Abstract Submitted
for the DNP19 Meeting of
The American Physical Society

Quantum Monte Carlo calculation of scattering in A=4 and A=5 systems[1] KENNETH NOLLETT, ABRAHAM FLORES, San Diego State University — Variational Monte Carlo and Green's function Monte Carlo methods have been applied very successfully to compute energies and other properties of states in light nuclei from quantitatively accurate nucleon-nucleon interactions. However, these calculations have nearly all involved either bound states or else unbound resonance states narrow enough to be approximated as confined systems. The most straightforward application of these methods to nonresonant scattering and reactions is to impose boundary conditions at a spherical surface with fixed separation of the scattering nuclei, and to compute the discrete states inside the confining boundary just like ordinary bound states; the boundary conditions then allow exact continuation of the wave functions into the exterior region, yielding elements of the S-matrix. We will describe the application of these methods to neutron scattering from ^{4}He and ^{3}H nuclei. Spin and orbital angular momentum quantum numbers can change in the latter process, so we are using it as an initial test case to develop coupled-channel calculations. Since the $A = 4$ systems are already accurately computed with Faddeev and hyperspherical methods, it will also allow a useful benchmark of our methods before we move on to systems of more nucleons.

[1]This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics, under Award Number DE-SC0019257.

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Date submitted: 29 Jun 2019 Electronic form version 1.4