.370	8.652	4.199	-4.403	3.608
143	245	0.228	1817.755	1.591	7.801	-9.091	-6.419	179	281	0.050	2025.995	8.861	3.625	-4.267	4.352
144	246	0.229	1826.375	1.787	8.620	-8.998	-7.041	180	282	0.043	2029.982	9.039	3.986	-4.136	4.115
145	247	0.229	1833.946	1.986	7.572	-8.821	-5.797	181	283	0.023	2033.396	9.215	3.415	-4.014	4.849
146	248	0.231	1842.260	2.176	8.314	-8.735	-6.342	182	284	0.012	2037.108	9.362	3.712	-3.950	4.707
147	249	0.233	1849.610	2.368	7.350	-8.553	-5.187	183	285	0.004	2040.264	9.527	3.156	-3.873	5.427
148	250	0.232	1857.612	2.566	8.002	-8.497	-5.646	184	286	0.	2043.804	9.330	3.540	-3.707	5.209
149	251	0.234	1864.780	2.756	7.168	-8.303	-4.616	185	287	0.020	2046.570	9.265	2.766	-3.758	6.154
150	252	0.230	1872.362	2.963	7.582	-8.323	-4.840	186	288	0.284	2050.171	9.309	3.601	-3.627	5.515
151	253	0.229	1879.256	3.160	6.894	-8.213	-3.946	187	289	0.286	2052.977	9.475	2.806	-3.469	6.420
152	254	0.228	1886.349	3.356	7.093	-8.271	-3.949	188	290	0.281	2056.543	9.641	3.566	-3.297	5.822
153	255	0.225	1892.757	3.557	6.408	-8.360	-3.068	189	291	0.282	2059.202	9.805	2.659	-3.125	6.909
154	256	0.225	1899.531	3.750	6.774	-8.287	-3.235	190	292	0.278	2062.593	9.970	3.391	-2.952	6.343
155	257	0.224	1905.525	3.943	5.994	-8.299	-2.261	191	293	0.280	2065.108	10.133	2.514	-2.766	7.398
156	258	0.221	1912.133	4.140	6.608	-8.082	-2.682	192	294	0.274	2068.338	10.299	3.231	-2.598	6.842
157	259	0.218	1917.840	4.338	5.707	-7.982	-1.584	193	295	0.276	2070.697	10.459	2.359	-2.441	7.895
158	260	0.216	1924.274	4.534	6.434	-7.764	-2.113	194	296	0.270	2073.777	10.627	3.080	-2.213	7.333
159	261	0.211	1929.808	4.761	5.534	-7.546	-1.007	195	297	0.270	2076.012	10.787	2.235	-2.058	8.348
160	262	0.209	1936.037	4.956	6.229	-7.363	-1.515	196	298	0.264	2078.914	10.956	2.902	-1.842	7.831
161	263	0.206	1941.334	5.149	5.297	-7.177	-0.393	197	299	0.263	2081.006	11.118	2.092	-1.665	8.838
162	264	0.204	1947.359	5.325	6.025	-6.993	-0.928	198	300	0.255	2083.755	11.295	2.749	-1.464	8.346
163	265	0.198	1952.449	5.532	5.091	-6.815	0.194	199	301	0.253	2085.732	11.458	1.978	-1.251	9.316
164	266	0.200	1958.159	5.702	5.710	-6.762	-0.231	200	302	0.250	2088.345	11.624	2.613	-1.037	8.843
165	267	0.195	1963.000	5.899	4.841	-6.617	0.818								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 103, LW.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
131	234	0.096	1709.680	-1.754	9.509	-11.476	-10.005	166	269	0.192	1973.703	5.248	5.636	-7.050	0.220
132	235	0.106	1719.501	-1.524	9.821	-11.456	-10.132	167	270	0.190	1978.466	5.433	4.763	-6.931	1.257
133	236	0.101	1728.343	-1.353	8.842	-11.697	-8.971	168	271	0.188	1983.880	5.614	5.415	-6.786	0.796
134	237	0.148	1738.236	-1.003	9.893	-11.198	-9.759	169	272	0.184	1988.380	5.800	4.500	-6.670	1.892
135	238	0.161	1746.988	-0.797	8.752	-11.004	-8.648	170	273	0.181	1993.602	5.981	5.222	-6.494	1.380
136	239	0.213	1756.915	-0.636	9.927	-10.842	-9.726	171	274	0.173	1997.868	6.137	4.266	-6.360	2.528
137	240	0.217	1765.567	-0.409	8.652	-10.652	-8.418	172	275	0.131	2002.984	6.259	5.116	-6.099	2.055
138	241	0.220	1775.295	-0.214	9.728	-10.442	-9.361	173	276	0.103	2007.413	6.377	4.430	-5.575	3.019
139	242	0.218	1783.704	-0.013	8.409	-10.253	-7.843	174	277	0.101	2012.382	6.548	4.968	-5.277	2.745
140	243	0.221	1793.185	0.196	9.480	-10.076	-8.688	175	278	0.086	2016.599	6.692	4.218	-4.979	3.675
141	244	0.223	1801.390	0.395	8.205	-9.899	-7.248	176	279	0.090	2021.201	6.862	4.601	-4.998	3.513
142	245	0.222	1810.553	0.599	9.163	-9.751	-8.010	177	280	0.079	2025.195	7.024	3.994	-4.885	4.297
143	246	0.224	1818.551	0.796	7.998	-9.557	-6.645	178	281	0.079	2029.565	7.195	4.369	-4.777	4.115
144	247	0.225	1827.367	0.992	8.816	-9.492	-7.268	179	282	0.056	2033.315	7.319	3.750	-4.673	4.911
145	248	0.226	1835.136	1.189	7.769	-9.324	-6.025	180	283	0.049	2037.463	7.481	4.148	-4.550	4.743
146	249	0.228	1843.641	1.381	8.505	-9.242	-6.566	181	284	0.025	2041.033	7.636	3.570	-4.396	5.503
147	250	0.229	1851.183	1.573	7.543	-9.072	-5.411	182	285	0.017	2044.908	7.801	3.876	-4.329	5.388
148	251	0.229	1859.382	1.770	8.199	-8.997	-5.875	183	286	0.006	2048.230	7.966	3.322	-4.246	6.120
149	252	0.231	1866.739	1.959	7.357	-8.798	-4.837	184	287	0.	2051.941	8.138	3.711	-4.100	5.905
150	253	0.227	1874.528	2.166	7.788	-8.814	-5.078	185	288	0.101	2054.903	8.334	2.962	-4.129	6.817
151	254	0.226	1881.618	2.362	7.090	-8.701	-4.179	186	289	0.277	2058.614	8.444	3.711	-4.155	6.206
152	255	0.225	1888.907	2.558	7.289	-8.787	-4.184	187	290	0.277	2061.583	8.606	2.968	-4.017	7.041
153	256	0.223	1895.514	2.757	6.607	-8.877	-3.307	188	291	0.273	2065.329	8.786	3.747	-3.827	6.245
154	257	0.222	1902.482	2.951	6.967	-8.806	-3.471	189	292	0.273	2068.153	8.951	2.824	-3.644	7.021
155	258	0.222	1908.668	3.143	6.186	-8.827	-2.497	190	293	0.269	2071.723	9.130	3.570	-3.475	6.278
156	259	0.218	1915.474	3.341	6.806	-8.603	-2.925	191	294	0.269	2074.398	9.290	2.675	-3.294	7.314
157	260	0.215	1921.379	3.539	5.905	-8.498	-1.826	192	295	0.264	2077.810	9.472	3.412	-3.108	6.740
158	261	0.212	1928.018	3.744	6.640	-8.269	-2.346	193	296	0.265	2080.327	9.631	2.518	-2.942	7.795
159	262	0.208	1933.739	3.931	5.721	-8.058	-1.248	194	297	0.259	2083.577	9.800	3.250	-2.757	7.224
160	263	0.206	1940.159	4.122	6.419	-7.877	-1.747	195	298	0.261	2085.963	9.951	2.386	-2.569	8.246
161	264	0.203	1945.648	4.314	5.490	-7.694	-0.625	196	299	0.252	2089.062	10.147	3.099	-2.383	7.693
162	265	0.201	1951.861	4.502	6.213	-7.515	-1.152	197	300	0.252	2091.318	10.312	2.256	-2.202	8.698
163	266	0.195	1957.146	4.697	5.285	-7.334	-0.034	198	301	0.247	2094.266	10.512	2.948	-1.987	8.166
164	267	0.197	1963.036	4.877	5.890	-7.292	-0.429	199	302	0.247	2096.406	10.674	2.140	-1.777	9.135
165	268	0.192	1968.067	5.067	5.031	-7.145	0.606	200	303	0.245	2099.187	10.841	2.780	-1.568	8.653

