Abstract

High energy cosmic neutrino fluxes can be produced inside relativistic jets under the envelopes of collapsing stars. In the energy range $E \sim (0.3 - 10^5)$ GeV, flavor conversion of these neutrinos is modified by various matter effects inside the star and the Earth. I will review the recent paper by S. Razzaque and A. Yu. Smirnov (arXiv:0912.4028) which gives a comprehensive (both analytic and numerical) description of the flavor conversion of these neutrinos including: (i) oscillations inside jets, (ii) flavor-to-mass state transitions in an envelope, (iii) loss of coherence on the way to observer, and (iv) oscillations of the mass states inside the Earth. It is shown that conversion has several new features which are not realized in other objects, in particular interference effects ("L- and H- wiggles") induced by the adiabaticity violation. The neutrino-neutrino scattering inside jet and inelastic neutrino interactions in the envelope may produce some additional features at $E > 10^4$ GeV. The dependence of the probabilities and flavor ratios in the matter-affected region on angles theta13 and theta23, on the CP-phase delta, as well as on the initial flavor content and density profile of the star are considered. The authors show that measurements of the energy dependence of the flavor ratios will, in principle, allow to determine independently the neutrino and astrophysical parameters.