Contribution ID: **51** Type: **Poster**

Neutrino-Nucleon Scattering in Proto-Neutron Stars

Thursday, 19 October 2017 16:40 (2 hours)

Recently, much attention has been paid to the equation of state (EOS) of dense nuclear matter to understand the neutron star (NS) thermal evolution. The exploration of NS cooling might clarify some diffcult issues of nuclear physics, such as the cooling mechanism due to the neutrino emission in supernovae and proto-neutron stars. In addition, the time scales over which proto-NS deleptonize and cool down are determined by the neutrino opacity. The main interest of the present investigation is in the neutral-current scattering reactions and charged current absorption, which are
both important sources of opacity, i.e. the neutrino mean free path (MFP) in the presence of dense nuclear-matter medium. Despite of the weak interaction, the effects of medium-polarization could be quite relevant. We study such effects on the neutrino MFP in the framework of the induced interaction theory. In the first step the
neutral-current neutrino MFP is considered in the region of crossover from the trapped to untrapped proto-NS phase. Since in this region the NS temperature T is expected to drop to less than Tc, the critical value for the onset of nuclear superfluidity, the nuclear polarization function must be extended to the superfluid case.

Primary author: Dr GUO, Wenmei (INFN-LNS)

Co-author: Prof. LOMBARDO, Umberto (INFN-LNS)

Presenter: GUO, Wenmei (LNS)

Session Classification: Poster session