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The R&D of the MCP based PMTs for High Energy Physics Detectors

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The Micro-Channel Plate (MCP) is a specially crafted microporous plate with millions of independent channels, which have secondary electron emission capability. The MCP could be used as the electronic multiplier amplifier in the PMTs. There are two types of MCP Photomultiplier tube (MCP-PMT), large-area electrostatic focusing PMTs (LPMT) and small size proximity focusing PMTs (FPMT) respectively. The LPMT always used in the large scalar neutrino detector for it's large area efficiency photocathode. The small size FPMT is widely used in high energy physics for its fast time response, strong anti-interference ability. The MCP-PMT Collaboration Group in China has successfully research and developed the LPMT for JUNO in 2017, and plan to research a new type of FPMT with multi-anode readout (4X4, 8X8). The FPMT prototypes have been produced with 50 ps time resolution, and also the 8X8 readout anode for the position resolution. We will introduce some design of the FPMTs for the time measurement, and the performance of the several different prototypes with different readout channels.

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