



Contribution ID: 205

Type: Oral

Search for tau neutrinos with the MAGIC telescopes: the quest continues

Wednesday, September 5, 2018 3:10 PM (20 minutes)

MAGIC, a system of two Cherenkov telescopes located at the Roque de los Muchachos Observatory (2200 a.s.l.) in the Canary Island of La Palma, has lately been engaged in an unconventional task: the search for a signature of particle showers induced by earth-skimming cosmic tau neutrinos arising from the ocean, in the PeV to EeV energy range.

When pointing at the Sea, the MAGIC telescopes can collect data in a range of about 5 deg in zenith and 80 deg in azimuth: the analysis of the shower images from 30 hours of data, together with the simulations of upward-going tau neutrino showers, shows that the air showers induced by tau neutrinos can be discriminated from the hadronic background coming from a similar direction. We have calculated the point source acceptance and the expected event rates, assuming an incoming tau neutrino flux consistent with IceCube measurements, and for a sample of generic neutrino fluxes from photo-hadronic interactions in AGNs and GRBs. A 90% C.L. upper limit on the tau-neutrino point source flux of $2.0 \times 10^{-4} \text{ GeV cm}^{-2} \text{ s}^{-1}$ has been obtained. The presented results can also be important for future Cherenkov experiments such as the Cherenkov Telescope Array. This next generation ground-based observatory can have a much better possibility to detect tau neutrinos, given its larger FOV and much larger effective area.

Primary author: Dr MANGANARO, Marina (University of Rijeka)

Co-authors: GORA, Dariusz (DESY); Dr SOBCZYNSKA, Dorota (University of Lodz); Prof. BERNARDINI, Elisa (DESY); Dr RICO, Javier (IFAE-BIST); MAGIC COLLABORATION; Dr WILL, Martin (Max-Planck-Institut für Physik); DORO, Michele (PD); Dr LOMBARDI, Saverio (INAF-OAR and ASI Science Data Center, Rome, Italy)

Presenter: Dr MANGANARO, Marina (University of Rijeka)

Session Classification: Neutrinos