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Collective neutrino oscillations accounting for neutrino quantum decoherence

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The effect of neutrino quantum decoherence has attracted a growing interest during the last 15 years. Most of already performed corresponding studies deal with searches of neutrino quantum decoherence in terrestrial reactor and solar neutrino experiments (see, for example, [1]). The forthcoming new large volume neutrino detectors (e.g. JUNO, DUNE and Hyper-Kamiokande), will provide a new frontier in high-statistics measurements of neutrino fluxes from supernovae that will give a new opportunity to study the effect of neutrino quantum decoherence also in supernovae fluxes. In [2-4] we suggested a new mechanism of neutrino quantum decoherence in the supernovae due to the neutrino interaction with external environment and showed that it becomes significant in the region where the collective neutrino oscillations occur. In this work we are presenting our new results on the numerical calculations of collective neutrino oscillations in supernovae accounting for the neutrino quantum decoherence and study the possibility to detect the effect of neutrino quantum decoherence in supernovae neutrino fluxes in the future terrestrial experiments.

[1] J.A.B.Coelho, W.A.Mann, S.S.Bashar, Phys.Rev.Lett. 118 (2017) 221801.
[2] K.Stankevich, A.Studenikin, PoS ICHEP2018 (2019) 925.
[3] K.Stankevich, A.Studenikin, arXiv:1912.13313.
[4] K.Stankevich, A.Studenikin "Neutrino quantum decoherence engendered by neutrino radiative decay", arXiv:submit/3035045 [hep-ph] 7 Feb 2020, accepted for publishing in Phys.Rev.D.

Secondary track (number)

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