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Construction of lambda-nucleon s-wave potential through quantum inverse scattering at fixed angular momentum

Quantum systems with a strangeness degree of freedom are very important as they provide an extra dimension, and hence a deeper insight into nuclear matter. Usually phenomenological potentials obtained through meson exchange theories are used in investigating these hypernuclear systems. In this paper potentials for lambda-nucleon interactions in the spin singlet and spin triplet states, constructed through fixed-angular momentum inversion based on Marchenko theory, are presented. Owing to experimental difficulties in obtaining a sufficient number of lambda-nucleon scattering events, theoretical phase shifts are used as input for the inversion. The constructed potential is energy-independent, making it more suitable for quantum-mechanical few-body calculations.

Primary author: Mr MEOTO, Emile (Department of Physics, University of South Africa)

Co-author: Prof. LEKALA, Mantile (UNISA)

Presenter: Mr MEOTO, Emile (Department of Physics, University of South Africa)