UCRL 8690

MASTER

UNIVERSITY OF
CALIFORNIA

Ernest O. Lawrence

*Radiation
Laboratory*

ION-SOURCE POSITIONER

BERKELEY, CALIFORNIA

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

UCRL-8690
Particle Accelerators and
High-Voltage Machines
TID 04500 (15th Ed.)

UNIVERSITY OF CALIFORNIA
Lawrence Radiation Laboratory
Berkeley, California
Contract No. W-7405-eng-48

ION-SOURCE POSITIONER

Roy F. Burton, W. Barclay Jones, and Charles A. Corum

April 1959

Printed in USA. Price 50 cents. Available from the
Office of Technical Services
U. S. Department of Commerce
Washington 25, D.C.

ION-SOURCE POSITIONER^{*}

Roy F. Burton, W. Barclay Jones, and Charles A. Corum

Lawrence Radiation Laboratory
University of California
Berkeley, California

April 1959

With this device (Fig. 1), we can adjust the position of the ion source inside the vacuum chamber of the 60-inch cyclotron in order to obtain maximum beam current.

For in-out movement, a worm-driven screw slides the ion source shaft through a supporting seal plate. The vacuum seal is made by an "O" ring.

For left-right and up-down movement a horizontal slide plate in a vertical slide frame is used. These are also moved by means of worm-driven screws. The vacuum seal for this double slide arrangement is made by the slide plate moving across the surface of an "O" ring. The plate has bearing pads to maintain the required pressure to compress the "O" ring.

"O" rings were used for moving seals because of their practicality, availability, and minimum space requirements. They have proven quite satisfactory for maintaining the 2×10^{-5} mm Hg vacuum our cyclotron requires.

The movements of the ion source obtained with this mechanism are 1.250 inch of total travel in-out and left-right; and 0.750 inch up-down.

* Work done in part under the auspices of the U. S. Atomic Energy Commission.

Worm-gear reduction results in 0.0083 inch of travel per turn of worm in-out, and 0.0167 inch of travel up-down and left-right.

Remote positioning is accomplished by small electric motors in a "magnetic field-free" area. These motors supply power through cable drives to the worm-driven screws. Linear potentiometers, mounted on the different adjustments, accurately measure the movement. They are electrically connected to meters in the control room that indicate the ion-source positions.

This positioner supports the ion source through its slide plate arrangement in a level position.[†] No tilt can occur. Its independent movements keep the ion-source arc chamber parallel to the magnetic field at all times.

ACKNOWLEDGMENTS

This positioner, designed by Charles A. Corum at the University of California, Berkeley, California, is similar in many respects to one in use at the 42-inch cyclotron at Los Alamos Scientific Laboratory, New Mexico. The authors wish to acknowledge the work of Edward Calhoon in assisting with this report.

[†] An earlier positioner was restricted in its design by a smaller opening in the vacuum chamber than now exists. This necessitated a gimbal arrangement where the ion-source shaft was pivoted about a point outside the vacuum chamber to obtain up-down and left-right movement. This permitted the arc chamber to be tilted as much as 7° off the magnetic field lines. The in-out position was adjusted by varying the location of a stop that determined the ion-source shaft length. All these adjustments at that time were done by hand.

LEGEND

Fig. 1. Ion-source positioner.

ION SOURCE POSITIONER

MUB-282.

Fig. 1

(1)

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

- A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or
- B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.