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The MCP based Large Area PMTs for Neutrino Detector

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The large scalar neutrino detectors (JUNO, HyperK), need the 20 inch area PMTs as the photo-detection device for their large photocathode coverage and less electronic channels. In 2009, the researchers at IHEP have conceived a new concept of large area PMTs, of which the small MCP units replace the bulky Dynode chain. After several years R&D, the 20 inch MCP-PMT was successfully produced. This type of PMT has large sensitive area, high QE, and large P/V for good single photon detection. The JUNO ordered 15000 pic 20 inch MCP-PMTs in Dec.2015. Then, from 2017 to 2020, all the 20-inch PMTs will be produced and tested one by one in the company for JUNO. This presentation will talk about the R&D, the mass production and batch test result of the 13K pieces of MCP-PMT prototypes for JUNO. Further more, another Flower-liked MCP-PMT was designed with the TTS less than 5ns, and this new type of 20 inch MCP-PMT has already evaluated by the PMT group in HyperK, and also be used in the LHAASO project in China.

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Author: QIAN, Sen (Institute of High Energy Physics,CAS)

Presenter: QIAN, Sen (Institute of High Energy Physics,CAS)

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