Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Ab initio Effective Potentials for Nucleon-Nucleus Elastic Scattering on Light Nuclei[1] MATTHEW BURROWS, ROBERT BAKER, CHARLOTTE ELSTER, Ohio University, STEPHEN WEPPNER, Eckerd College, KRISTINA LAUNEY, Louisiana State University, PIETER MARIS, Iowa State University, GABRIELA POPA, Ohio University — Effective interactions ('optical potentials') are needed as input to nuclear reaction calculations. In a multiple scattering expansion for nucleon-nucleus elastic scattering the leading order term requires integrating over nonlocal, translationally invariant one-body densities and off-shell nucleon-nucleon (NN) scattering amplitudes. For consistency the spin of the struck nucleon must be taken into account on the same footing as the spin of the projectile nucleon. In this talk, the first complete nucleon-nucleus *ab initio* leading order effective interactions will be used to calculate elastic scattering observables for light nuclei. These potentials are based on NCSM spin-dependent one-body densities together with NN amplitudes derived from the same NN interaction. We will focus on elastic scattering off the Helium isotope chain ^{4}He, ^{6}He, and ^{8}He in the energy regime between 71 and 200 MeV laboratory kinetic energy.

[1]Supported in part by US DoE DE-FG02-93ER40756, DE-SC0018223, as well as US NSF OIA-1738287 and PHY-1913728. Computational resources provided by NERSC (US DoE Contract No. DE-AC02-05CH11231), LSU HPC (www.hpc.lsu.edu), and Blue Waters (supported by US NSF OCI-0725070, ACI-1238993, and the state of Illinois).

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Date submitted: 26 Jun 2020 Electronic form version 1.4