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Effective Spectral Function for Quasielastic Scattering on Nuclei
ARIE BODEK, University of Rochester, M. ERIC CHRISTY, Hampton University, BRIAN COOPERSMITH, University of Rochester — Spectral functions that are used in neutrino event generators (such as GENIE, NEUT, NUANCE, NUWRO, and GiBUU) to model quasielastic (QE) scattering from nuclear targets include Fermi gas, Local Thomas Fermi gas (LTF), Bodek-Ritche Fermi gas with high momentum tail, and the Benhar Fantoni two dimensional spectral function. We find that the predictions of these spectral functions for the $\frac{d\sigma}{d\nu}$ distribution of QE events are in disagreement with the prediction of the ψ' superscaling function which is extracted from fits to quasielastic electron scattering data on nuclear targets. It is known that spectral functions do not fully describe quasielastic scattering because they only model the initial state. Final state interactions distort the shape of $\frac{d\sigma}{d\nu}$, reduce the cross section at the peak and increase the cross section at the tails of the distribution. We show that the kinematic distributions predicted by the ψ' superscaling formalism can be well described with a modified *effective spectral function* (EFS).

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