Elastic Scattering and Optical Potentials of Halo Nuclei[*]

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Abstract

We discuss a semiclassical microscopic model to calculate the long range surface part, due to the coupling to breakup, of the ion-ion optical potential for a halo projectile. Assuming an exponential tail for the imaginary surface potential, we show that the most important parameter is the diffusness α of the potential which is directly related to the decay length γ_i of the initial wave function by $\alpha \approx (2\gamma_i)^{-1}$. The relation to folding model potentials and phenomenological potentials is clarified. Furthermore we show how experimental elastic scattering angular distributions could be used to obtain information on the structure of halo nuclei and on their reaction properties.