Contribution ID: **90**   Type: **Plenary talk (30 min + 10 min questions)**

SUPERNOVA NEUTRINO SPECTRA & OBSERVATIONS BY LARGE VOLUME TELESCOPES

Saturday, 16 July 2022 11:10 (35 minutes)

The neutrino dynamics in hot and dense matter corresponding to supernova explosions is considered. The kinetic equation for a neutrino phase-space distribution function is obtained, taking into account inelastic scattering by nuclear particles. The transfer and diffusion components in an energy space are argued to dominate in the transport properties. It is shown that the energy transfer coefficient changes from positive to negative values when the neutrino energy exceeds four times the temperature. Effects in the neutrino dynamics and energy spectra are discussed.

Strongly variable transient supernova neutrino fluxes can be detected using Large-Volume Neutrino Telescopes: KM3NeT, Baikal-GVD, etc. Sensitivity to neutrinos on a scale of 10 MeV can be achieved by observing a collective increase in the rate r of counting coincidences using multiple detectors. For the multiple k coincidences the ratio signal/background is given by $(1+ r_{SN} / r_B)^k \tilde{} (1+ k\, r_{SN} / r_B)$ with supernova and background detection rates r_{SN} and r_B. Evidently, the k–fold coincidence enhances a sensitivity by a factor k. The strengthening of neutrino hard energies is also favorable for supernova neutrino observations by Large Volume Telescopes.

The speaker is a student or young scientist

No

Section

1. Neutrino physics and nuclear astrophysics

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