

# 10 m<sup>2</sup> SiPM Mass Testing Results for the TAO Experiment

*Friday, 21 June 2024 17:30 (2 hours)*

The Taishan Antineutrino Observatory (TAO) aims to measure the fine structure in the reactor antineutrino spectrum with an unprecedented energy resolution of better than 2% at 1 MeV. Its primary goal is to provide a reference spectrum for JUNO, thereby enhancing its sensitivity for determining neutrino mass ordering. The precise spectrum also serves as a benchmark to verify the nuclear database and promote related research in nuclear physics. The TAO detector combines cutting-edge technologies in liquid scintillation and solid-state photon sensors to achieve the desired performance. About 10 m<sup>2</sup> of SiPMs, covering 94% of the area, will be deployed to efficiently collect scintillation light, yielding a light yield of ~4000 p.e./MeV. The TAO detector will operate at -50 °C to suppress the dark count rate of SiPMs, with the SiPM performance being a critical factor influencing the detector's overall performance. This poster will report the mass testing results obtained at -50 °C for approximately 4000 SiPM tiles (5 cm × 5 cm each), comprising around 64,000 channels. The poster will summarize key parameters, including photon detection efficiency, dark count rate, probabilities of optical cross-talk and after pulse, etc.

## Poster prize

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