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Tests of an MCP-PMT with an Active Ion Barrier

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Micro Channel Plate (MCP) Photomultiplier Tubes (MCP-PMTs) are photon detectors with many useful characteristics, such as high gain, single photon detection efficiency, precise timing resolution, and the capability of operating in strong magnetic fields without performance degradation. The quantum efficiency of the photocathode of the MCP-PMTs, however, is known to degrade due to “positive-ion feedback,” positive ions liberated from the pores and accelerated back towards the photocathode. Coating the MCP pores using Atomic Layer deposition has shown tremendous potential in prolonging the MCP-PMT lifetime. Here, we report on tests of an alternate method of reducing positive-ion feedback developed by Photonis, Inc.—an active ion barrier grid that redirects the liberated positive ions toward the MCP using an opposing electric field.

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