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**HEADQUARTERS
AIR FORCE SPECIAL WEAPONS CENTER
AIR FORCE SYSTEMS COMMAND
KIRTLAND AIR FORCE BASE, NEW MEXICO**

THEORETICAL STUDY OF OPTICAL PROPERTIES

Appendix B

**Monochromatic Absorption Coefficients
for
Nitrogen, Aluminum, and Silicon**

by

John C. Stewart Kedar D. Pyatt, Jr.

**General Atomic Division
General Dynamics Corporation
San Diego, California**

September 1961

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Final Report

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Research Directorate
AIR FORCE SPECIAL WEAPONS CENTER
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Approved:

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DONALD I. PRICKETT
Colonel USAF

Director, Research Directorate

Appendix B

MONOCHROMATIC ABSORPTION COEFFICIENTS

The following graphs show plots of the monochromatic absorption coefficient with and without lines. The upper graphs on each page are with lines, and the lower are without. The graphs are grouped by element according to increasing atomic number, for each element grouped according to increasing values of $kT = \theta$, and for each value of θ grouped according to increasing Γ . Each graph is labeled with the name of the element, the value of Γ (GAMMA), and the value of θ in electron volts (THETA).

In the range $u = 0.6$ to 15.0 , $\log_{10} [\bar{\mu}(u)/\mu_0]$ is plotted versus u . The quantity $\bar{\mu}(u)$ is the inverse of the average of $1/\mu(u)$ over a range of 0.1 in u . The quantity μ_0 (MUZRO), the minimum of $\bar{\mu}(u)$ in the range $u = 0.6$ to 15.0 , is printed on each graph in units of inverse centimeters.

In the range $u = 15$ to $1,000$, $\log_{10} [\mu(u)/\mu_1]$ is plotted versus $\log_{10} u$. The lines are not shown on these graphs. However, on the upper set of graphs the edges are placed at the position in u where the lines are fully merged. The quantity μ_1 (MUONE), the minimum of $\mu(u)$ in the range $u = 15$ to 150 , is printed on each graph in units of inverse centimeters. On these upper-range graphs, nothing is plotted between $u = 15$ and the position of the first edge after $u = 15$; after the position of the last edge; and between any point with $\mu(u) > 10^3 \mu_1$ and the next edge after that point with $\mu(u) < 10^3 \mu_1$ just after the edge.

These graphs were plotted on 35-mm film by the SC-4020 using tapes prepared by the code DIAPHANOUS on the IBM-7090. The numbers are printed in floating-point format; e. g., $0. \text{xxxxx} \pm \text{yy}$ is read as $0. \text{xxxxx} \times 10^{\pm \text{yy}}$. The logarithmic scale is the same as that of Keuffel and Esser semilogarithmic graph paper No. 358-39.

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Mechanical malfunctions prevented the following silicon graphs from appearing:

$\theta = 7.00$, first three Γ -values;

$\theta = 10.00$, second and third Γ -values.

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