TRENDS IN MECHANISMS OF ^{9}Be(d,^{4}He)^{7}Li TRANSFER REACTION

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Theoretical analysis of ^{9}Be(d,^{4}He)^{7}Li transfer reaction at energies 7, 19.5, 25 and 35 MeV has been performed. The present work purpose is to enhance the theoretical description of the transfer reaction angular distribution, since a purely one step transfer mechanism is incapable to describe satisfactorily the experimental data. Drawing on the weakly bound neutron in ^{9}Be, it is proposed a treatment by including a two-step transfer process (d,t) → (t,^{4}He). A sequential endothermic transfer (d,^{3}He) → (^{3}He,^{4}He) and heavy ion transfer are also quite possible (see Fig. 1).

Experimental data have been analyzed by means of coupled reaction channels (CRC) calculations [1]. The channel coupling scheme adopted, including intermediate excited states, is shown in Fig. 1. A potential introduced in [2] has been used as optical potential of entrance channel, because it reflects real sizes of interaction and has been calculated within the double folding model. For other optical potentials the global parameterizations with slight reasonable modifications in the Woods-Saxon's potential form have been used. Overlap functions for one particle states have been calculated in the framework of realistic shell model [3].

Data used for CRC calculations and theoretical analysis of angular distributions for ^{9}Be(d,^{4}He)^{7}Li reaction at different energies are presented. It is established that generally sequential transfer of the deuteron is dominated.

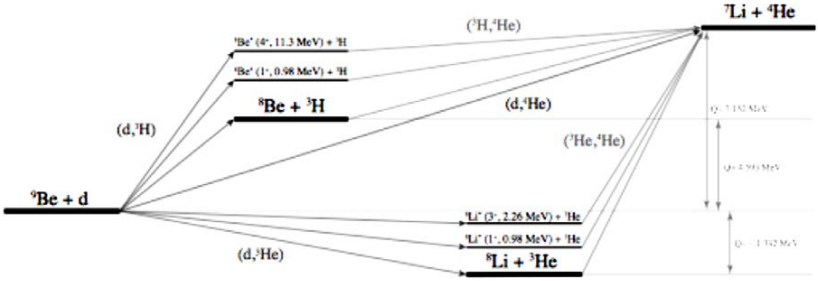

Fig. 1. Scheme of transfer mechanisms for channel coupling.

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