

## 3-inch PMTs and electronics system in JUNO

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25600 3-inch PMTs (SPMTs) were designed in the JUNO detector together with 20012 20-inch PMTs (LPMTs). The SPMT system can enhance the detector's performances such as calibrating charge nonlinearity of LPMTs and thus improving the energy resolution. Signals of SPMTs are read out by the frontend electronics contained in 200 underwater boxes through 1600 customized multichannel connectors. All of SPMTs and electronics have been produced, integrated and tested. 5% of them have been installed in the 700-m underground JUNO detector and verified with a dedicated light-off test. In this talk, we will report the design of the SPMT system, mass production and performances of SPMTs and electronics, as well as the latest progress of SPMT installation and commissioning.

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