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 104, KU.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
133	237	0.082	1727.694	-0.649	9.104	-12.035	-10.543	167	271	0.181	1983.894	5.429	4.954	-7.401	0.242
134	238	0.122	1737.558	-0.678	9.863	-11.763	-11.127	168	272	0.177	1989.490	5.609	5.595	-7.261	-0.214
135	239	0.146	1746.406	-0.582	8.849	-11.584	-9.850	169	273	0.170	1994.199	5.819	4.710	-7.129	0.856
136	240	0.176	1756.367	-0.548	9.960	-11.167	-10.747	170	274	0.162	1999.614	6.012	5.415	-6.947	0.335
137	241	0.194	1765.151	-0.416	8.785	-10.929	-9.363	171	275	0.122	2004.256	6.388	4.642	-6.619	1.282
138	242	0.208	1775.079	-0.216	9.928	-10.767	-10.305	172	276	0.110	2009.650	6.666	5.394	-6.266	0.704
139	243	0.208	1783.714	0.010	8.635	-10.557	-8.854	173	277	0.093	2014.344	6.931	4.694	-5.681	1.580
140	244	0.215	1793.360	0.175	9.646	-10.444	-9.667	174	278	0.092	2019.492	7.111	5.148	-5.528	1.285
141	245	0.218	1801.761	0.370	8.401	-10.252	-8.234	175	279	0.081	2023.931	7.332	4.439	-5.400	2.168
142	246	0.218	1811.124	0.570	9.363	-10.160	-9.010	176	280	0.081	2028.709	7.509	4.778	-5.419	1.975
143	247	0.221	1819.317	0.766	8.193	-9.973	-7.646	177	281	0.073	2032.897	7.702	4.188	-5.305	2.741
144	248	0.222	1828.328	0.961	9.011	-9.921	-8.273	178	282	0.070	2037.443	7.878	4.546	-5.191	2.541
145	249	0.224	1836.292	1.157	7.964	-9.758	-7.032	179	283	0.049	2041.423	8.108	3.980	-5.043	3.276
146	250	0.225	1844.990	1.349	8.698	-9.680	-7.574	180	284	0.041	2045.754	8.291	4.331	-4.911	3.070
147	251	0.227	1852.725	1.542	7.735	-9.516	-6.420	181	285	0.022	2049.514	8.482	3.761	-4.776	3.806
148	252	0.227	1861.120	1.738	8.395	-9.435	-6.891	182	286	0.010	2053.568	8.659	4.053	-4.709	3.680
149	253	0.229	1868.667	1.927	7.547	-9.238	-5.847	183	287	0.003	2057.064	8.834	3.496	-4.628	4.398
150	254	0.225	1876.656	2.129	7.989	-9.251	-6.106	184	288	0.	2060.938	8.996	3.874	-4.465	4.179
151	255	0.225	1883.941	2.323	7.284	-9.135	-5.192	185	289	0.019	2064.037	9.134	3.100	-4.522	5.133
152	256	0.223	1891.425	2.518	7.484	-9.232	-5.197	186	290	0.	2067.841	9.226	3.803	-4.258	4.605
153	257	0.221	1898.228	2.714	6.803	-9.323	-4.319	187	291	0.022	2070.792	9.209	2.951	-4.073	5.609
154	258	0.220	1905.389	2.907	7.161	-9.255	-4.478	188	292	0.027	2074.392	9.062	3.600	-4.074	5.145
155	259	0.219	1911.767	3.099	6.378	-9.286	-3.498	189	293	0.040	2077.218	9.065	2.827	-4.053	6.088
156	260	0.215	1918.770	3.296	7.003	-9.056	-3.932	190	294	0.269	2080.929	9.206	3.711	-3.909	5.368
157	261	0.211	1924.890	3.511	6.120	-8.930	-2.844	191	295	0.270	2083.767	9.370	2.838	-3.730	6.250
158	262	0.209	1931.709	3.690	6.819	-8.719	-3.343	192	296	0.265	2087.340	9.530	3.573	-3.548	5.679
159	263	0.204	1937.629	3.889	5.920	-8.507	-2.249	193	297	0.265	2090.019	9.692	2.680	-3.383	6.712
160	264	0.202	1944.240	4.082	6.612	-8.329	-2.743	194	298	0.258	2093.426	9.849	3.407	-3.207	6.149
161	265	0.198	1949.927	4.279	5.686	-8.177	-1.626	195	299	0.260	2095.972	10.009	2.546	-3.019	7.230
162	266	0.196	1956.330	4.469	6.403	-8.002	-2.148	196	300	0.250	2099.234	10.172	3.261	-2.838	6.686
163	267	0.138	1961.824	4.678	5.494	-7.805	-1.051	197	301	0.249	2101.649	10.331	2.416	-2.658	7.709
164	268	0.139	1967.891	4.855	6.066	-7.763	-1.385	198	302	0.245	2104.759	10.493	3.109	-2.451	7.176
165	269	0.134	1973.140	5.073	5.249	-7.604	-0.405	199	303	0.245	2107.057	10.651	2.298	-2.244	8.147
166	270	0.134	1978.940	5.237	5.799	-7.515	-0.785	200	304	0.243	2109.996	10.809	2.939	-2.054	7.663

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 105$.

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
135	240	0.147	1744.837	-1.569	9.063	-11.801	-9.620	168	273	0.174	1994.272	4.783	5.780	-7.726	-0.415
136	241	0.172	1755.006	-1.361	10.169	-11.525	-10.682	169	274	0.168	1999.166	4.967	4.894	-7.594	0.701
137	242	0.184	1763.992	-1.159	8.986	-11.291	-9.446	170	275	0.162	2004.756	5.142	5.589	-7.420	0.243
138	243	0.198	1774.077	-1.002	10.085	-11.133	-10.450	171	276	0.123	2009.571	5.316	4.816	-7.103	1.327
139	244	0.201	1782.910	-0.804	8.833	-10.952	-9.081	172	277	0.111	2015.142	5.492	5.570	-6.755	0.910
140	245	0.208	1792.744	-0.616	9.834	-10.846	-9.915	173	278	0.096	2019.995	5.651	4.853	-6.168	1.846
141	246	0.212	1801.331	-0.429	8.587	-10.668	-8.490	174	279	0.095	2025.317	5.825	5.322	-5.961	1.636
142	247	0.213	1810.889	-0.235	9.557	-10.591	-9.267	175	280	0.084	2029.902	5.971	4.585	-5.806	2.538
143	248	0.216	1819.273	-0.044	8.384	-10.412	-7.894	176	281	0.085	2034.856	6.146	4.954	-5.821	2.410
144	249	0.217	1828.478	0.150	9.205	-10.370	-8.527	177	282	0.076	2039.202	6.305	4.346	-5.693	3.189
145	250	0.220	1836.634	0.341	8.155	-10.213	-7.281	178	283	0.074	2043.916	6.473	4.714	-5.580	3.027
146	251	0.221	1845.522	0.532	8.089	-10.139	-7.818	179	284	0.052	2048.041	6.619	4.125	-5.449	3.801
147	252	0.223	1853.447	0.721	7.924	-9.984	-6.659	180	285	0.044	2052.538	6.785	4.497	-5.321	3.660
148	253	0.223	1862.037	0.918	8.591	-9.898	-7.130	181	286	0.024	2056.465	6.951	3.927	-5.144	4.405
149	254	0.226	1869.768	1.101	7.730	-9.710	-6.075	182	287	0.018	2060.679	7.112	4.214	-5.079	4.320
150	255	0.222	1877.967	1.310	8.199	-9.711	-6.349	183	288	0.010	2064.334	7.270	3.655	-4.994	5.064
151	256	0.222	1885.445	1.505	7.479	-9.589	-5.437	184	289	0.	2068.388	7.450	4.054	-4.816	4.846
152	257	0.220	1893.127	1.702	7.682	-9.696	-5.448	185	290	0.023	2071.663	7.625	3.275	-4.862	5.778
153	258	0.219	1900.128	1.900	7.001	-9.784	-4.576	186	291	0.010	2075.618	7.778	3.955	-4.618	5.252
154	259	0.216	1907.486	2.097	7.358	-9.716	-4.740	187	292	0.027	2078.754	7.962	3.136	-4.444	6.258
155	260	0.216	1914.056	2.289	6.569	-9.754	-3.760	188	293	0.035	2082.524	8.132	3.770	-4.385	5.765
156	261	0.211	1921.263	2.493	7.208	-9.513	-4.208	189	294	0.044	2085.515	8.296	2.991	-4.363	6.702
157	262	0.208	1927.584	2.694	6.320	-9.380	-3.124	190	295	0.265	2089.235	8.306	3.720	-4.390	6.120
158	263	0.205	1934.597	2.888	7.013	-9.172	-3.621	191	296	0.265	2092.236	8.469	3.001	-4.212	6.902
159	264	0.201	1940.715	3.086	6.118	-8.959	-2.532	192	297	0.256	2095.949	8.609	3.713	-4.068	6.212
160	265	0.199	1947.518	3.278	6.804	-8.795	-3.020	193	298	0.252	2098.793	8.774	2.844	-3.899	6.941
161	266	0.195	1953.400	3.473	5.881	-8.635	-1.905	194	299	0.236	2102.420	8.994	3.627	-3.684	6.145
162	267	0.193	1959.991	3.661	6.591	-8.462	-2.413	195	300	0.235	2105.138	9.165	2.717	-3.485	7.088
163	268	0.186	1965.723	3.899	5.732	-8.220	-1.347	196	301	0.235	2108.576	9.342	3.439	-3.296	6.515
164	269	0.186	1971.953	4.062	6.230	-8.203	-1.650	197	302	0.236	2111.152	9.503	2.576	-3.106	7.537
165	270	0.182	1977.372	4.232	5.420	-8.069	-0.654	198	303	0.236	2114.421	9.662	3.269	-2.936	7.002
166	271	0.181	1983.353	4.414	5.981	-7.978	-1.005	199	304	0.237	2116.876	9.819	2.455	-2.737	7.979
167	272	0.179	1988.493	4.598	5.139	-7.869	0.027	200	305	0.237	2119.966	9.971	3.090	-2.595	7.502

