Contribution ID: **60** Type: **Vídeo-Poster**

Vertex ν–e^-–ϕ^+ of neutrino autoenergy in external magnetic field using the Ritus method

Thursday 9 December 2021 15:55 (10 minutes)

The presence of a magnetic field in a specific direction compromises the isotropy, so that particles subject to this field are no longer described by plane waves. Therefore, the propagator assumes a non-diagonal form, which does not allow us to write it as a Fourier transform. In order to find the propagators of charged particles subject to external magnetic field, onde can use Ritus eigenfunction method to diagonalize differential operators and, consequently, Green's functions. The latter become similar to free propagators. From Weinberg-Salam model, spontaneous symmetry breaking and Ritus method applied to both electron and Higgs propagators subject to a constant magnetic field, the term ν–e^-–ϕ^+ of 1-loop neutrino self-energy in a magnetic field is calculated in the lowest Landau level for the electron. The external magnetic field gives rise to an anisotropy in the propagation of the neutrino, which also appears at the self-energy vertex. In turn, it passes to rely only on momentum parallel to the magnetic field applied. Also, it is important to note that there is a linear dependency of the autoenergy vertex with respect to the magnitude of magnetic field.

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Session Classification: Apresentações de vídeo-pôsteres