

Spin-light of neutrino in astrophysical media

The Spin Light of Neutrino (SLnu) is a magnetic moment electromagnetic radiation of a massive neutrino moving under the influence of external conditions (matter or external fields) [1]. The effect, being proportional to the second power of the neutrino magnetic moment, is very faint for the moderate neutrino energies. However it has a strong energy dependence and in the light of the recent discovery of the ultra-high-energy neutrinos from the PeV band by the IceCube collaboration [2] the question of the SLnu effectiveness becomes meaningful. In this study we consider several astrophysical settings in which the effect is in principal possible: a neutron star, supernova, gamma-ray burst, and relic neutrino background. We defined conditions and corresponding settings which most of all favor the effect manifestation. These are provided by an ultra dense matter of neutron stars and neutrinos bound within galaxy clusters, and also by neutrinos generated by GRBs during the afterglow phase. Due to the specific polarization properties we propose the SLnu to be possibly connected with the observed polarization in GRB emission [3].

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