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 106, .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
136	242	0.142	1753.763	-1.242	10.222	-12.089	-11.731	169	275	0.141	2004.216	5.050	5.131	-7.973	-0.384
137	243	0.161	1762.845	-1.147	9.082	-11.856	-10.420	170	276	0.127	2010.116	5.361	5.900	-7.668	-0.913
138	244	0.182	1773.047	-1.030	10.202	-11.615	-11.385	171	277	0.106	2015.269	5.698	5.153	-7.225	0.017
139	245	0.193	1782.047	-0.863	9.000	-11.399	-10.090	172	278	0.099	2021.059	5.917	5.789	-6.850	-0.430
140	246	0.203	1792.059	-0.685	10.012	-11.315	-10.953	173	279	0.085	2026.170	6.175	5.112	-6.380	0.427
141	247	0.208	1800.839	-0.493	8.780	-11.170	-9.592	174	280	0.085	2031.658	6.340	5.487	-6.287	0.235
142	248	0.211	1810.596	-0.293	9.757	-11.059	-10.319	175	281	0.076	2036.483	6.581	4.825	-6.156	1.072
143	249	0.215	1819.169	-0.104	8.573	-10.886	-8.933	176	282	0.075	2041.609	6.753	5.126	-6.179	0.947
144	250	0.216	1828.570	0.092	9.401	-10.848	-9.547	177	283	0.069	2046.161	6.959	4.552	-6.065	1.694
145	251	0.219	1836.921	0.288	8.351	-10.690	-8.297	178	284	0.064	2051.060	7.143	4.899	-5.945	1.519
146	252	0.220	1846.005	0.483	9.084	-10.618	-8.828	179	285	0.044	2055.416	7.374	4.356	-5.777	2.233
147	253	0.223	1854.125	0.678	8.120	-10.462	-7.666	180	286	0.034	2060.088	7.550	4.672	-5.650	2.073
148	254	0.223	1862.910	0.872	8.785	-10.375	-8.132	181	287	0.020	2064.216	7.751	4.128	-5.501	2.789
149	255	0.226	1870.835	1.067	7.925	-10.185	-7.078	182	288	0.007	2068.615	7.936	4.399	-5.433	2.659
150	256	0.222	1879.226	1.259	8.391	-10.189	-7.347	183	289	0.002	2072.451	8.117	3.836	-5.358	3.398
151	257	0.222	1886.897	1.452	7.671	-10.065	-6.439	184	290	0.	2076.658	8.271	4.207	-5.204	3.193
152	258	0.220	1894.770	1.643	7.874	-10.181	-6.449	185	291	0.017	2080.088	8.425	3.430	-5.270	4.132
153	259	0.218	1901.964	1.835	7.193	-10.272	-5.580	186	292	0.	2084.229	8.611	4.141	-5.004	3.593
154	260	0.215	1909.513	2.027	7.550	-10.206	-5.748	187	293	0.018	2087.506	8.752	3.277	-4.826	4.619
155	261	0.215	1916.273	2.217	6.759	-10.250	-4.772	188	294	0.015	2091.435	8.911	3.928	-4.701	4.138
156	262	0.209	1923.677	2.414	7.404	-10.007	-5.227	189	295	0.029	2094.573	9.058	3.138	-4.514	5.095
157	263	0.203	1930.193	2.610	6.516	-9.868	-4.167	190	296	0.035	2098.355	9.120	3.783	-4.331	4.634
158	264	0.202	1937.400	2.803	7.207	-9.665	-4.715	191	297	0.040	2101.379	9.143	3.023	-4.135	5.571
159	265	0.197	1943.716	3.001	6.316	-9.469	-3.639	192	298	0.022	2104.952	9.002	3.573	-4.272	5.174
160	266	0.194	1950.713	3.194	6.997	-9.291	-4.126	193	299	0.025	2107.783	8.990	2.832	-4.279	6.079
161	267	0.189	1956.796	3.396	6.083	-9.128	-2.984	194	300	0.246	2111.443	9.023	3.660	-4.192	5.390
162	268	0.187	1963.594	3.603	6.798	-8.942	-3.474	195	301	0.245	2114.309	9.171	2.865	-4.006	6.149
163	269	0.182	1969.520	3.797	5.927	-8.701	-2.435	196	302	0.240	2117.907	9.330	3.598	-3.815	5.563
164	270	0.180	1975.936	3.983	6.415	-8.689	-2.717	197	303	0.241	2120.641	9.488	2.734	-3.627	6.586
165	271	0.173	1981.565	4.193	5.629	-8.554	-1.734	198	304	0.239	2124.073	9.651	3.432	-3.456	6.048
166	272	0.169	1987.737	4.384	6.172	-8.449	-2.055	199	305	0.240	2126.686	9.810	2.613	-3.259	7.020
167	273	0.166	1993.075	4.582	5.338	-8.360	-0.985	200	306	0.239	2129.941	9.975	3.255	-3.113	6.535
168	274	0.157	1999.085	4.813	6.010	-8.150	-1.477								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 107$, .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
138	245	0.164	1771.174	-1.872	10.295	-12.127	-11.245	170	277	0.123	2014.504	4.388	6.084	-8.063	-0.867
139	246	0.180	1780.323	-1.723	9.149	-11.964	-9.998	171	278	0.105	2019.846	4.576	5.342	-7.615	0.135
140	247	0.206	1790.465	-1.594	10.141	-11.907	-10.912	172	279	0.098	2025.814	4.756	5.968	-7.236	-0.195
141	248	0.215	1799.494	-1.344	9.030	-11.711	-9.643	173	280	0.084	2031.110	4.940	5.296	-6.756	0.683
142	249	0.216	1809.453	-1.143	9.959	-11.586	-10.483	174	281	0.085	2036.772	5.115	5.662	-6.664	0.549
143	250	0.218	1818.241	-0.929	8.787	-11.386	-9.139	175	282	0.076	2041.773	5.291	5.001	-6.517	1.383
144	251	0.219	1827.842	-0.728	9.601	-11.342	-9.782	176	283	0.075	2047.072	5.464	5.299	-6.540	1.293
145	252	0.221	1836.395	-0.526	8.554	-11.172	-8.530	177	284	0.069	2051.797	5.636	4.724	-6.400	2.048
146	253	0.222	1845.677	-0.328	9.282	-11.096	-9.070	178	285	0.065	2056.866	5.806	5.069	-6.285	1.870
147	254	0.224	1853.995	-0.130	8.318	-10.933	-7.915	179	286	0.047	2061.379	5.963	4.513	-6.118	2.642
148	255	0.224	1862.974	0.064	8.978	-10.843	-8.385	180	287	0.041	2066.223	6.135	4.844	-5.988	2.531
149	256	0.227	1871.096	0.261	8.122	-10.646	-7.335	181	288	0.020	2070.492	6.276	4.269	-5.844	3.332
150	257	0.223	1879.675	0.450	8.579	-10.657	-7.603	182	289	0.	2075.067	6.452	4.575	-5.766	3.237
151	258	0.223	1887.539	0.642	7.864	-10.524	-6.689	183	290	0.	2079.069	6.617	4.002	-5.692	3.983
152	259	0.221	1895.602	0.831	8.063	-10.660	-6.696	184	291	0.	2083.437	6.779	4.369	-5.537	3.788
153	260	0.220	1902.983	1.020	7.382	-10.757	-5.820	185	292	0.015	2087.039	6.951	3.602	-5.590	4.727
154	261	0.218	1910.718	1.205	7.735	-10.704	-5.978	186	293	0.	2091.342	7.113	4.303	-5.340	4.182
155	262	0.217	1917.667	1.394	6.949	-10.756	-4.995	187	294	0.016	2094.790	7.284	3.448	-5.168	5.213
156	263	0.213	1925.244	1.567	7.577	-10.538	-5.432	188	295	0.	2098.886	7.451	4.096	-5.028	4.719
157	264	0.207	1931.902	1.709	6.659	-10.448	-4.307	189	296	0.040	2102.207	7.634	3.321	-4.842	5.659
158	265	0.201	1939.294	1.894	7.392	-10.264	-4.787	190	297	0.042	2106.168	7.812	3.961	-4.651	5.152
159	266	0.193	1945.804	2.088	6.510	-10.074	-3.695	191	298	0.043	2109.343	7.965	3.176	-4.466	6.083
160	267	0.187	1953.030	2.317	7.225	-9.862	-4.180	192	299	0.038	2113.080	8.129	3.737	-4.450	5.651
161	268	0.183	1959.337	2.541	6.307	-9.673	-3.092	193	300	0.028	2116.051	8.267	2.971	-4.480	6.632
162	269	0.181	1966.303	2.709	6.966	-9.510	-3.549	194	301	0.	2119.675	8.232	3.624	-4.569	6.158
163	270	0.176	1972.437	2.916	6.134	-9.258	-2.523	195	302	0.236	2122.687	8.378	3.012	-4.401	6.948
164	271	0.172	1979.049	3.113	6.612	-9.237	-2.800	196	303	0.235	2126.444	8.537	3.757	-4.272	6.141
165	272	0.163	1984.900	3.335	5.851	-9.118	-1.826	197	304	0.236	2129.338	8.698	2.895	-4.094	6.805
166	273	0.159	1991.307	3.570	6.407	-8.941	-2.111	198	305	0.236	2132.923	8.850	3.585	-3.948	5.811
167	274	0.155	1996.826	3.751	5.518	-8.842	-1.052	199	306	0.237	2135.694	9.008	2.771	-3.753	6.787
168	275	0.148	2003.050	3.965	6.225	-8.598	-1.530	200	307	0.237	2139.097	9.156	3.403	-3.619	6.312
169	276	0.134	2008.420	4.204	5.370	-8.367	-0.430								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 108, .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
140	248	0.179	1789.069	-1.395	10.299	-12.272	-11.816	171	279	0.092	2024.837	4.991	5.639	-7.674	-1.120
141	249	0.191	1798.188	-1.306	9.119	-12.154	-10.528	172	280	0.088	2031.011	5.197	6.174	-7.400	-1.470
142	250	0.204	1808.319	-1.134	10.131	-12.035	-11.450	173	281	0.076	2036.539	5.429	5.528	-7.025	-0.648
143	251	0.212	1817.278	-0.963	8.958	-11.856	-10.161	174	282	0.076	2042.374	5.601	5.835	-6.980	-0.788
144	252	0.214	1827.083	-0.759	9.805	-11.808	-10.845	175	283	0.070	2047.583	5.809	5.209	-6.883	0.012
145	253	0.218	1835.825	-0.571	8.742	-11.639	-9.607	176	284	0.067	2053.062	5.990	5.479	-6.891	-0.088
146	254	0.219	1845.298	-0.379	9.473	-11.568	-10.128	177	285	0.062	2057.953	6.157	4.891	-6.825	0.672
147	255	0.222	1853.806	-0.189	8.509	-11.410	-8.972	178	286	0.051	2063.238	6.373	5.285	-6.665	0.476
148	256	0.222	1862.979	0.005	9.173	-11.322	-9.450	179	287	0.034	2067.971	6.593	4.733	-6.484	1.163
149	257	0.226	1871.290	0.194	8.311	-11.130	-8.394	180	288	0.021	2073.042	6.819	5.070	-6.313	1.000
150	258	0.221	1880.067	0.392	8.778	-11.137	-8.682	181	289	0.017	2077.522	7.030	4.480	-6.189	1.761
151	259	0.221	1888.123	0.584	8.056	-11.007	-7.751	182	290	0.005	2082.269	7.202	4.747	-6.114	1.663
152	260	0.219	1896.381	0.779	8.258	-11.140	-7.761	183	291	0.002	2086.443	7.374	4.174	-6.068	2.404
153	261	0.217	1903.958	0.974	7.577	-11.234	-6.883	184	292	0.	2090.984	7.546	4.541	-5.926	2.206
154	262	0.214	1911.890	1.172	7.932	-11.175	-7.043	185	293	0.013	2094.742	7.702	3.758	-6.005	3.158
155	263	0.213	1919.029	1.362	7.139	-11.229	-6.081	186	294	0.	2099.221	7.878	4.479	-5.733	2.604
156	264	0.204	1926.813	1.569	7.783	-10.995	-6.553	187	295	0.013	2102.822	8.032	3.602	-5.561	3.648
157	265	0.198	1933.724	1.822	6.912	-10.843	-5.426	188	296	0.008	2107.083	8.198	4.261	-5.441	3.155
158	266	0.192	1941.327	2.033	7.602	-10.645	-5.905	189	297	0.017	2110.538	8.331	3.454	-5.263	4.126
159	267	0.186	1948.067	2.263	6.741	-10.421	-4.819	190	298	0.017	2114.644	8.476	4.106	-5.086	3.639
160	268	0.182	1955.462	2.433	7.395	-10.233	-5.274	191	299	0.024	2117.949	8.605	3.305	-4.919	4.604
161	269	0.178	1961.972	2.635	6.510	-10.039	-4.179	192	300	0.012	2121.900	8.820	3.951	-4.750	4.121
162	270	0.175	1969.131	2.828	7.160	-9.876	-4.618	193	301	0.017	2125.051	9.000	3.151	-4.623	5.084
163	271	0.171	1975.467	3.030	6.335	-9.624	-3.583	194	302	0.	2128.853	9.178	3.802	-4.394	4.594
164	272	0.163	1982.291	3.242	6.825	-9.597	-3.867	195	303	0.016	2131.803	9.116	2.950	-4.276	5.606
165	273	0.157	1988.413	3.513	6.122	-9.402	-2.891	196	304	0.	2135.361	8.917	3.558	-4.378	5.160
166	274	0.151	1994.991	3.684	6.578	-9.240	-3.145	197	305	0.241	2137.951	8.613	2.590	-4.653	6.288
167	275	0.141	2000.737	3.912	5.746	-9.123	-2.089	198	306	0.240	2141.698	8.775	3.747	-4.503	5.084
168	276	0.133	2007.208	4.158	6.470	-8.825	-2.554	199	307	0.241	2144.627	8.933	2.929	-4.308	5.792
169	277	0.120	2012.855	4.434	5.647	-8.515	-1.537	200	308	0.240	2148.195	9.098	3.568	-4.172	5.209
170	278	0.106	2019.198	4.694	6.343	-8.182	-2.017								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 109$,

