



Contribution ID: 624

Type: **Poster contribution**

Time-dependent search of high energy cosmic neutrinos from variable Blazars with the ANTARES telescope

Saturday, August 1, 2015 3:30 PM (1 hour)

ANTARES, the largest neutrino telescope operating in the Northern Hemisphere, performs multiple analyses in the search for neutrino point-source candidates. In a time-dependent search, the background is drastically reduced, and the point-source sensitivity improved, by selecting a narrow time window around the assumed neutrino production period. Blazars are particularly attractive potential neutrino point sources, since they are among the most likely sources of the observed very-high-energy cosmic rays. Neutrinos and gamma-rays may be produced in hadronic interactions with the surrounding medium. Moreover, blazars generally show large time variability in their light curves at different wavelengths and on various time scales. For the time-window selection, their gamma-ray emission measured by the LAT instrument on-board the Fermi satellite is derived, and the resulting light curves are characterised by a time series analysis. The studied periods are determined by applying a threshold on the fluence on the light curves. In addition, the flares reported at TeV energies by the IACTs HESS, MAGIC and VERITAS have been included in a second dedicated analysis. The sensitivities reached with this method improve by a factor 2-3 with respect to a standard time-integrated point source search. The results of the two searches, using data from the years 2008 up to 2012, will be presented.

Collaboration

ANTARES

Registration number following "ICRC2015-I"

188

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