

Abstract Submitted
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Relativistic Effect and α -⁴⁰Ca and α -⁴⁸Ca Scattering JEREMY S. SCOTT, 1Physics Department, Southern Illinois University, R. TRIPATHI, NASA Langley Research Center, F. BARY MALIK, 1Physics Department, Southern Illinois University — Past optical model calculations of elastic differential scattering cross sections of α - particles incident upon ⁴⁰Ca and ⁴⁸Ca have been examined to illustrate the need for relativistic calculations at 1.37 GeV. Khoa et al. and Nakano et al¹. have constructed potentials that match the experimental data very well in the forward angles using Woods-Saxon and Mexican hat types of potentials using the non-relativistic Schroedinger equation. However, when the potentials are used in the relativistic Schroedinger equation (RSE) to produce scattering cross sections, the fits are no longer that good. At 1.37 GeV, the α -particle momentum calculated relativistically differs significantly from the one determined from the non-relativistic energy-momentum relation. The new α -⁴⁰Ca and α -⁴⁸Ca potentials determined using RSE, differ from those of Khoa et al¹. and Nakano². et al. ¹D.T. Khoa, M. Nakano et al., Phys. Rev. C. 65, 024611, 2002 ² M. Nakano et al., Phys. Rev. C. 40, 1323, 1989.

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