



Contribution ID: 1121

Type: Oral contribution

Updates on the neutrino and photon limits from the Pierre Auger Observatory

Monday 3 August 2015 14:45 (15 minutes)

Ultra-high energy neutrinos and photons, with energies above 1 EeV and 10 EeV respectively, can be detected with the Surface Detector array (SD) of the Pierre Auger Observatory. Downward-going neutrinos of all flavours interacting in the atmosphere at zenith angles larger than 60 degrees, as well as upward-going tau neutrinos ("Earth-skimming") can be identified through the broad time-structure of the signals expected to be induced in the SD stations. In the absence of candidates in data from January 2004 until June 2013, an updated and stringent limit to the diffuse flux of ultra-high energy (UHE) neutrinos is computed. The sensitivity is improved with respect to the latest published results due to the additional data, the combination of the Earth-Skimming and downward-going searches, and the improved calculation of the exposure to UHE neutrinos. The photon search analysis uses SD observables sensitive to the mass composition of the primary particle. Compared to the hadronic background, photon-induced showers show a steeper lateral distribution of secondary particles at ground level and a larger spread in their arrival times. Upper limits on the diffuse flux of UHE photons and neutrinos are set in the hypothesis of an E^{-2} spectrum.

Collaboration

Pierre Auger

Registration number following "ICRC2015-I"

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