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Electron Interaction in Matter

This report presents the results of three investigations in the area of electron interactions with matter. Specifically, the investigations treat: 1) the scattering of 1-MeV electrons in aluminum for the case of non-normal incidence; 2) electron-bremsstrahlung cross-section; and 3) production of bremsstrahlung in thick targets.

In the first experiment, 1-MeV electrons were directed at a 0.22 g/cm² aluminum target, with the incident angle inclined 60° to the target normal. Spectral data on the scattered electrons were collected at 212 points in the space on one side of the plane of incidence. The angular distribution of scattered electrons and the energy distribution of these electrons at various points are presented both in tabular form and graphically.

The second experiment explores the effect of electron-bremsstrahlung cross-section in the energy range between 1.0 and 2.72 MeV. (Previous experiments have indicated that this is a transition region, within which the cross-sections vary from well above to well below theoretical values.) Thin targets of aluminum, copper, tin, and gold were used, and the results are presented graphically, together with theoretical predictions and previous results, presented for comparison.

In the final experiment, a study of the production of bremsstrahlung by electron interaction in thick targets

was continued. At emission angles from 0 to 150 degrees, intensity measurements were made of the bremsstrahlung from targets of beryllium, aluminum, iron, tin, and gold, for incident electron energies between 0.2 and 2.0 MeV. In every case, the targets were of sufficient thickness to stop the electrons. Once again, the results are presented graphically.

Notes:

1. The results of these investigations may be of interest to physicists and radiologists.
2. The following documentation may be obtained from:

Clearinghouse for Federal Scientific
and Technical Information
Springfield, Virginia 22151
Single document price \$3.00
(or microfiche \$0.65)

Reference: NASA CR-1194 (N68-37708), Investigation of Electron Interaction in Matter

Patent status:

No patent action is contemplated by NASA.

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