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Applying Renormalization Group Techniques to Nuclear Reactions ZACHARY ELDREDGE, University of Oklahoma and Michigan State University, SCOTT BOGNER, FILOMENA NUNES, Michigan State University/National Superconducting Cyclotron Lab — Nuclear reactions are commonly used to explore the physics of unstable nuclei. Therefore, it is important that accurate, computationally favorable methods exist to describe them. Reaction models often make use of effective nucleon-nucleus potentials (optical potentials) which fit low-energy scattering data and include an imaginary component to account for the removal of flux from the elastic channel. When describing reactions in momentum space, the coupling between low- and high-momentum states can pose a technical challenge. We would like potentials which allow us to compute low-momentum interactions without including highly virtual momentum states. A solution to this problem is to apply renormalization group (RG) techniques to produce a new effective potential in which high and low momentum degrees of freedom are decoupled, so that we need only consider momenta below some cutoff. This poster will present results relating to an implementation of RG techniques on optical potentials, including complex potentials and spin-orbit effects. We show that our evolved optical potentials reproduce bound states and scattering phase shifts without the inclusion of any momenta above a selected cutoff, and compare new potentials to old ones to examine the effect of transformation.

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