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
141	250	0.170	1796.087	-2.101	9.209	-12.531	-10.481	171	280	0.092	2028.759	3.922	5.824	-7.957	-1.080
142	251	0.189	1806.334	-1.985	10.247	-12.426	-11.374	172	281	0.088	2035.108	4.097	6.349	-7.691	-1.339
143	252	0.203	1815.456	-1.822	9.122	-12.334	-10.096	173	282	0.077	2040.803	4.264	5.695	-7.338	-0.479
144	253	0.207	1825.435	-1.648	9.979	-12.313	-10.785	174	283	0.077	2046.812	4.438	6.009	-7.298	-0.549
145	254	0.214	1834.387	-1.438	8.952	-12.148	-9.578	175	284	0.070	2052.192	4.609	5.380	-7.213	0.254
146	255	0.215	1844.051	-1.246	9.664	-12.085	-10.172	176	285	0.068	2057.843	4.781	5.651	-7.225	0.164
147	256	0.218	1852.746	-1.060	8.695	-11.944	-9.011	177	286	0.063	2062.932	4.979	5.089	-7.136	0.935
148	257	0.218	1862.114	-0.865	9.367	-11.858	-9.517	178	287	0.052	2068.352	5.113	5.419	-7.016	0.811
149	258	0.222	1870.603	-0.687	8.489	-11.688	-8.445	179	288	0.031	2073.259	5.287	4.907	-6.833	1.558
150	259	0.217	1879.590	-0.478	8.987	-11.679	-8.768	180	289	0.021	2078.500	5.458	5.241	-6.661	1.495
151	260	0.218	1887.837	-0.286	8.247	-11.554	-7.824	181	290	0.017	2083.150	5.628	4.650	-6.524	2.254
152	261	0.216	1896.292	-0.088	8.455	-11.678	-7.841	182	291	0.005	2088.065	5.796	4.915	-6.453	2.159
153	262	0.214	1904.065	0.107	7.773	-11.769	-6.955	183	292	0.002	2092.408	5.965	4.343	-6.379	2.910
154	263	0.210	1912.166	0.275	8.101	-11.731	-7.089	184	293	0.	2097.117	6.134	4.710	-6.245	2.711
155	264	0.207	1919.478	0.448	7.312	-11.801	-6.042	185	294	0.013	2101.042	6.301	3.925	-6.321	3.663
156	265	0.197	1927.516	0.703	8.038	-11.497	-6.559	186	295	0.	2105.688	6.468	4.646	-6.044	3.102
157	266	0.190	1934.639	0.915	7.123	-11.323	-5.429	187	296	0.013	2109.455	6.633	3.767	-5.879	4.151
158	267	0.182	1942.466	1.139	7.827	-11.073	-5.939	188	297	0.008	2113.881	6.798	4.425	-5.756	3.652
159	268	0.177	1949.406	1.338	6.940	-10.792	-4.845	189	298	0.017	2117.501	6.963	3.620	-5.585	4.625
160	269	0.172	1957.010	1.548	7.604	-10.579	-5.313	190	299	0.017	2121.770	7.126	4.269	-5.411	4.132
161	270	0.168	1963.731	1.759	6.721	-10.368	-4.234	191	300	0.024	2125.238	7.290	3.468	-5.264	5.096
162	271	0.163	1971.101	1.969	7.370	-10.224	-4.690	192	301	0.012	2129.352	7.452	4.113	-5.111	4.607
163	272	0.162	1977.642	2.176	6.542	-9.989	-3.663	193	302	0.017	2132.665	7.614	3.313	-4.974	5.578
164	273	0.153	1984.740	2.449	7.098	-9.858	-4.053	194	303	0.000	2136.627	7.774	3.962	-4.748	5.084
165	274	0.150	1991.064	2.650	6.323	-9.668	-3.067	195	304	0.016	2139.738	7.936	3.112	-4.608	6.104
166	275	0.142	1997.866	2.875	6.802	-9.478	-3.351	196	305	0.	2143.456	8.096	3.718	-4.514	5.647
167	276	0.133	2003.871	3.134	6.005	-9.324	-2.330	197	306	0.013	2146.000	8.049	2.544	-4.982	6.990
168	277	0.126	2010.536	3.328	6.665	-9.066	-2.735	198	307	0.	2149.637	7.939	3.637	-5.102	6.050
169	278	0.116	2016.398	3.543	5.863	-8.722	-1.694	199	308	0.232	2152.621	7.994	2.985	-5.012	6.865
170	279	0.104	2022.935	3.737	6.536	-8.410	-2.101	200	309	0.232	2156.338	8.143	3.717	-4.879	5.716

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 110, .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
143	253	0.191	1813.868	-1.588	9.290	-12.615	-11.096	172	282	0.066	2039.542	4.433	6.554	-7.952	-2.485
144	254	0.195	1824.027	-1.408	10.159	-12.588	-11.824	173	283	0.065	2045.481	4.677	5.939	-7.651	-1.700
145	255	0.202	1833.097	-1.290	9.070	-12.476	-10.559	174	284	0.065	2051.664	4.852	6.183	-7.642	-1.777
146	256	0.204	1842.953	-1.098	9.856	-12.425	-11.192	175	285	0.060	2057.224	5.032	5.560	-7.610	-0.981
147	257	0.209	1851.814	-0.933	8.860	-12.306	-10.014	176	286	0.052	2063.084	5.241	5.860	-7.584	-1.070
148	258	0.209	1861.375	-0.739	9.561	-12.218	-10.553	177	287	0.047	2068.380	5.448	5.296	-7.497	-0.328
149	259	0.217	1870.040	-0.563	8.665	-12.062	-9.466	178	288	0.034	2074.034	5.682	5.653	-7.323	-0.513
150	260	0.211	1879.231	-0.359	9.191	-12.043	-9.895	179	289	0.009	2079.212	5.954	5.179	-7.036	0.149
151	261	0.212	1887.668	-0.169	8.438	-11.916	-8.867	180	290	0.014	2084.621	6.121	5.409	-6.912	0.010
152	262	0.208	1896.327	0.035	8.658	-12.036	-8.909	181	291	0.015	2089.441	6.292	4.820	-6.825	0.771
153	263	0.207	1904.294	0.230	7.968	-12.124	-8.005	182	292	0.004	2094.536	6.471	5.094	-6.801	0.667
154	264	0.201	1912.654	0.488	8.359	-12.022	-8.203	183	293	0.001	2099.047	6.639	4.511	-6.770	1.411
155	265	0.195	1920.175	0.697	7.521	-12.078	-7.138	184	294	0.	2103.923	6.805	4.876	-6.641	1.213
156	266	0.190	1928.428	0.912	8.253	-11.757	-7.614	185	295	0.010	2108.007	6.965	4.085	-6.731	2.174
157	267	0.184	1935.744	1.105	7.316	-11.580	-6.487	186	296	0.	2112.824	7.136	4.817	-6.455	1.612
158	268	0.177	1943.779	1.313	8.035	-11.329	-6.985	187	297	0.010	2116.751	7.295	3.926	-6.286	2.665
159	269	0.173	1950.914	1.509	7.136	-11.105	-5.884	188	298	0.005	2121.343	7.463	4.593	-6.172	2.167
160	270	0.168	1958.715	1.705	7.801	-10.907	-6.357	189	299	0.011	2125.119	7.619	3.776	-5.998	3.145
161	271	0.164	1965.629	1.897	6.914	-10.734	-5.281	190	300	0.010	2129.552	7.782	4.433	-5.826	2.657
162	272	0.159	1973.197	2.096	7.569	-10.560	-5.752	191	301	0.013	2133.176	7.938	3.624	-5.656	3.628
163	273	0.158	1979.905	2.263	6.708	-10.361	-4.757	192	302	0.007	2137.460	8.109	4.284	-5.478	3.134
164	274	0.148	1987.214	2.474	7.309	-10.212	-5.172	193	303	0.012	2140.929	8.264	3.468	-5.315	4.107
165	275	0.145	1993.732	2.669	6.518	-10.029	-4.113	194	304	0.000	2145.060	8.434	4.132	-5.135	3.609
166	276	0.134	2000.758	2.892	7.026	-9.828	-4.454	195	305	0.014	2148.321	8.583	3.261	-5.024	4.633
167	277	0.124	2007.018	3.147	6.260	-9.690	-3.367	196	306	0.	2152.208	8.751	3.886	-4.940	4.176
168	278	0.114	2013.922	3.386	6.904	-9.364	-3.774	197	307	0.010	2154.904	8.904	2.696	-5.194	5.520
169	279	0.095	2020.052	3.653	6.130	-8.981	-2.767	198	308	0.	2158.704	9.067	3.800	-4.952	4.579
170	280	0.	2026.896	3.961	6.844	-8.607	-3.186	199	309	0.016	2161.272	8.651	2.568	-4.974	5.965
171	281	0.065	2032.987	4.228	6.091	-8.163	-2.234	200	310	0.005	2164.824	8.485	3.551	-5.170	5.149

