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Electromagnetic and neutral-weak response functions of light nuclei

ALESSANDRO LOVATO, Argonne National Laboratory

A major goal of nuclear theory is to understand the strong interaction in nuclei as it manifests itself in terms of two- and many-body forces among the nuclear constituents, the protons and neutrons, and the interactions of these constituents with external electroweak probes via one- and many-body currents. Using imaginary-time projection technique, quantum Monte Carlo allows for solving the time-independent Schrödinger equation even for Hamiltonians including highly spin-isospin dependent two- and three- body forces. I will present a recent Greens function Monte Carlo calculation of the quasi-elastic electroweak response functions in light nuclei, needed to describe electron and neutrino scattering. We found that meson-exchange two-body currents generate excess transverse strength from threshold to the quasielastic to the dip region and beyond. These results challenge the conventional picture of quasi elastic inclusive scattering as being largely dominated by single-nucleon knockout processes. These findings are of particular interest for the interpretation of neutrino oscillation signals.