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Neutrino spin oscillations engendered by transversal matter current

We consider the effect of neutrino spin oscillations $\nu_e^L \Leftrightarrow \nu_e^R$ engendered by the neutrino weak interaction with the transversal matter current $\mathbf{j}_\perp$ that was predicted [1] within the quasiclassical treatment of the neutrino spin vector evolution based on the generalized Bargmann-Michel-Telegdi equation. Now
we develop [2] the consistent quantum treatment of this effect based on the direct calculations of the effective Hamiltonian of the neutrino evolution in the presence of the longitudinal $\mathbf{j}_\parallel$ and transversal $\mathbf{j}_\perp$ matter currents. Within the developed approach the neutrino mixing effects are properly accounted for. The obtained closed expressions for the neutrino spin oscillation probabilities are of interest for the astrophysical applications.

Session and Location

Wednesday Session, Poster Wall #139 (Hölderlin-Room)

Poster included in proceedings:

yes

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Track Classification: Poster (participating in poster prize competition)