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 111$, .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
145	256	0.189	1830.979	-2.118	9.224	-12.772	-10.653	173	284	0.061	2049.104	3.624	6.107	-7.949	-1.457
146	257	0.192	1841.018	-1.936	10.039	-12.712	-11.241	174	285	0.060	2055.461	3.797	6.356	-7.943	-1.611
147	258	0.198	1850.040	-1.774	9.022	-12.642	-10.032	175	286	0.057	2061.231	4.007	5.771	-7.867	-0.839
148	259	0.199	1859.791	-1.584	9.752	-12.555	-10.576	176	287	0.051	2067.270	4.186	6.039	-7.836	-0.933
149	260	0.210	1868.553	-1.487	8.762	-12.488	-9.396	177	288	0.047	2072.739	4.358	5.468	-7.748	-0.172
150	261	0.202	1878.019	-1.212	9.466	-12.390	-9.935	178	289	0.041	2078.579	4.545	5.840	-7.559	-0.328
151	262	0.206	1886.635	-1.033	8.617	-12.262	-8.878	179	290	0.016	2083.849	4.636	5.270	-7.378	0.509
152	263	0.201	1895.507	-0.820	8.872	-12.378	-8.954	180	291	0.018	2089.430	4.809	5.581	-7.216	0.465
153	264	0.200	1903.668	-0.626	8.161	-12.464	-8.039	181	292	0.016	2094.420	4.979	4.990	-7.134	1.215
154	265	0.193	1912.254	-0.400	8.586	-12.333	-8.275	182	293	0.005	2099.675	5.139	5.255	-7.120	1.115
155	266	0.185	1920.032	-0.143	7.778	-12.328	-7.266	183	294	0.002	2104.353	5.307	4.678	-7.092	1.878
156	267	0.182	1928.474	0.046	8.442	-11.986	-7.773	184	295	0.	2109.399	5.476	5.046	-6.961	1.679
157	268	0.177	1936.011	0.267	7.537	-11.761	-6.680	185	296	0.012	2113.653	5.646	4.254	-7.049	2.636
158	269	0.173	1944.248	0.470	8.237	-11.563	-7.187	186	297	0.	2118.633	5.809	4.980	-6.779	2.067
159	270	0.171	1951.575	0.661	7.327	-11.359	-6.084	187	298	0.012	2122.728	5.977	4.094	-6.610	3.126
160	271	0.167	1959.565	0.850	7.990	-11.196	-6.557	188	299	0.007	2127.482	6.139	4.755	-6.501	2.622
161	272	0.165	1966.663	1.034	7.098	-11.038	-5.499	189	300	0.015	2131.427	6.308	3.945	-6.324	3.601
162	273	0.156	1974.365	1.168	7.703	-10.939	-5.914	190	301	0.013	2136.022	6.469	4.595	-6.154	3.106
163	274	0.153	1981.260	1.354	6.894	-10.766	-4.839	191	302	0.018	2139.812	6.636	3.790	-5.983	4.075
164	275	0.135	1988.836	1.622	7.577	-10.559	-5.330	192	303	0.010	2144.253	6.793	4.441	-5.812	3.580
165	276	0.134	1995.522	1.790	6.686	-10.415	-4.234	193	304	0.015	2147.886	6.958	3.633	-5.647	4.557
166	277	0.122	2002.869	2.110	7.346	-10.167	-4.702	194	305	0.001	2152.171	7.111	4.285	-5.475	4.058
167	278	0.115	2009.366	2.348	6.497	-9.993	-3.570	195	306	0.015	2155.601	7.280	3.429	-5.359	5.086
168	279	0.097	2016.502	2.580	7.136	-9.659	-3.794	196	307	0.	2159.641	7.434	4.041	-5.280	4.617
169	280	0.042	2022.928	2.876	6.426	-9.238	-2.555	197	308	0.012	2162.500	7.596	2.859	-5.533	5.974
170	281	0.	2029.970	3.074	7.042	-8.861	-2.777	198	309	0.	2166.455	7.751	3.955	-5.296	5.027
171	282	0.051	2036.274	3.287	6.304	-8.419	-1.797	199	310	0.019	2169.190	7.917	2.735	-5.106	6.413
172	283	0.059	2042.998	3.456	6.723	-8.232	-2.145	200	311	0.009	2172.890	8.066	3.700	-5.042	5.584

