Elastic Scattering of ^{8}B Proton-Halo Projectile on Nuclear Targets at Energies $20 < E < 170$ MeV

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A microscopic analysis of the optical potentials (OPs) and cross sections of elastic scattering of ^{8}B on ^{12}C [1], ^{58}Ni [2], and ^{208}Pb [3] targets at energies $20 < E < 170$ MeV is carried out. The real part of the OP is calculated by a folding procedure and the imaginary part is obtained on the base of the the high-energy approximation (HEA) [4]. The density distributions of ^{8}B obtained within the variational Monte Carlo (VMC) model [5] and the three-cluster model (3CM) [6] are used to construct the potentials. In this hybrid model developed and used in our previous works [7, 8] the only free parameters are the depths of the real and imaginary parts of OP obtained by fitting the experimental data. The use of HEA to estimate the imaginary OP at energies just above the Coulomb barrier is discussed. The analysis of the behavior of 3CM and VMC densities and the corresponding OPs in comparison with the fitted Woods-Saxon OP from Ref. [2] gives additional information on the decisive role of the nuclear surface on the elastic scattering mechanism in the particular example of ^{8}B+^{58}Ni cross sections measured in a wide range of angles and at energies of 20.7, 23.4, 25.3, 27.2, and 29.3 MeV.

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