

# Performance of the Mass Testing Setup for Arrays of Silicon Photomultipliers in the TAO Experiment

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Modern neutrino physics detectors often employ thousands, and sometimes even hundreds of thousands, of Silicon Photomultipliers (SiPMs). The TAO experiment is a notable example that utilizes a spherical scintillator barrel with a diameter of 1.8 meters, housing approximately 130,000 SiPMs organized into 4,100 tiles. Each tile with size of  $5 \times 5 \text{ cm}^2$  consists of a 32-SiPM array functioning as a single detector unit. To achieve an unparalleled energy resolution of 2% at 1 MeV within this volume, the SiPMs must possess cutting-edge parameters, including a photon detection efficiency (PDE) exceeding 50%, cross-talk of approximately 10%, and an extremely low dark count rate (DCR) below  $50 \text{ Hz/mm}^2$ . Maintaining the setup at a negative temperature of  $-50^\circ\text{C}$  is necessary to achieve the desired DCR. This talk presents the setup and methods employed to individually characterize the mass of SiPMs across all 4,100 tiles at the specified negative temperature.

## Section

Applications of nuclear methods in science, technology, medicine and radioecology

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