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The effect of neutrino quantum decoherence

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The origin of neutrino oscillations is the coherent superposition of different neutrino states. The loss of coherence of neutrino states due to neutrino interactions with an external environment leads to damping of oscillations. The neutrino quantum decoherence is studied in the formalism of open quantum systems using a density matrix. In the framework of this approach, it is possible to obtain the quantum optical equation for neutrinos with a dissipator that is responsible for decoherence. The exact form of the dissipator is determined by the neutrinos interaction with the external environment. The neutrino quantum decoherence is considered for an environment peculiar for supernovae bursts.

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