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Mass testing of Large-PMT electronics at Kunshan for the JUNO experiment

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The Jiangmen Underground Neutrino Observatory (JUNO) is a neutrino medium baseline experiment under construction in southern China, expecting to begin data taking in 2023. The experiment has been proposed with the main goals of determining the neutrino mass ordering and measuring three oscillation parameters with sub-percent precision. To reach these goals, JUNO is located about 53 km from two nuclear power plants and will detect electron antineutrinos from reactors through inverse beta decay. Furthermore, an unprecedented energy resolution of 3 % at 1 MeV is required. The JUNO detector consists of 20 kton of liquid scintillator contained in a 35.4 m diameter acrylic vessel, which is instrumented with a system of about 18 000 20-inch Large-PMTs and 25 600 3-inch small-PMTs, with a total photocoverage greater than 75 %.

The front-end electronics for the Large-PMT system consists of a Global Central Unit (GCU), which performs the analog-to-digital conversion of the waveforms a few meters away from the PMT, thus providing good performance in terms of signal-to-noise ratio. The mass production of the Large-PMT electronics is currently ongoing in Kunshan, China. At the production site, several tests are performed to assess the integrity and the performances of the GCUs; the integration with the back-end electronics is also tested.

This contribution will focus on the test protocol that has been developed for the mass testing of the Large-PMT electronics at Kunshan. Results of the tests will also be presented.

In-person participation

Yes

Primary authors: JELMINI, Beatrice (Istituto Nazionale di Fisica Nucleare); CERRONE, Vanessa; COPPI, Alberto; SERAFINI, Andrea (Istituto Nazionale di Fisica Nucleare); VON STURM ZU VEHLINGEN, Katharina Caecilie (Istituto Nazionale di Fisica Nucleare)

Presenter: TRIOZZI, Riccardo (Università degli Studi di Padova)

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