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Neutrino quantum decoherence in supernovae explosions

The effect of neutrino quantum decoherence has attracted a growing interest during the last 15 years. Most existing studies deal with searches of the neutrino quantum decoherence in terrestrial reactor and solar neutrino experiments. New large volume neutrino detectors will provide a new frontier in high-statistics measurements of neutrino fluxes from supernovae. It is thus important for calculations of the supernovae neutrino fluxes to include effects of neutrino quantum decoherence. We suggest a new approach to describe the neutrino quantum decoherence that accounts for the concrete mechanism that engenders the decoherence. As an example, we have considered the decoherence in the neutrino supernovae fluxes due to neutrino radiative decay. We present our new results on the decoherence in the supernovae neutrino fluxes accounting for the collective neutrino oscillations and study the possibility to detect the effect of neutrino quantum decoherence in supernovae neutrino fluxes in the future terrestrial experiments.

Mini-abstract

New results on neutrino mass state decoherence accounting for collective oscillations in SNe.

Experiment/Collaboration

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