

Abstract Submitted
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Neutrino Scattering and Flavor Transformation in Supernovae JOHN CHERRY, University of California, San Diego, JOSEPH CARLSON, ALEXANDER FRIEDLAND, Los Alamos National Laboratory, GEORGE FULLER, ALEXEY VLASENKO, University of California, San Diego — We show that the small fraction of neutrinos that undergo direction-changing scattering outside of the neutrinosphere could have significant influence on neutrino flavor transformation in core-collapse supernova environments. The flux of these scattered neutrinos is strongly dependent on the nuclear composition of the supernova envelope, and as a result the neutrino flavor evolution history may also be dependent on nuclear composition. We demonstrate that the standard treatment for collective neutrino flavor transformation is adequate at late times, but could be inadequate in early epochs of core-collapse supernovae, where the potentials that govern neutrino flavor evolution are affected by the scattered neutrinos. Taking account of this effect, and the way it couples to entropy and composition, will require a new approach in neutrino flavor transformation modeling.

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