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Coherent Scattering of Neutrinos on Nuclei in Core Collapse Supernovae IAN SCOTT, EVAN O'CONNOR, North Carolina State University —
When calculating the coherent scattering cross section of neutrinos on nuclei for core collapse supernovae (CCSNe) simulations, it is commonplace to use a representative average nucleus rather than the full distribution of nuclei that is actually predicted for CCSN conditions. This may lead to errors when predicting the cross section of neutrinos on the matter. To determine the extent of this error, or to justify the use of the representative nucleus, we use a full distribution of nuclei and their respective cross sections to calculate how the scattering of neutrinos is effected by this approximation. In particular, we apply this to typical matter conditions during the collapse phase of a CCSN. In order to explore potential effects of variations of the neutrino-nucleus cross section on the CCSN itself, we also run core collapse simulations with varied cross sections and analyze the results.

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