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Nuclear inelastic scattering effect in spectra of neutrinos at weak coupling regime

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Effect of inelastic nuclear scattering in magnetized hot and dense matter in neutrino spectra relevant for supernovae, neutron star mergers, proto-neutron stars is considered. At finite temperature neutrino exhibits exo- and endoenergetic scattering on nuclear species due to the neutral-current Gamow-Teller interaction component. The kinetic equation for neutrino transport at decoupling regime is derived from an analysis of energy transfer cross sections [1] due to additional noticeable mechanisms of energy exchange. The energy transfer coefficient is shown to change from positive to negative value at neutrino energy increasing four times the matter temperature. Such a property results in focusing neutrino energy.
[1] V. N. Kondratyev, et al. // Phys. Rev. C 2019. V. 100, 045802

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