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Remote: Study of After-pulse of Fast Timing MCP-PMT and Its Performance in Magnetic Fields

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The Microchannel Plate Photomultiplier (MCP-PMT), also known as Fast-timing PMT (FPMT), is a photosensitive device renowned for its high gain, exceptional detection efficiency, single-photon detection capability, magnetic field resistance, and superior time resolution. Widely utilized in high-energy physics and medical detection applications, the FPMT requires rapid time resolution and robust magnetic field resistance.

Of particular concern are after-pulses, undesired pulses occurring in a PMT following the initial pulse, which can compromise applications requiring minimal noise levels. To enhance the time performance of FPMTs, a comprehensive study was undertaken to investigate the after-pulse characteristics and origins across different FPMT models, encompassing both single-anode and 8 × 8 anode configurations.

Furthermore, to assess the viability of FPMT operation in high magnetic fields, a detailed examination was conducted to evaluate the impact of magnetic fields on the performance metrics of single-anode FPMTs and 8 × 8 anode FPMTs, including Rise Time (RT), Fall Time (FT), Transit Time Spread (TTS), gain, and amplitude.

Initial findings suggest that FPMTs exhibit robust single-photon detection capabilities at 2.4T when the magnetic field aligns parallel to the detector axis, with retained sensitivity at 1.2T even when the field is perpendicular. Notably, the 8 × 8 anode FPMTs display heightened susceptibility to magnetic fields compared to their single-anode counterparts. Further analysis of FPMT signals holds promise in elucidating the differential impact of magnetic fields on various FPMT models, thereby advancing their magnetic field resilience capabilities.

Do you need a VISA letter for traveling to Canada ?

Yes

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