

Abdo, K.M.^a, Abdulmomen, M.A.^b, Fox, J.D.^c

Energy dependence of the elastic scattering $^{40}\text{Ca}(^3\text{He}, ^3\text{He})$ in the energy range 10.0 to 18.0 MeV

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^a Department of Physics, Faculty of Science, University of Cairo, Giza, Egypt

^b Department of Physics, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia

^c Department of Physics, The Florida State University, Tallahassee, FL 32306, United States

Abstract

Differential cross sections for the elastic scattering of 18, 16, 14, 12 and 10 MeV ^3He particles by ^{40}Ca were measured and analyzed in terms of the optical model with volume imaginary and real spin-orbit potentials. Angular distributions have been measured in 5° steps between 25° and 175° . Four sets of optical model parameters were established and in two of these, sets A and B, systematic variations with energy of the real, volume imaginary and spin-orbit potentials were obtained. The geometrical parameters were not varied as a function of energy. The effect of the matching radius R_M on the optical model calculations, was investigated. It was found that the matching radius should be calculated using the geometrical parameters of the potential that yields the largest value for R_M according to the recipe $R_M = R + 7a$ where R is the nuclear radius and a is the diffuseness. © 1986.

Author Keywords

Nuclear Reaction