MODEL DEPENDENCE OF DIFFERENTIAL CROSS SECTIONS OF THE FOUR-BODY $d + d$ REACTION

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Experimental two-dimensional proton-proton double coincidence spectrum of the four-particle $d + d \rightarrow p + p + n + n$ reaction which was obtained previously in the proton - proton (*pp*) quasifree scattering (QFS) kinematic conditions was simulated with a least-square method. Dominant quasi-binary processes, viz. a *pp* QFS and a neutron - proton (*np*) final-state interaction (FSI) have been taking into account. QFS cross sections were calculated in plane waves impulse approximation (PWIA) using alternate models: Simple Impulse Approximation (SIA) and a Modified Impulse Approximation (MIA). The characteristic of the latter is cutting of a deuteron wave function at small distances. The distributions of FSI neutron - proton pairs in $^1S_0$ and $^3S_1$ states were calculated using the Watson - Migdal model. Thus, it was possible to calculate cross sections of each process separately and to estimate a model dependence of obtained values. Usage MIA instead of SIA in fitting of the experimental spectrum results in lower values of cross sections for QFS of protons and little higher for a double spin flip, while a key conclusion about the dominant contribution of the latter remains valid. In particular, an integrated cross section of the $^2H(d,\ d^*)d^*$ double spin flip reaction was obtained which is 1,2 ± 0,3 mb/sr at $\theta\ \square_{cm} = 90^o$ in the case of SIA and 1,4 ± 0,4 mb/sr in the case of MIA, while the unique so far theoretical value calculated within the framework of the Super-Multiplet Potential Theory of clusters is 0,61 mb/sr.