fast fragments there is a preference for angles < 90°. By assuming independence of the production of the two fragments and by knowing the form of the angular distributions of single fragments, we can calculate the form of the angular correlation for all groups. Comparison with experiment (Fig. 2) shows that for groups II and III the assumed independence of the formation of each of the fragments is correct. For group I, this assumption is not sufficient. Our analysis has shown that to explain the angular correlation in this group it is necessary to assume that the fragment pair is produced simultaneously in one disintegration.

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INELASTIC SCATTERING OF DEUTERONS BY SEVERAL EVEN TIN ISOTOPES

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MEASUREMENTS were made, at a deuteron energy of 13.6 MeV, of the differential cross-sections of inelastic scattering on the isotopes $Sn^{116,118,120,122,124}$ with excitation of the first 2^+ levels ($Q \approx -1$ MeV) and also of the states which form a gross-structure peak at $Q \approx -2.5$ MeV. The deuterons were recorded by a selective scintillation spectrometer[1].

The method used to determine the absolute cross-sections was similar to that described previously[2]. The angular distributions for the excitation of the quadrupole 2^+ levels are shown in Fig. 1, where the curve is drawn through the points corresponding to Sn^{120}. The position of the extremal points of all the angular distributions is described by the Huby-Newns theory[3] for $L = 2$ and $R_0 = 8.2 - 8.5$ F. The angular distributions of the deuterons which form a gross-structure peak for $Q \approx -2.5$ MeV do not, on the whole, possess a clear enough structure, because several levels contribute to the peak. As the example of Sn^{120} clearly illustrates (Fig. 2), several of these levels give angular distributions which fluctuate partly in phase with the curve for the 2^+ level, and partly in anti-phase to it. The latter phenomenon indicates the presence of levels with negative parity in the gross-structure peak. At the same time, the position of the $Q \approx -2.5$ MeV peak coincides with that of the 3^- level in the region of $A \sim 120$, and so it is natural to assume that it is these levels which make the greatest contribution to the gross-structure peak, since in inelastic scattering the collective states are excited the most intensely.

In a previous investigation carried out by us on the excitations of the collective and single-particle states of the isotopes $Sn^{118,120}$ in (d, p) reactions [4,5], it was shown that in this reaction the single-particle states are excited more intensely than the

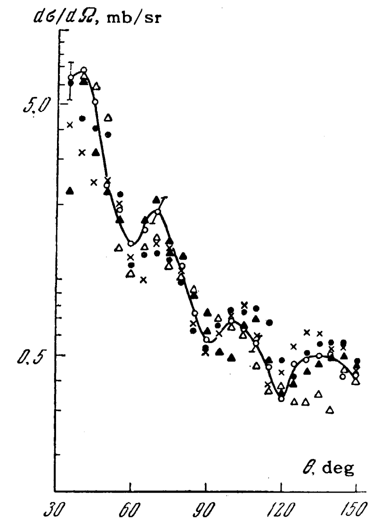

FIG. 1. Angular distributions of deuterons inelastically scattered by tin isotopes: ● = Sn^{116}; × – Sn^{118}; ○ = Sn^{120}; △ = Sn^{122}; ▲ = Sn^{124}. Abscissa: laboratory angle of scattering. Ordinate: differential cross-section in mb/sr.

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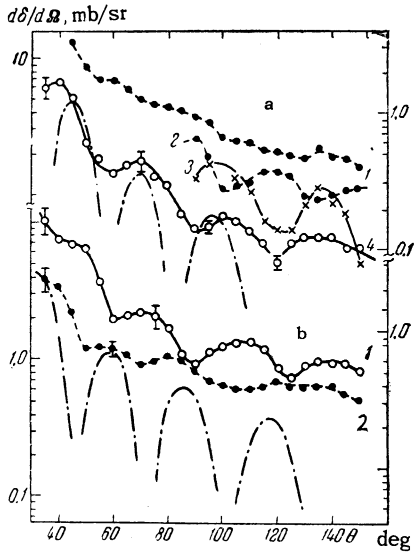

FIG. 2. Angular distributions of 13.6 MeV deuterons inelastically scattered on tin isotopes. (a): scattering on Sn^{120}. Curve 4 – 1.2 MeV level, curve 1 – anomalous Q = –2.4 MeV peak, curve 3 – Q = –2.7 MeV peak, dot-and-dash curve – Huby-Newns theory for L = 2 and R_0 = 8.4 F; (b): scattering on Sn^{116}. Curve 1 – 1.2 MeV level, curve 2 – "anomalous" Q = –2.3 MeV peak, dot-and-dash curve – Huby-Newns theory for L = 3 and R_0 = 8.12 F. Abscissa: laboratory angle of deuteron scattering. Ordinates: differential cross-section in mb/sr. The left-hand ordinate corresponds to curves a4 and b2, and the right-hand to curves a1, a2, b1 and a3.

collective states by one order of magnitude. Comparison of the inelastic scattering spectra of deuterons with the spectra of protons from (d, p) reactions shows that the excitation probability of single-particle states is very low in inelastic scattering. At the same time, in this case the quadrupole 2^+ levels are excited by one order more intensely than in (d, p) stripping. Indeed, the ratios of the integral cross-sections (in the range θ = 40 – 150° for inelastic scattering and θ = 5 – 90° for stripping) $\sigma(d,d')\,(0^+ \to 2^+)/\sigma(d,p)\,(1/2^+ \to 2^+)$ were found to be 6 and 9 (allowing for the spin factors) for Sn^{118} and Sn^{120} respectively. If allowance is made for the fact that the principal maximum of the angular distribution of inelastically scattered deuterons lies at θ < 40°, the real ratio will be far greater.

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