Contribution ID: **43** Type: **Oral Talk**

Diffuse PeV neutrino emission from Ultra-Luminous Infrared Galaxies

Wednesday, 24 April 2013 16:20 (20 minutes)

The origins of the reported two PeV neutrinos (by Ice- Cube Collaboration) are highly controversial so far. Ultra-luminous infrared galaxies (ULIRGs) are the most luminous and intense starburst galaxies in the Universe. Both their star-formation rate (SFR) and gas surface mass density are very high, implying a high supernovae rate and an efficient energy conversion of energetic protons. A small fraction of these supernovae is the so-called hypernovae with a typical kinetic energy ˜10ˆ52 erg and a shock velocity >=10ˆ9cm sˆ-1. The strong shocks driven by hypernovae are able to accelerate cosmic ray protons up to 10ˆ17 eV. These energetic protons lose a good fraction of their energy through proton-proton collision when ejected into very dense interstellar medium, and as a result, produce high energy neutrinos (<=5 PeV). Recent deep infrared surveys provide solid constraints on the number density of ULIRGs across a wide redshift range 0<z<2.3, allowing us to derive the flux of diffuse neutrinos from hypernovae. We find that at PeV energies, the diffuse neutrinos contributed by ULIRGs are comparable with the atmosphere neutrinos with the flux of 2e-9 GeV cmˆ-2 sˆ-1 srˆ-1, by assuming the injected power law cosmic ray spectrum with the index of -2. Such a component may be detected in 20 years by the IceCube full configuration.

Primary author: Dr HE, Hao-Ning (Purple Mountain Observatory,)

Presenter: Dr HE, Hao-Ning (Purple Mountain Observatory,)