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 112,

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
146	258	0.190	1839.225	-1.793	10.231	-13.097	-12.326	174	286	0.042	2059.610	4.150	6.543	-8.226	-2.691
147	259	0.195	1848.432	-1.607	9.208	-12.959	-11.125	175	287	0.044	2065.555	4.324	5.945	-8.220	-1.916
148	260	0.195	1858.374	-1.417	9.942	-12.874	-11.700	176	288	0.032	2071.784	4.514	6.229	-8.175	-2.031
149	261	0.201	1867.301	-1.251	8.927	-12.807	-10.503	177	289	0.030	2077.468	4.730	5.684	-8.051	-1.306
150	262	0.193	1876.975	-1.044	9.673	-12.695	-11.076	178	290	0.009	2083.575	4.996	6.107	-7.804	-1.560
151	263	0.201	1885.770	-0.865	8.796	-12.564	-10.002	179	291	0.005	2089.113	5.264	5.538	-7.563	-0.855
152	264	0.197	1894.847	-0.660	9.077	-12.679	-10.122	180	292	0.009	2094.853	5.423	5.740	-7.476	-0.910
153	265	0.197	1903.197	-0.471	8.350	-12.766	-9.169	181	293	0.012	2100.008	5.588	5.155	-7.499	-0.146
154	266	0.191	1911.984	-0.270	8.787	-12.638	-9.420	182	294	0.003	2105.449	5.774	5.441	-7.467	-0.260
155	267	0.185	1919.919	-0.113	7.935	-12.670	-8.349	183	295	0.001	2110.295	5.942	4.846	-7.441	0.470
156	268	0.180	1928.549	0.075	8.630	-12.399	-8.782	184	296	0.	2115.506	6.108	5.211	-7.324	0.262
157	269	0.175	1936.278	0.267	7.729	-12.191	-7.673	185	297	0.008	2119.917	6.264	4.411	-7.424	1.237
158	270	0.170	1944.708	0.460	8.430	-12.015	-8.170	186	298	0.	2125.071	6.438	5.154	-7.147	0.683
159	271	0.167	1952.226	0.650	7.517	-11.814	-7.062	187	299	0.007	2129.322	6.594	4.251	-6.980	1.724
160	272	0.162	1960.381	0.817	8.156	-11.692	-7.512	188	300	0.003	2134.245	6.763	4.923	-6.874	1.242
161	273	0.155	1967.669	1.006	7.288	-11.540	-6.447	189	301	0.007	2138.345	6.918	4.100	-6.701	2.220
162	274	0.144	1975.639	1.273	7.970	-11.371	-6.915	190	302	0.006	2143.104	7.082	4.759	-6.534	1.739
163	275	0.141	1982.724	1.465	7.086	-11.199	-5.728	191	303	0.008	2147.051	7.239	3.947	-6.363	2.711
164	276	0.124	1990.506	1.669	7.781	-10.986	-6.223	192	304	0.005	2151.661	7.408	4.610	-6.186	2.217
165	277	0.119	1997.384	1.862	6.878	-10.816	-4.996	193	305	0.009	2155.447	7.560	3.786	-6.024	3.191
166	278	0.094	2005.013	2.145	7.629	-10.496	-5.508	194	306	0.000	2159.905	7.733	4.458	-5.851	2.691
167	279	0.005	2011.926	2.560	6.913	-10.101	-4.340	195	307	0.011	2163.476	7.875	3.571	-5.748	3.702
168	280	0.000	2019.590	3.088	7.664	-9.463	-4.886	196	308	0.	2167.691	8.050	4.216	-5.664	3.257
169	281	0.019	2026.410	3.483	6.820	-8.903	-3.878	197	309	0.008	2170.699	8.199	3.008	-5.917	4.600
170	282	0.	2033.695	3.725	7.285	-8.522	-4.142	198	310	0.	2174.820	8.365	4.121	-5.682	3.660
171	283	0.020	2040.070	3.796	6.375	-8.277	-3.106	199	311	0.011	2177.691	8.501	2.871	-5.508	5.040
172	284	0.012	2046.865	3.867	6.795	-8.326	-3.298	200	312	0.003	2181.565	8.676	3.874	-5.433	4.237
173	285	0.045	2053.067	3.962	6.202	-8.215	-2.533								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 113$, .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
148	261	0.185	1856.016	-2.358	10.124	-13.296	-11.905	175	288	0.042	2068.971	3.416	6.115	-8.429	-1.821
149	262	0.189	1865.116	-2.186	9.099	-13.219	-10.697	176	289	0.035	2075.379	3.595	6.409	-8.376	-2.016
150	263	0.190	1874.986	-1.989	9.870	-13.101	-11.304	177	290	0.032	2081.233	3.765	5.854	-8.293	-1.153
151	264	0.193	1883.943	-1.828	8.957	-12.905	-10.234	178	291	0.022	2087.475	3.900	6.242	-8.090	-1.391
152	265	0.189	1893.245	-1.602	9.303	-13.068	-10.426	179	292	0.017	2093.161	4.048	5.685	-7.873	-0.583
153	266	0.190	1901.781	-1.416	8.535	-13.149	-9.431	180	293	0.018	2099.080	4.227	5.919	-7.795	-0.623
154	267	0.182	1910.787	-1.196	9.006	-13.015	-9.729	181	294	0.017	2104.406	4.398	5.327	-7.738	0.124
155	268	0.177	1918.985	-0.934	8.198	-12.978	-8.636	182	295	0.013	2109.983	4.534	5.577	-7.742	0.034
156	269	0.173	1927.823	-0.726	8.838	-12.726	-9.057	183	296	0.010	2114.986	4.691	5.003	-7.729	0.816
157	270	0.170	1935.756	-0.522	7.933	-12.571	-7.952	184	297	0.008	2120.372	4.866	5.386	-7.598	0.611
158	271	0.167	1944.381	-0.327	8.625	-12.388	-8.403	185	298	0.015	2124.971	5.054	4.599	-7.677	1.558
159	272	0.165	1952.087	-0.139	7.705	-12.220	-7.252	186	299	0.011	2130.263	5.192	5.292	-7.431	1.003
160	273	0.131	1960.439	0.058	8.353	-12.104	-7.704	187	300	0.015	2134.705	5.383	4.442	-7.243	2.050
161	274	0.128	1967.941	0.272	7.502	-11.929	-6.432	188	301	0.014	2139.783	5.537	5.078	-7.146	1.548
162	275	0.112	1976.213	0.575	8.272	-11.646	-7.006	189	302	0.017	2144.061	5.716	4.278	-6.962	2.522
163	276	0.110	1983.500	0.776	7.287	-11.457	-5.682	190	303	0.016	2148.980	5.876	4.919	-6.797	2.027
164	277	0.094	1991.606	1.100	8.105	-11.055	-6.260	191	304	0.018	2153.096	6.045	4.116	-6.626	2.995
165	278	0.086	1998.723	1.339	7.117	-10.832	-4.709	192	305	0.015	2157.855	6.194	4.759	-6.462	2.506
166	279	0.037	2006.804	1.791	8.081	-10.327	-5.320	193	306	0.017	2161.813	6.367	3.958	-6.294	3.481
167	280	0.026	2013.922	1.996	7.118	-9.896	-4.127	194	307	0.011	2166.396	6.491	4.582	-6.153	3.004
168	281	0.024	2021.750	2.160	7.828	-9.413	-4.629	195	308	0.016	2170.166	6.690	3.770	-6.015	4.014
169	282	0.025	2028.771	2.360	7.020	-8.890	-3.633	196	309	0.005	2174.517	6.826	4.351	-5.949	3.544
170	283	0.014	2036.181	2.486	7.411	-8.616	-3.895	197	310	0.015	2177.698	6.998	3.181	-6.198	4.908
171	284	0.026	2042.784	2.714	6.603	-8.439	-2.837	198	311	0.010	2181.948	7.128	4.250	-5.988	3.977
172	285	0.029	2049.751	2.886	6.967	-8.514	-3.107	199	312	0.018	2185.020	7.329	3.072	-5.775	5.346
173	286	0.042	2056.137	3.070	6.386	-8.432	-2.330	200	313	0.016	2189.029	7.463	4.008	-5.721	4.513
174	287	0.040	2062.856	3.246	6.719	-8.436	-2.637								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 114, .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
150	264	0.181	1872.926	-2.059	10.027	-13.743	-12.086	176	290	0.010	2079.297	3.918	6.716	-8.608	-4.402
151	265	0.189	1882.037	-1.906	9.111	-13.560	-10.992	177	291	0.017	2085.302	4.069	6.005	-8.548	-3.652
152	266	0.180	1891.567	-1.678	9.531	-13.702	-11.309	178	292	0.005	2091.795	4.320	6.493	-8.284	-3.948
153	267	0.182	1900.276	-1.505	8.709	-13.789	-10.206	179	293	0.003	2097.674	4.514	5.879	-8.089	-3.232
154	268	0.171	1909.566	-1.221	9.290	-13.576	-10.611	180	294	0.006	2103.748	4.668	6.073	-8.122	-3.272
155	269	0.168	1917.984	-1.001	8.417	-13.508	-9.506	181	295	0.009	2109.235	4.829	5.487	-8.173	-2.503
156	270	0.159	1927.022	-0.801	9.039	-13.256	-9.927	182	296	0.002	2115.020	5.036	5.785	-8.128	-2.623
157	271	0.152	1935.196	-0.560	8.174	-13.018	-8.741	183	297	0.001	2120.201	5.215	5.181	-8.102	-1.883
158	272	0.142	1944.052	-0.329	8.856	-12.792	-9.218	184	298	0.	2125.747	5.374	5.546	-7.997	-2.087
159	273	0.142	1951.953	-0.134	7.901	-12.620	-8.043	185	299	0.006	2130.484	5.513	4.737	-8.107	-1.099
160	274	0.097	1960.727	0.288	8.774	-12.276	-8.739	186	300	0.	2135.973	5.710	5.489	-7.829	-1.670
161	275	0.096	1968.425	0.484	7.698	-12.096	-7.537	187	301	0.005	2140.548	5.843	4.575	-7.665	-0.615
162	276	0.	1977.035	0.822	8.611	-11.641	-8.273	188	302	0.003	2145.800	6.017	5.252	-7.566	-1.103
163	277	0.051	1984.564	1.063	7.528	-11.400	-7.127	189	303	0.005	2150.224	6.163	4.424	-7.393	-0.120
164	278	0.	1993.232	1.626	8.668	-10.702	-8.137	190	304	0.004	2155.309	6.329	5.084	-7.232	-0.602
165	279	0.004	2000.701	1.978	7.469	-10.318	-7.118	191	305	0.005	2159.579	6.483	4.270	-7.061	0.373
166	280	0.001	2009.013	2.209	8.312	-9.788	-7.903	192	306	0.004	2164.512	6.657	4.933	-6.887	-0.121
167	281	0.002	2016.339	2.417	7.326	-9.340	-6.760	193	307	0.006	2168.617	6.803	4.105	-6.729	0.860
168	282	0.001	2024.355	2.605	8.017	-8.953	-7.292	194	308	0.001	2173.398	7.002	4.781	-6.558	0.358
169	283	0.013	2031.504	2.733	7.148	-8.717	-6.257	195	309	0.009	2177.279	7.112	3.881	-6.463	1.389
170	284	0.	2039.165	2.983	7.661	-8.721	-6.546	196	310	0.	2181.823	7.306	4.544	-6.377	0.926
171	285	0.013	2045.862	3.078	6.697	-8.844	-5.463	197	311	0.006	2185.143	7.445	3.320	-6.628	2.297
172	286	0.004	2053.025	3.274	7.163	-8.965	-5.693	198	312	0.	2189.584	7.635	4.441	-6.403	1.336
173	287	0.014	2059.437	3.300	6.412	-8.928	-4.792	199	313	0.008	2192.759	7.739	3.176	-6.235	2.736
174	288	0.011	2066.367	3.511	6.930	-8.792	-4.997	200	314	0.002	2196.952	7.924	4.193	-6.163	1.916
175	289	0.018	2072.581	3.611	6.214	-8.781	-4.145								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 115$,

