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Large photocathode 20-inch PMT testing at the scanning station for the JUNO experiment

The 20kt Liquid Scintillator (LS) JUNO detector is being constructed by the International Collaboration in China. The primary goal of JUNO is the neutrino mass ordering determination. The main challenge for JUNO is to achieve an unprecedented energy resolution, ~3% at 1 MeV of energy released in the LS. About 20000 large 20" PMTs with high Photon Detection Efficiency (PDE) will cover the detector surface. High demands on the energy resolution place distinct requirements to PMTs properties, namely high uniformity of PDE and gain along the photocathode surface. A dedicated scanning system was constructed for PMTs tests that allows us to study the variation of the abovementioned characteristics. It allows for the testing of individual PMTs in all relevant aspects by means of scanning the photocathode and identifying any potential problems. The scanning setup, method and results of PMTs performance tests are reported.

Mini-abstract

Scanning of JUNO 20" PMT studies PDE uniformity, MF sensitivity, cross-check with mass-testing.

Experiment/Collaboration

JUNO

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