

Neutrinos from dynamo-driven supernovae

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The dynamics of neutrinos in hot and dense magnetized matter, corresponding to dynamo-driven supernova explosion, is considered. It is shown that taking into account fluctuations in the interaction of neutrinos with matter leads to the Fokker-Planck equation for the dynamics of the distribution function in the phase space. The component of the kinetic equation additional to the transfer effect [1] is determined by straggling in neutrino collisions in a magnetized nucleon gas due to the Gamow-Teller neutral current interaction. The effect of fluctuations leads to an additional increase in the hardness of the neutrino spectra. The effects of neutrino oscillations in magnetic field and dense matter on detection by the KM3NeT and Baikal-GVD observatories are discussed. It is shown that the applications of the k-fold coincidence technique in data processing makes it possible to increase the upper limits of the distance for the observation threshold by a factor of $1.5\sqrt{k}$.

1. Kondratyev V. N. Magnetorotational Supernova Neutrino Emission Spectra and Prospects for Observations by Large-Size Underwater Telescopes // Phys. At. Nucl. –2023. –V. 86. –P. 1083-1089.

Section

Neutrino physics and nuclear astrophysics

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