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
151	266	0.172	1879.476	-2.561	9.214	-13.935	-11.073	176	291	0.032	2080.867	1.570	6.755	-10.284	-4.593
152	267	0.165	1889.288	-2.279	9.812	-13.992	-11.575	177	292	0.030	2087.065	1.763	6.198	-10.201	-3.853
153	268	0.166	1898.173	-2.103	8.885	-14.065	-10.365	178	293	0.019	2093.660	1.865	6.595	-10.014	-4.123
154	269	0.152	1907.695	-1.872	9.522	-13.846	-10.829	179	294	0.014	2099.693	2.019	6.033	-9.835	-3.394
155	270	0.151	1916.312	-1.671	8.618	-13.763	-9.619	180	295	0.015	2105.949	2.201	6.256	-9.821	-3.437
156	271	0.140	1925.672	-1.350	9.360	-13.410	-10.177	181	296	0.015	2111.614	2.379	5.665	-9.841	-2.681
157	272	0.139	1934.052	-1.144	8.380	-13.228	-8.994	182	297	0.010	2117.535	2.515	5.921	-9.840	-2.769
158	273	0.129	1943.128	-0.924	9.076	-12.990	-9.505	183	298	0.008	2122.877	2.676	5.342	-9.824	-2.006
159	274	0.128	1951.206	-0.747	8.078	-12.845	-8.336	184	299	0.005	2128.602	2.855	5.725	-9.676	-2.215
160	275	0.117	1960.105	-0.622	8.899	-12.571	-8.973	185	300	0.013	2133.520	3.037	4.918	-9.761	-1.247
161	276	0.116	1967.980	-0.445	7.875	-12.402	-7.794	186	301	0.008	2139.151	3.178	5.630	-9.516	-1.802
162	277	0.104	1976.654	-0.381	8.674	-12.080	-8.416	187	302	0.013	2143.915	3.367	4.764	-9.351	-0.750
163	278	0.100	1984.312	-0.251	7.658	-11.924	-7.277	188	303	0.012	2149.322	3.522	5.407	-9.236	-1.246
164	279	0.083	1992.801	-0.431	8.489	-11.707	-7.936	189	304	0.014	2153.925	3.700	4.603	-9.075	-0.272
165	280	0.072	2000.327	-0.374	7.526	-11.469	-6.904	190	305	0.014	2159.169	3.860	5.245	-8.909	-0.757
166	281	0.032	2008.796	-0.216	8.469	-11.105	-7.738	191	306	0.015	2163.609	4.030	4.440	-8.747	0.212
167	282	0.022	2016.281	-0.058	7.485	-10.737	-6.819	192	307	0.013	2168.694	4.182	5.086	-8.581	-0.273
168	283	0.020	2024.465	0.109	8.184	-10.634	-7.464	193	308	0.014	2172.973	4.356	4.279	-8.418	0.701
169	284	0.023	2031.836	0.332	7.371	-10.381	-6.470	194	309	0.008	2177.885	4.487	4.912	-8.265	0.224
170	285	0.009	2039.616	0.451	7.780	-10.430	-6.706	195	310	0.014	2181.967	4.688	4.081	-8.142	1.234
171	286	0.024	2046.549	0.688	6.933	-10.516	-5.665	196	311	0.002	2186.657	4.834	4.690	-8.034	0.765
172	287	0.024	2053.863	0.838	7.314	-10.614	-5.889	197	312	0.013	2190.137	4.994	3.480	-8.324	2.136
173	288	0.041	2060.588	1.151	6.725	-10.491	-5.125	198	313	0.007	2194.712	5.129	4.575	-8.100	1.205
174	289	0.039	2067.654	1.287	7.066	-10.392	-5.251	199	314	0.016	2198.086	5.327	3.373	-7.907	2.585
175	290	0.042	2074.112	1.531	6.458	-10.320	-4.478	200	315	0.012	2202.412	5.459	4.326	-7.832	1.764

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 116$, .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
153	269	0.150	1896.083	-2.090	9.058	-14.249	-11.624	177	293	0.035	2088.755	1.689	6.325	-12.122	-4.634
154	270	0.142	1905.911	-1.784	9.827	-13.952	-12.209	178	294	0.014	2095.517	1.856	6.762	-12.076	-4.890
155	271	0.143	1914.714	-1.599	8.803	-13.858	-10.990	179	295	0.008	2101.729	2.036	6.213	-11.867	-4.230
156	272	0.138	1924.275	-1.397	9.562	-13.586	-11.563	180	296	0.012	2108.150	2.202	6.421	-11.940	-4.356
157	273	0.138	1932.840	-1.212	8.565	-13.439	-10.395	181	297	0.013	2113.984	2.370	5.833	-11.986	-3.593
158	274	0.133	1942.088	-1.040	9.248	-13.229	-10.893	182	298	0.005	2120.088	2.553	6.105	-11.955	-3.694
159	275	0.133	1950.349	-0.857	8.261	-13.142	-9.702	183	299	0.003	2125.605	2.728	5.517	-11.925	-2.954
160	276	0.127	1959.404	-0.701	9.055	-12.944	-10.311	184	300	0.	2131.490	2.889	5.886	-11.824	-3.158
161	277	0.126	1967.456	-0.524	8.052	-12.792	-9.123	185	301	0.009	2136.567	3.046	5.076	-11.929	-2.176
162	278	0.119	1976.253	-0.401	8.798	-12.769	-9.686	186	302	0.000	2142.383	3.232	5.816	-11.659	-2.742
163	279	0.118	1984.082	-0.230	7.829	-12.638	-8.533	187	303	0.009	2147.293	3.378	4.910	-11.485	-1.685
164	280	0.110	1992.641	-0.160	8.559	-12.690	-9.081	188	304	0.006	2152.870	3.548	5.577	-11.398	-2.171
165	281	0.103	2000.276	-0.051	7.635	-12.583	-7.976	189	305	0.010	2157.629	3.705	4.760	-11.213	-1.195
166	282	0.038	2008.680	-0.117	8.404	-12.847	-8.564	190	306	0.009	2163.039	3.869	5.409	-11.057	-1.671
167	283	0.018	2016.219	-0.062	7.539	-12.778	-7.523	191	307	0.010	2167.638	4.030	4.600	-10.881	-0.700
168	284	0.011	2024.583	0.118	8.365	-12.724	-8.235	192	308	0.007	2172.891	4.197	5.253	-10.712	-1.185
169	285	0.022	2032.127	0.291	7.544	-12.507	-7.284	193	309	0.011	2177.327	4.354	4.435	-10.547	-0.214
170	286	0.	2040.102	0.486	7.974	-12.549	-7.594	194	310	0.002	2182.418	4.533	5.091	-10.389	-0.701
171	287	0.024	2047.192	0.642	7.090	-12.607	-6.592	195	311	0.013	2186.640	4.673	4.222	-10.272	0.313
172	288	0.028	2054.680	0.817	7.488	-12.779	-6.738	196	312	0.	2191.490	4.833	4.850	-10.202	-0.136
173	289	0.048	2061.621	1.033	6.941	-12.535	-5.934	197	313	0.009	2195.134	4.997	3.644	-10.439	1.218
174	290	0.045	2068.852	1.198	7.231	-12.467	-6.030	198	314	0.	2199.888	5.176	4.754	-10.230	0.274
175	291	0.047	2075.492	1.379	6.639	-12.240	-5.271	199	315	0.013	2203.393	5.307	3.505	-10.044	1.669
176	292	0.040	2082.430	1.563	6.938	-12.232	-5.396	200	316	0.006	2207.887	5.475	4.493	-9.992	0.863

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 117$,

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
155	272	0.142	1911.930	-2.784	8.989	-14.538	-11.238	178	295	0.039	2096.718	1.201	6.873	-12.445	-5.116
156	273	0.137	1921.662	-2.613	9.733	-14.327	-11.793	179	296	0.018	2103.012	1.283	6.295	-12.348	-4.393
157	274	0.137	1930.413	-2.427	8.751	-14.195	-10.632	180	297	0.019	2109.609	1.458	6.596	-12.347	-4.449
158	275	0.132	1939.864	-2.224	9.452	-14.103	-11.150	181	298	0.017	2115.612	1.628	6.003	-12.376	-3.689
159	276	0.132	1948.310	-2.039	8.445	-14.037	-9.983	182	299	0.008	2121.868	1.780	6.256	-12.376	-3.773
160	277	0.126	1957.550	-1.854	9.240	-13.873	-10.594	183	300	0.005	2127.550	1.945	5.682	-12.359	-3.022
161	278	0.125	1965.785	-1.670	8.235	-13.716	-9.423	184	301	0.	2133.608	2.118	6.058	-12.222	-3.229
162	279	0.119	1974.766	-1.487	8.981	-13.634	-9.989	185	302	0.013	2138.858	2.292	5.250	-12.314	-2.258
163	280	0.118	1982.777	-1.305	8.010	-13.498	-8.850	186	303	0.003	2144.826	2.443	5.968	-12.071	-2.812
164	281	0.109	1991.517	-1.123	8.741	-13.432	-9.402	187	304	0.013	2149.916	2.623	5.090	-11.899	-1.760
165	282	0.103	1999.333	-0.943	7.816	-13.274	-8.303	188	305	0.011	2155.652	2.782	5.736	-11.794	-2.249
166	283	0.089	2007.913	-0.767	8.580	-13.183	-8.895	189	306	0.016	2160.585	2.956	4.933	-11.625	-1.280
167	284	0.071	2015.566	-0.653	7.653	-13.056	-7.802	190	307	0.016	2166.156	3.117	5.571	-11.461	-1.758
168	285	0.052	2024.061	-0.522	8.495	-13.030	-8.477	191	308	0.019	2170.924	3.286	4.768	-11.296	-0.792
169	286	0.035	2031.725	-0.402	7.664	-12.851	-7.476	192	309	0.013	2176.331	3.439	5.406	-11.134	-1.270
170	287	0.	2039.817	-0.284	8.093	-12.942	-7.694	193	310	0.016	2180.935	3.608	4.604	-10.969	-0.302
171	288	0.040	2047.160	-0.032	7.342	-12.971	-6.741	194	311	0.005	2186.171	3.753	5.236	-10.818	-0.775
172	289	0.048	2054.904	0.224	7.745	-13.006	-7.009	195	312	0.015	2190.571	3.932	4.401	-10.697	0.230
173	290	0.054	2062.040	0.419	7.135	-12.805	-6.245	196	313	0.	2195.569	4.079	4.998	-10.611	-0.216
174	291	0.053	2069.438	0.585	7.398	-12.720	-6.338	197	314	0.013	2199.380	4.246	3.811	-10.882	1.135
175	292	0.052	2076.252	0.760	6.814	-12.631	-5.581	198	315	0.002	2204.279	4.391	4.899	-10.673	0.203
176	293	0.047	2083.338	0.908	7.086	-12.611	-5.680	199	316	0.019	2207.967	4.574	3.688	-10.465	1.582
177	294	0.044	2089.844	1.090	6.506	-12.563	-4.924	200	317	0.013	2212.603	4.716	4.636	-10.404	0.777

