Microscopic Analysis of ^{10,11}Be Elastic Scattering on Protons and Nuclei

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A microscopic approach to calculate the optical potential (OP) with the real part obtained by a folding procedure and with the imaginary part inherent in the high-energy approximation [1] is applied to study the ^{10,11}Be+p and ^{10,11}Be+^{12}C elastic scattering at energies of tens of MeV/nucleon, in addition to our previous studies of ^{6}He+p [2], ^{8}He+p [3], ^{6}He+^{12}C [4], and ^{11}Li+p [5] scattering. The OP's and the cross sections are calculated using the Generator Coordinate Method (GCM) for the neutron and proton densities of ^{10,11}Be [6] and the Quantum Monte Carlo (QMC) method for the latter of ^{10}Be [7]. The depths of both components of the OP are determined from the comparison of the calculations with the available experimental data on the elastic scattering differential cross sections and taking into account the known behavior of the volume integrals as functions of the incident energy [8]. The present approach, in which the only parameters are the depths of OP's, can be applied to calculations of more complex processes, such as diffraction breakup and stripping reactions.

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