



Contribution ID: 1282

Type: **Poster contribution**

Muon track reconstruction and muon energy estimate in the KM3NeT/ARCA detector

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

KM3NeT is a large research infrastructure that will consist of a network of deep-sea neutrino telescopes in the Mediterranean Sea, of which the ARCA detector installed at the CapoPassero site (Italy) is optimised for studying high-energy neutrinos of cosmic origin. The “golden channel” for neutrino astronomy with Cherenkov telescopes is the muon-neutrino charged-current interaction. The final-state muon has a track length in water (for neutrino energies above 1 TeV) of the order of kilometres and its trajectory is almost co-linear to the parent neutrino direction, thus pointing back to the neutrino source. The neutrino direction is reconstructed from the arrival times of the photons at the photomultiplier tubes. After an initial hit selection requiring space-time coincidences between hits, the reconstruction proceeds through four consecutive fitting procedures. The pointing accuracy reached is about 0.1° for neutrino energies above 10 TeV. Together with the track reconstruction, also the muon energy has to be estimated and it can also be used for the distinction of muons generated by neutrinos of cosmic origin from the background of atmospheric muons and neutrinos, both produced by the interaction of primary cosmic rays in the atmosphere. The method to determine the muon energy is based on a Neural Network. The main aspects of the techniques employed for the track reconstruction and energy estimate will be discussed and the results achieved presented.

Collaboration

KM3NeT

Registration number following ”ICRC2015-I/”

1229

Primary authors: TROVATO, Agata (INFN); SAPIENZA, Piera (LNS)**Co-author:** DRAKOPOULOU, Evangelia (Nat. Cent. for Sci. Res. Demokritos (GR))**Presenter:** SAPIENZA, Piera (LNS)**Session Classification:** Poster 2 DM and NU**Track Classification:** NU-EX