ELASTIC SCATTERING OF DEUTERONS BY STRONTIUM AND TIN ISOTOPES

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THE elastic scattering of 13.6-MeV deuterons by the isotopes $Sr^{84,86,87,88}$ and $Sn^{116,118,120,122,124}$ was investigated. Measurements in the angle range 10—150° were made with a selective scintillation spectrometer[1]. The strontium targets were polystyrene films impregnated with $SrCO_3$. In the angle region $\theta > 30°$, the peaks corresponding to elastic scattering by the strontium could be separated reliably from the peaks corresponding to the elastic scattering by carbon and oxygen. The tin-isotope targets were free-standing foils 3—4 mg/cm^2 thick with 90% enrichment.

The figure (curves a) shows the angular distributions for the lightest and heaviest isotopes Sr^{84} and Sr^{88}. The ordinates are the products of the relative differential cross sections and $\sin^4(\theta/2)$. It is seen from the figure that in the region of angles larger than 25° the angular distributions have a clear cut diffraction structure, which changes little on going from isotope to isotope.

The angular distributions for the tin isotopes were investigated using a rotating target and the quantity $R = \sigma_{exp}(\theta)/\sigma_{Ruther}(\theta)$, shown in the figure (curves b) for the lightest and heaviest isotopes Sn^{116} and Sn^{122}, was determined by a comparison method[2]. Our own data are in good agreement with those of Cindro and Wall[3] for natural tin at 13.5 MeV[3].

All the tin isotopes display a clear-cut diffraction structure. As in the base of the strontium isotopes, no noticeable difference is observed in the cross sections for the different isotopes. From the comparison of the elastic scattering of deuterons by tin at 15, 13.6 and 11.8 MeV we can conclude that the diffraction structure becomes more pronounced with increasing energy, and shifts towards the smaller angles.

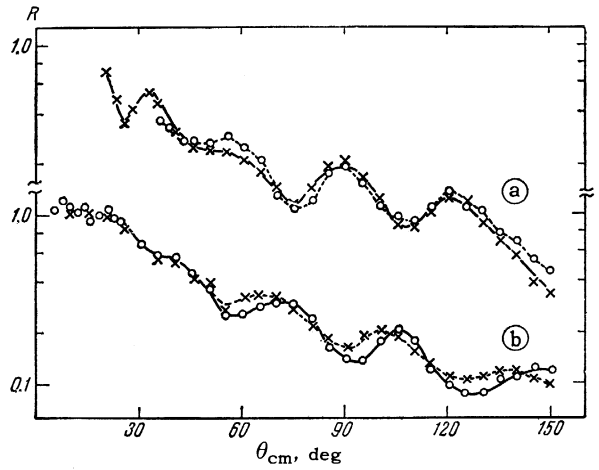

FIG. 1

[1)] Joliot-Curie Laboratory, Orsay, France.

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[3] N. Cindro and N. S. Wall, Phys. Rev. 119, 1340 (1960).

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275