Dynamo and oscillation effects in supernova neutrino spectra

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The neutrino dynamics in hot and dense magnetized matter corresponding to a supernova explosion is considered. It is shown that accounting for fluctuations during interaction of neutrinos with matter leads to the Fokker-Planck equation for the dynamics of the phase space distribution function. The additional to the energy transfer effect component of the kinetic equation is determined by straggling in neutrino collisions with a magnetized nucleon gas caused by the neutral current Gamow-Teller interaction. When accounting for the effect of fluctuations, the switching of acceleration and deceleration modes of neutrino dynamics remains for average energy. The effect of fluctuations leads to an additional increase in the hardness of the neutrino spectra. It is shown that the high-energy component of the electron antineutrino flux is enhanced in addition due to the effect of neutrino oscillations. Such an increase in the high-energy component of the spectrum is especially noticeable in the case of the inverted mass ordering and makes the signal more registrable by ground-based detectors. The possibilities of detecting supernova neutrinos by KM3NeT and Baikal-GVD observatories are discussed.