

Self-induced flavor evolution of supernova neutrinos without axial symmetry

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Supernova neutrinos experience self-induced flavor conversions associated with the neutrino-neutrino interactions in the deepest stellar regions.

In this context, we perform the first numerical simulations of the self-induced neutrino evolution including the azimuthal angle of neutrino propagation as an explicit variable. Without enforcing the axial symmetry of the solution, we find that new surprising results can occur. In particular, a new flavor instability develops in normal mass hierarchy leading to large flavor conversions. Depending on the initial differences of the neutrino fluxes, these can lead to peculiar spectral splits or to flavor decoherence of the neutrino ensemble.

Primary author: Prof. MIRIZZI, Alessandro (Hamburg University)

Presenter: Prof. MIRIZZI, Alessandro (Hamburg University)

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