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Design and status of the Taishan Antineutrino Observatory (TAO)

TAO is a Gadolinium-doped liquid scintillator (GdLS) antineutrino detector located very close (~30 m) to one of Taishan nuclear reactors. TAO will act as a reference detector for the JUNO experiment and will measure the fine structure of the reactor antineutrino spectrum thus providing a benchmark for the nuclear database and reactor monitoring. TAO consists of a 90 cm radius acrylic sphere filled with 2.8 ton of GdLS and viewed by 10 m^2 Silicon Photomultipliers (SiPM). The photoelectron yield is about 4500 per MeV, corresponding to an energy resolution better than 2% at 1 MeV. The system will be operated at -50 C in order to reduce the SiPMs dark counts. Water Cherenkov and plastic scintillator detectors will act as a veto for cosmic muons and shielding for external radioactivity. The TAO design and status is presented: the detector is expected to start its operation in 2022.

Mini-abstract

TAO is a SiPM-based liquid scintillator reactor antineutrino detector expected to start in 2022.

Experiment/Collaboration

JUNO

Primary author: MONTINI, Paolo (Università degli Studi Roma Tre & INFN)

Presenter: MONTINI, Paolo (Università degli Studi Roma Tre & INFN)

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