

Test and Simulation of FPMT with single chip MCP

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Abstract: Micro-channel plate photomultiplier tube (MCP-PMT) is a kind of photosensitive device with single photon detection capability and great time resolution, which is also called Fast-PMT (FPMT). The MCP is the electron multiplier structure and in order to achieve single photon detection, two layers of MCPs are always used together. Due to the new-generation particle accelerators with high energy and luminosity, the time resolution of the detector is more important than single-photon detection. The single-MCP-FPMT is expected to have a greater time resolution. Based on the CST STUDIO SUITE, the single-chip-FPMT model was built and relative structure parameters are changed to see the performance change of the model including the gain, transit time, transit time spread and rise time. At the same time, two single-chip FPMTs samples produced by North Night Vision Tech. Co. in China are tested thoroughly in our laboratory and the performance evaluation results are given.

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