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Measurements of the Gain, Time Resolution, and Spatial Resolution of a 20x20cm MCP-based Picosecond Photo-Detector

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Microchannel plates (MCPs) allow for micron-level spatial imaging and picosecond-level time resolution, making them a good solution for the next generation of photo-detectors aiming for precision time-of-flight measurements. The Large-Area Picosecond Photo-Detector Collaboration (LAPPD) is currently developing a 20x20cm, thin, planar, glass-body detector with the MCPs serving as the gain stage. In such a detector photo-electrons ejected from a photo-cathode produce a cascade of secondary electrons in the pores of a pair of MCP's which are consequently collected at the anode circuit. The modular design allows covering large areas while keeping the number of electronics channels low. We report on the recent progress in the development of the detector components. We have built a complete detector system approximating the final detector design. We have measured gain up to 2×10^7 , time-of-flight resolution of ~ 60 ps, differential time resolution of ~ 6 ps, and spatial resolution of ~ 0.6 mm.

quote your primary experiment

LAPPD

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