

Abstract Submitted
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Bucking Coil Efficiency Correction for 5" PMT Exposed to an External Magnetic Field¹ ANTHONY LLODRA, JOERG REINHOLD, Florida Intl Univ — This research was conducted in support of the Hall C upgrade activities at Thomas Jefferson National Accelerator Facility (JLab). We propose to employ bucking coils in order to maximize the collection efficiency of the 5" PMTs installed on the Cherenkov detector, which could potentially be exposed to external magnetic field produced by the Super Conducting Super High Momentum Spectrometer (SHMS) magnet. In this research project a 5" PMT was placed in a light tight cylinder with a fiber optic cable. The cylinder was centered within a set of Helmholtz coils to produce a constant external magnetic field. Furthermore, the cylinder was wrapped with 20 coils of standard 12 gauge cable to act as the bucking coil. With the intensity of the LED source, and the magnitude of the external magnetic field fixed at a carefully determined value, data was taken to determine if the collection efficiency of the PMT was indeed affected. With a decrease in collection efficiency confirmed, further data were taken. A range of current (0-6 A) was applied to the bucking coils, while ADC spectra were analyzed in intervals of 0.25 A. The data indicated that in an external magnetic field of approximately 3 Gauss, the 5" PMT collection efficiency is maximized with the bucking coil current set to approximately 3.5 A. Thus, the data conclusively indicates that the bucking coil system will indeed maximize the collection efficiency of the 5" PMT.

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