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Progress in Quantum Monte Carlo Calculations of Light Nuclei with Non-Local Potentials[1] JOEL LYNN, KEVIN SCHMIDT, Arizona State University, JOE CARLSON, STEFANO GANDOLFI, Los Alamos National Laboratory — Monte Carlo methods often used in nuclear physics, such as auxiliary field diffusion Monte Carlo and Green's function Monte Carlo, have typically relied on phenomenological local real-space potentials containing as few derivatives as possible, such as the Argonne-Urbana family of interactions, to make sampling simple and efficient. Basis set methods such as no-core shell model or coupled-cluster techniques typically use softer non-local potentials because of their more rapid convergence with basis set size. These non-local potentials are typically defined in momentum space and are often based on effective field theory. Comparisons of the results of the two types of methods are complicated by the use of different potentials. I will discuss progress we have made in using such non-local potentials in quantum Monte Carlo calculations of light nuclei. In particular, I will show methods for evaluating the real-space, imaginary-time propagators needed to perform quantum Monte Carlo calculations using such non-local potentials, how to formulate a good trial wave function for such potentials, and how to perform a "one-step" Green's function Monte Carlo calculation for such potentials.

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