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Precise detector of JUNO-TAO experiment

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Taishan Antineutrino Observatory (TAO) is a ton scale liquid scintillator (LS) detector and proposed to precisely measure reactor neutrino energy spectrum with as high as possible energy resolution, which can provide a reference spectrum for Jiangmen Underground Neutrino Observatory (JUNO) and a benchmark to verify the nuclear database.

As a satellite experiment of JUNO, TAO will be installed near the reactor core with a distance of ~30 m. The detector uses 2.6 ton gadolinium-doped LS (1 ton fiducial volume) contained in a spherical acrylic vessel. To maximize the photon collection efficiency in the detector, 10 m2 SiPM array is proposed to fully cover the acrylic vessel and collect scintillation photons as many as possible. The photon detection efficiency of SiPM should be larger than 50%, in order to achieve the desired energy resolution (1.5%/sqrt(E) photon statistical resolution). The SiPMs will also be operated at low temperature (-50 degree or lower) to reduce the dark noise. Meanwhile, a shield and muon veto system will be located outside of the neutrino detector to control the background to the system. In this talk, an overview and progress of the JUNO-TAO will be reported.

Collaboration

JUNO-TAO

Role of Submitter

I am the presenter

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