Abstract Submitted
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Studies of the Gain of a Small-Pore Size Microchannel Plate Photomultiplier in High Magnetic Fields[1] ALAN ROWLAND, University of South Carolina, EIC PID COLLABORATION — Microchannel plate photomultipliers (MCP PMTs) are small devices that convert light into an electric signal. These devices have many applications, but most notably in physics they are used to readout Cherenkov detectors. In the current designs of the central detector of a future Electron Ion Collider, MCP PMTs will readout several Cherenkov detectors located in a magnetic field of ˜1.5 T. Work has been done to see how the functionality of MCP PMTs is affected by high magnetic fields and our research furthers these studies. We studied a Planacon MCP PMT, which has a pore size of 10 m, inside a variable magnetic field. While one can simply determine the gain of the device outside of a field by means of fits to pulse height distributions, in high magnetic fields (>1.5 T), where the signals become small, this method to determine the gain cannot be applied. Due to the linearity of the relationship between several variables that are proportional to the gain, we have developed a method to determine the gain even when the PMT signals are very small and the standard method is not useable. This helps to extend the range of settings for which the sensor can be evaluated and provides support for this sensor to be used in the EIC.

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