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# Modeling neutrino-nucleus interactions in the few-GeV region

A good understanding of neutrino-nucleus scattering mechanisms is essential to reduce the systematic errors in neutrino oscillation experiments. Recent interest of the Ghent group focus on providing a consistent description of this process in the intermediate energy region. We describe the low energy response with collective nuclear excitations and the quasielastic peak using a Hartree-Fock-CRPA (continuum random phase approximation) model that takes into account nuclear long-range correlations as well as hadronic final-state interactions. The two-body current mechanisms, which are especially important in the region between the quasielastic and the delta-resonance peak, are included through short-range correlations and meson-exchange currents, treated within the same mean-field based model. Our description of intermediate-energy neutrino-nucleus scattering is completed by modeling neutrino-induced pion production. For that, we consider the dominant contribution from the decay of the delta resonance as well as other terms required by chiral symmetry, working in a fully relativistic formalism with a refined treatment of nuclear effects.

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