Abstract Submitted
for the DNP16 Meeting of
The American Physical Society

Separable Multichannel Momentum Space Potentials for Nuclear Reactions[1] LINDA HLOPHE, National Superconducting Cyclotron Laboratory and Department of Physics and Astronomy, Michigan State University, East Lansing, MI 48824, USA, CHARLOTTE ELSTER, Institute of Nuclear and Particle Physics, and Department of Physics and Astronomy, Ohio University, Athens, OH, 45710, USA — Many nuclei are deformed and their properties can be described using a rotational model. This involves defining a deformed surface of the nucleus and constructing the nucleon-nucleus interaction as a function of distance to the surface. Such a potential has non-zero matrix elements between different nuclear rotational states which are characterized by the spin-parity I^π, leading to channel couplings. For specific reaction calculations, it is advantageous to have separable representations of the interaction matrix elements available. We develop separable representations following a scheme suggested by Ernst, Shakin, and Thaler (EST). Since optical potentials are complex and energy-dependent, the multichannel EST scheme is generalized to complex, energy-dependent separable potentials. In the case of proton-nucleus interactions the EST scheme is further extended to include charged particles. The multichannel EST scheme is applied to nucleon scattering off ^{12}C, where the first two excited states ($I^\pi = 2^+, 4^+$) are taken into account.

[1]Research for this project was supported in part by the US Department of Energy, Office of Science of Nuclear Physics under contract No. DE-FG02-93ER40756.

National Superconducting Cyclotron Laboratory and Department of Physics and Astronomy, Michigan State U

Date submitted: 29 Jun 2016 Electronic form version 1.4