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 118, .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
156	274	0.142	1918.998	-2.664	9.911	-15.207	-12.176	179	297	0.012	2104.377	1.364	6.539	-12.673	-5.327
157	275	0.141	1921.932	-2.481	3.933	-15.077	-11.270	180	298	0.015	2111.140	1.532	6.763	-12.671	-5.440
158	276	0.136	1931.545	-2.320	9.613	-15.025	-12.111	181	299	0.015	2117.313	1.701	6.173	-12.711	-4.679
159	277	0.136	1946.174	-2.136	3.629	-14.961	-10.912	182	300	0.006	2123.746	1.877	6.432	-12.700	-4.771
160	278	0.129	1955.580	-1.970	9.406	-14.803	-11.506	183	301	0.004	2129.597	2.047	5.852	-12.682	-4.038
161	279	0.128	1963.995	-1.791	3.415	-14.650	-10.322	184	302	0.	2135.818	2.210	6.221	-12.566	-4.245
162	280	0.122	1973.144	-1.622	9.149	-14.555	-10.873	185	303	0.011	2141.232	2.374	5.414	-12.668	-3.264
163	281	0.120	1981.333	-1.443	3.189	-14.417	-9.723	186	304	0.001	2147.373	2.547	6.141	-12.412	-3.817
164	282	0.112	1990.247	-1.270	3.914	-14.301	-10.266	187	305	0.011	2152.621	2.704	5.247	-12.241	-2.776
165	283	0.106	1998.236	-1.097	7.989	-14.141	-9.151	188	306	0.008	2158.523	2.871	5.902	-12.155	-3.246
166	284	0.091	2006.981	-0.932	3.745	-13.955	-9.724	189	307	0.013	2163.616	3.030	5.092	-11.973	-2.276
167	285	0.076	2014.802	-0.764	7.821	-13.769	-8.623	190	308	0.012	2169.350	3.194	5.734	-11.815	-2.745
168	286	0.047	2023.466	-0.595	8.664	-13.509	-9.296	191	309	0.014	2174.278	3.354	4.928	-11.647	-1.777
169	287	0.029	2031.341	-0.384	7.875	-13.173	-8.379	192	310	0.010	2179.851	3.520	5.573	-11.483	-2.086
170	288	0.	2039.636	-0.182	9.295	-13.243	-8.676	193	311	0.013	2184.614	3.679	4.763	-11.320	-1.276
171	289	0.033	2047.113	-0.047	7.477	-13.309	-7.720	194	312	0.003	2190.019	3.848	5.405	-11.168	-1.628
172	290	0.046	2055.012	0.108	7.899	-13.384	-7.934	195	313	0.014	2194.571	3.999	4.552	-11.051	-0.768
173	291	0.053	2062.317	0.277	7.305	-13.170	-7.140	196	314	0.	2199.732	4.163	5.162	-10.981	-1.074
174	292	0.051	2069.889	0.451	7.572	-13.086	-7.220	197	315	0.011	2203.700	4.320	3.968	-11.235	0.148
175	293	0.051	2076.875	0.624	6.987	-13.041	-6.465	198	316	0.000	2208.766	4.487	5.066	-11.019	-0.392
176	294	0.045	2084.138	0.800	7.263	-13.009	-6.571	199	317	0.016	2212.598	4.631	3.832	-10.832	0.928
177	295	0.042	2090.820	0.975	6.681	-12.967	-5.830	200	318	0.009	2217.397	4.794	4.799	-10.786	0.508
178	296	0.027	2097.837	1.120	7.018	-12.888	-6.001								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR $Z = 119$, .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
158	277	0.133	1934.479	-3.066	9.828	-15.478	-11.477	180	299	0.020	2111.852	0.712	6.934	-13.161	-5.486
159	278	0.133	1943.291	-2.882	8.812	-15.417	-10.460	181	300	0.018	2118.192	0.879	6.340	-13.116	-4.727
160	279	0.127	1952.890	-2.690	9.599	-15.269	-11.354	182	301	0.011	2124.777	1.031	6.585	-13.127	-4.802
161	280	0.126	1961.489	-2.506	8.599	-15.116	-10.304	183	302	0.008	2130.790	1.193	6.014	-13.117	-4.041
162	281	0.120	1970.828	-2.316	9.339	-15.018	-11.026	184	303	0.002	2137.185	1.367	6.395	-12.978	-4.248
163	282	0.118	1979.199	-2.134	8.372	-14.881	-9.919	185	304	0.015	2142.774	1.542	5.589	-13.071	-3.288
164	283	0.110	1988.303	-1.945	9.103	-14.759	-10.478	186	305	0.008	2149.062	1.689	6.288	-12.841	-3.584
165	284	0.105	1996.474	-1.762	8.172	-14.597	-9.388	187	306	0.016	2154.494	1.874	5.432	-12.659	-2.734
166	285	0.092	2005.396	-1.585	8.922	-14.416	-9.984	188	307	0.014	2160.557	2.034	6.063	-12.564	-3.004
167	286	0.086	2013.388	-1.414	7.991	-14.240	-8.921	189	308	0.018	2165.822	2.207	5.265	-12.389	-2.003
168	287	0.065	2022.179	-1.287	8.792	-14.029	-9.528	190	309	0.018	2171.718	2.369	5.896	-12.229	-2.119
169	288	0.034	2030.177	-1.163	7.998	-13.684	-8.560	191	310	0.480	2176.983	2.705	5.264	-11.898	-1.377
170	289	0.013	2038.611	-1.025	8.434	-13.745	-8.744	192	311	0.478	2182.555	2.704	5.573	-11.896	-1.472
171	290	0.039	2046.295	-0.818	7.684	-13.725	-7.770	193	312	0.477	2187.609	2.995	5.053	-11.610	-0.792
172	291	0.053	2054.394	-0.618	8.099	-13.718	-8.058	194	313	0.476	2193.020	3.002	5.412	-11.605	-0.990
173	292	0.058	2061.886	-0.431	7.492	-13.568	-7.324	195	314	0.475	2197.876	3.305	4.856	-11.354	-0.274
174	293	0.056	2069.628	-0.261	7.741	-13.572	-7.416	196	315	0.	2203.066	3.333	5.190	-11.400	-0.450
175	294	0.055	2076.785	-0.091	7.157	-13.550	-6.656	197	316	0.474	2207.591	3.891	4.526	-11.275	0.384
176	295	0.048	2084.207	0.069	7.422	-13.526	-6.747	198	317	0.469	2212.743	3.977	5.152	-11.121	-0.094
177	296	0.045	2091.054	0.234	6.847	-13.493	-5.985	199	318	0.466	2217.122	4.525	4.379	-10.553	0.849
178	297	0.038	2098.267	0.430	7.213	-13.366	-6.172	200	319	0.459	2222.179	4.782	5.056	-10.395	0.380
179	298	0.022	2104.918	0.541	6.650	-13.222	-5.440								

ATOMIC BINDING ENERGY AND PARTICLE SEPARATION ENERGIES FOR Z = 120, .

N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)	N	A	EPSILON	BINDING (MEV)	PROTON (MEV)	NEUTRON (MEV)	ALPHA (MEV)	BETA- (MEV)
160	280	0.449	1950.402	-2.488	9.648	-15.438	-11.734	181	301	0.014	2119.193	1.001	6.510	-13.479	-5.750
161	281	0.137	1959.019	-2.470	8.617	-15.449	-10.552	182	302	0.005	2125.966	1.190	6.774	-13.469	-5.655
162	282	0.129	1968.497	-2.330	9.478	-15.377	-11.364	183	303	0.003	2132.155	1.364	6.188	-13.453	-4.506
163	283	0.127	1977.042	-2.157	8.545	-15.247	-10.281	184	304	0.	2138.704	1.519	6.549	-13.337	-4.652
164	284	0.118	1986.304	-1.998	9.262	-15.135	-11.005	185	305	0.436	2144.696	1.922	5.992	-13.196	-3.933
165	285	0.113	1994.630	-1.844	8.326	-14.998	-9.848	186	306	0.446	2150.978	1.916	6.282	-13.134	-4.072
166	286	0.097	2003.684	-1.712	9.054	-14.858	-10.457	187	307	0.461	2156.771	2.276	5.793	-12.756	-3.298
167	287	0.089	2011.869	-1.519	8.185	-14.662	-9.389	188	308	0.477	2163.037	2.480	6.266	-12.632	-3.548
168	288	0.040	2020.835	-1.344	8.966	-14.441	-10.073	189	309	0.482	2168.817	2.995	5.780	-12.099	-2.872
169	289	0.026	2029.084	-1.093	8.249	-14.012	-9.329	190	310	0.477	2174.824	3.105	6.007	-11.995	-2.935
170	290	0.	2037.743	-0.868	8.659	-14.018	-9.786	191	311	0.479	2180.301	3.318	5.477	-11.610	-2.248
171	291	0.029	2045.553	-0.742	7.810	-14.082	-8.766	192	312	0.476	2186.034	3.479	5.734	-11.610	-2.343
172	292	0.044	2053.780	-0.614	8.227	-14.151	-9.005	193	313	0.476	2191.247	3.639	5.213	-11.325	-1.666
173	293	0.053	2061.429	-0.457	7.649	-13.979	-8.256	194	314	0.474	2196.820	3.799	5.572	-11.326	-1.867
174	294	0.051	2069.346	-0.281	7.917	-13.961	-8.362	195	315	0.474	2201.833	3.957	5.013	-11.076	-1.152
175	295	0.051	2076.678	-0.107	7.332	-13.934	-7.601	196	316	0.471	2207.193	4.127	5.360	-11.121	-1.341
176	296	0.044	2084.286	0.079	7.608	-13.898	-7.706	197	317	0.470	2211.866	4.275	4.673	-10.999	-0.502
177	297	0.040	2091.312	0.259	7.026	-13.858	-6.945	198	318	0.463	2217.189	4.446	5.323	-10.839	-0.995
178	298	0.020	2098.695	0.428	7.382	-13.738	-7.127	199	319	0.458	2221.776	4.654	4.588	-10.219	-0.118
179	299	0.009	2105.584	0.666	6.889	-13.531	-6.464	200	320	0.452	2226.995	4.816	5.219	-10.066	-0.644
180	300	0.013	2112.683	0.831	7.099	-13.450	-6.511								