Poster session 2 – Tuesday 5 July

P2.017 What is the galactic contribution to IceCube neutrino events?

A Palladino[1] and Vissani[2]

[1]Gran Sasso Science Institute, Italy, [2]LNGS , GSSI, Italy

on behalf of Theorist collaboration

The discovery of high energy extraterrestrial neutrinos has opened a new era for neutrino astronomy. The observations of IceCube are compatible with cosmic neutrinos, that undergo three flavor oscillations. The topologies of the events were used to probe ordinary and exotic physics. However many important questions, raised by these findings, are still unresolved: what is the source and the mechanism of production of the cosmic neutrinos seen by IceCube? Are them all extragalactic or there is also a galactic population? The last question is noteworthy. There are hints that the spectra measured by IceCube from Northern sky and Southern sky are different; particularly, there is a tension of 3.6 sigma between passing muons and the dataset of high energy starting events. The angular distribution of these events has an excess near to the plane of the Galaxy, in an interval of galactic coordinates between -10^o and 10^o . These observational features are compatible with the existence of a significant galactic component of the high energy neutrinos, and indeed the Galactic center and the surrounding regions of the disk fall in the Southern sky. This interpretation points to a Galactic population of neutrinos characterized by a soft spectrum, $E^{-2.7}$, that gives a contribution of 20-30% to the total number of events and that dominates below some 100 TeV. Above this energy, an isotropic population, most likely of extragalactic origin and with a much harder spectrum, close to E^{-2} , becomes dominant. New experiments in the Northern hemisphere (Antares, KM3NeT, Baikal, GVD) will observe the Galaxy via through-going muons with a sub-degree angular resolution, and will be therefore crucial to confirm or refute this hypothesis.