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The Top Tracker detector of the JUNO experiment

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The JUNO (Jiangmen Underground Neutrino Observatory) experiment is under preparation in China. The project's main goal is to determine the neutrino mass ordering via the precise measurement of the energy spectrum of antineutrinos emitted from nuclear reactors located 53km from the JUNO detector. Data taking is expected to begin in 2021.

In order to achieve JUNO's goals, it is essential to be able to measure the reactor neutrino spectrum with an energy resolution better than 3%. It is also essential to be able to suppress or control the background processes rate, as these processes may produce events with the same signature as those from the neutrino interactions in the central detector. While there are several sources of background, the most dangerous one is the cosmogenic isotopes produced in nuclear spallation processes by atmospheric muons in the detector volume.

The Veto system of the JUNO detector is designed to measure, and characterize the muon flux in the detector as well as to reduce the cosmogenic isotopes' contribution to the antineutrino spectrum. This system consists of the Top Tracker and the Water Cherenkov detector surrounding the Central Detector which is responsible for measuring the antineutrino energy spectrum. The Top Tracker consists of three layers of two-dimensional detectors made of scintillator strips and will cover about 1/3 of the surface above the Central and Water Cherenkov detectors. The role of the Top Tracker will be to detect atmospheric muons and to reconstruct precisely their trajectory in JUNO in order to study the cosmogenic background production and to supress its contribution.

This poster will discuss the JUNO detector's Top Tracker current design and expected performance.

Authors: Dr ATHAYDE MARCONDES DE ANDRE, Joao Pedro (Michigan State University/IceCube); Dr DRACOS, Marcos (Institut Pluridisciplinaire Hubert Curien (FR)); GORNUSHKIN, Yuri (Joint Institute for Nuclear Research (RU))

Presenter: GORNUSHKIN, Yuri (Joint Institute for Nuclear Research (RU))

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