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Neutrino and Muon Energy Reconstruction for KM3NeT

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KM3NeT is a European deep-sea research infrastructure that will host a neutrino telescope with a volume of several cubic kilometers at the bottom of the Mediterranean Sea. The telescope will search for galactic and extragalactic neutrinos from distant astrophysical sources like gamma ray bursts, super-novae or colliding stars. The analyses performed in large ice and water Cherenkov detectors rely upon the reconstruction of the muon direction and energy, and consequently, those of the neutrino. The estimation of the muon energy is also critical for the differentiation of muons from neutrinos originating from astrophysical sources from muons and neutrinos that have been generated in the atmosphere and constitute the detector's background. The energy is derived from the detection of the Cherenkov light produced by the muons that are created during the charged current interactions of neutrinos in or in the vicinity of the detector.

We describe a method to determine the muon and neutrino energy employing a Neural Network. An energy resolution of about 0.3 has been achieved for muons at the TeV range.

Primary author: DRAKOPOULOU, Evangelia (N.C.S.R. Demokritos)

Presenter: DRAKOPOULOU, Evangelia (N.C.S.R. Demokritos)

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