

the 20-inch PMT system for the JUNO experiment

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The Jiangmen Underground Neutrino Observatory (JUNO) is a multi-purpose neutrino experiment under construction. The primary goal is to determine the neutrino mass hierarchy and precisely measure the oscillation parameters by detecting reactor anti-neutrinos. There will be around 20000 PMTs with a large photo-cathode of 20-inch equipped for the JUNO experiment, which includes 15000 MCP PMTs from a Chinese company and 5000 Dynode PMTs from Hamamatsu company. To achieve the designed 3% energy resolution, the PMTs are required to have high detection efficiency as well as very tight positioning in the JUNO detector. The 20-inch PMT system for JUNO includes PMT performance testing, design of high voltage divider, waterproof potting, chain implosion protection, and installation on the detector. Testing of the PMTs will use a device developed in a container for batch test and a scanning station for sampling test. Since the PMTs are required to work for 20 years in water with a depth up to 45 m, the PMTs need to be potted to keep the high voltage divider away from water. And in a situation that the PMTs will be closest possible arranged with the spacing only a few mm to achieve a coverage larger than 75%, the protection for chain implosion and also the installation are very challenging. In this talk, all aspects mentioned above for the JUNO 20-inch PMT system will be addressed.

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