

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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