



Microscopic study of deuteron–nucleus total reaction cross section at medium energies

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Abstract

Total reaction cross sections for 38, 67 and 97 MeV deuteron for several nuclei have been analyzed within the theoretical framework of the Glauber model. The Glauber elastic S -matrix element to the deuteron–nucleus system is evaluated in the rigid projectile model which takes as the input N – d elastic scattering amplitude evaluated in terms of the nucleon–nucleon amplitude and ground state density of the deuteron. The analysis takes into consideration the Coulomb modification of the projectile trajectory, downward energy shift of the projectile nucleon due to the Coulomb field and the modification on nucleon–nucleon total cross section. The contribution to the total reaction cross section from the photo-disintegration of the deuteron is also considered. Using the semi-phenomenological proton and neutron densities for the target, we find that in general, the theoretical predictions are in fairly good agreement with the experimental data.

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