

Degeneracy Enhancement of Neutron-Antineutron Oscillation in Neutron Star

Saturday, 28 September 2024 10:00 (30 minutes)

We explore the fermion oscillation in a degenerate environment. The direct consequence is introducing a Pauli blocking factor $1-f_i$, where f_i is the phase space distribution function, for each intermediate mass eigenstate during propagation. It is then much easier for a state with larger existing fraction or density to oscillate into other states with less degeneracy while the reversed process is not enhanced. This can significantly modify the oscillation behaviors. We apply this degenerate fermion oscillation to a concrete scenario of neutron-antineutron oscillation in neutron star. It turns out antineutrons receive a standing fraction to annihilate with the environmental neutrons. The subsequent neutron star heating can put an extremely stringent bound on the baryon number violating cross mass term between neutron and antineutron.

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