

Abstract Submitted
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Evaluation of Light Collection System for Pion and Kaon Experiments in Hall C at Jefferson Lab¹ SALIM ROUSTOM, Virginia Tech — The neutral pion and the kaon are opportune to study the hadron structure through General Parton Distributions, which can be viewed as spatial densities at different momenta of the quarks inside the proton. To study hadron structure with pion or kaon experiments in Hall C at 12 GeV Jefferson Lab, one must analyze the final state neutral pions and kaons and their decay products. For the analysis of these particles, dedicated detectors based on the Cherenkov or scintillation mechanism are used, e.g. the HMS and SHMS aerogel detectors and the PbWO₄-based Neutral Particle Spectrometer. A critical part of these detectors is the light collection system. Photomultiplier Tubes (PMTs) have many advantages, however, they are sensitive to magnetic fields and can get damaged by elevated helium levels in the atmosphere. An alternative to PMTs are Avalanche Photodiodes (APDs). APDs are sensitive to background noise, temperature, and radiation. It is thus important to evaluate the benefits of each light collection system and optimize operating conditions to ensure performance over a reasonably long time. I will present a performance study of PMTs exposed to elevated levels of helium and a comparison of APDs as alternatives, as well as new, compact readout methods.

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