Contribution ID: **110** Type: **not specified**

Constraints to a Galactic component of the Ice Cube cosmic neutrino flux

Wednesday, 1 October 2014 14:20 (20 minutes)

The IceCube evidence for cosmic neutrinos in the high-energy starting events (HESE) sample has suggested a large number of hypothesis for their origin. The fact that most of HESE are downward going suggests a possible Galactic origin for a fraction of the signal.

The hypothesis of a Galactic component of the IceCube signal, either considering a cluster of events from a single point-like source, or considering a directional excess from an extended Galactic region, are reviewed and constrained from the present available upper limits from the ANTARES neutrino telescope.
ANTARES, located in the Northern hemisphere, has for the ν_μ flavor an effective area larger than that of IceCube for $E_\nu < 60$ TeV and a factor of $\sim$2 smaller at 1 PeV, independently of the neutrino flavor, for sources in the Southern sky.
In addition, the use of the ν_μ channel allows an accurate measurement (al the level of 0.5°) of the incoming neutrino direction.

The IceCube possible signal and the ANTARES limits, using the published effective areas, are studied in terms of a power law flux $E^{-\Gamma}$, with spectral index Γ ranging from 2.0 to 2.5 to cover most astrophysical models.
The perspectives for the imminent Phase-1 of the KM3NeT Neutrino telescope in the Mediterranean Sea are also considered.

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Session Classification: Parallel Session E