

DIFFERENTIAL CROSS-SECTIONS OF A DOUBLE SPIN-FLIP IN $d+d$ REACTIONS AND SUPERMULTIPLY POTENTIAL MODEL OF THE INTERACTION OF CLUSTERS

V. M. Lebedev, V. G. Neudatchin, B. G. Struzhko

The experimental two-dimensional proton-proton coincidence spectra of the four-particle reaction $d + d \rightarrow p + p + n + n$ are simulated with regard to dominant quasi-binary processes, viz. a quasi-free scattering of protons and final-state interaction of nucleons. Differential cross-sections $d\sigma(\vartheta, E)/d\Omega$ of a deuteron charge exchange ${}^2H(d, {}^2n){}^2p$ reaction ($0,57 \pm 0,03$ mb/sr at $\theta_{\text{cm}} = 62,5^\circ$, $1,01 \pm 0,05$ mb /sr at $\theta_{\text{cm}} = 79,6^\circ$, $E_{\text{cm}} = 11,6$ MeV) and spin-isospin flip ${}^2H(d, d^*)d^*$ one ($1,1 \pm 0,3$ mb /sr at $\theta_{\text{cm}} = 90^\circ$, $E_{\text{cm}} = 23,4$ MeV) are defined. They are compared to the cross-sections calculated in the approach of generalized (supermultiplet) potential model where the problem of the interaction of clusters A and B can be reduced to a transformations set of one-channel scattering problems with potentials $V^{[f]}$, where $[f]$ are the allowed Young schemes for the system A + B. This is important for channels with minimum total spin S, in which the nonunitary elastic scattering amplitude T_{LS} is the half-sum of two different amplitudes $T_{\text{L}}^{[f]}$, which are invariant to $SU(4)$. Inelastic amplitudes of the deuteron spin-isospin flip or charge exchange reactions are the half-difference of $T_{\text{L}}^{[f]}$ ones. The theoretical cross-sections of inelastic processes are obtained equal 0.48, 1.61 and 0.61 mb /sr respectively.