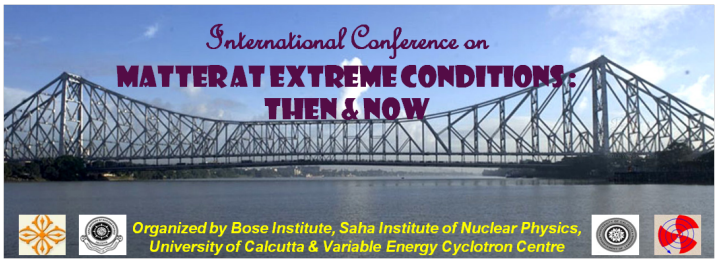

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Cooling of neutron star including magnetic interaction

In the core of the neutron star the density may go up to 5 ~ 6 times the normal nuclear matter density, where the matter is not expected to be in the hadronic phase, rather it is more appropriate to describe the core as degenerate quark matter. In this regime, the constituents like quarks are moving with a velocity close to the velocity of light, where the magnetic interaction can no longer be neglected. In fact, the transverse interactions, due to its infrared sensitivity, may become more important than its longitudinal counterpart in this kinematic regime. This characteristic behavior having non-trivial origin in the analytical structure of the Fermion self-energy close to the Fermi surface. The introduction of magnetic interaction changes some of the characteristic behavior of dense plasma which enters in thermodynamic response functions, show departure from normal Fermi liquid case. We investigate and see the effect of such non-Fermi liquid corrections in quantities like specific heat (Cv), neutrino emissivity (ε) and neutrino mean free path. Equipped with these results, we have studied the cooling behavior of neutron star with dense quark core.

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