Abstract Submitted
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Characterization of Large Diameter PMTs for Kaon Cerenkov Detector[1] DEREK BOYLAN, University of Virginia — The 12GeV upgrade at the Jefferson Laboratory allows for unique new opportunities to study hadron structure through kaon production in Hall C, a threshold aerogel detector was constructed at the Catholic University of America. It uses the emission of Cerenkov radiation at different indices of refraction ranging from 1.03 to 1.01 to distinguish pions, kaons, and protons. An important aspect of this detector is the collection of very small amounts of light, in particular as the aerogel refractive index decreases. The Hall C aerogel detector uses the Photonis XP4500 large-diameter photomultiplier tubes (PMT) in order to detect these small traces of light. The purpose of this project is to explore the performance of alternative large-diameter PMTs and compares them to that of the XP4500. The PMT uniformity across the photocathode was characterized through scans along the surface of the PMT with a low-intensity, focused LED, thereby creating a 3D image of the gain at each section. The method of scanning consists of a two axis step motor moving an LED light source on a 100 x 100 grid parallel to the face of the PMT, with 30 pulses of light from the LED at each step. The step motor scans with a resolution of 1.2 mm. Scans conducted in this manner result in high resolution images which pick up most sensitive/non-sensitive spots on the photocathode. In this presentation I will present the results of the characterization and performance test of the XP4500 and comparison to alternative large-diameter PMT models.

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