

Abstract Submitted
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Optimizing light collection for low index aerogels used in Cherenkov Detectors¹ SALIM ROUSTOM, George C. Marshall High School — The SHMS aerogel Cherenkov detector built at CUA is used in Hall C at JLab to differentiate Kaons from Protons. It features four refractive aerogel indices ranging from $n=1.03-1.01$. The lowest index is expected to produce a very small signal and it is thus important to collect it with the highest possible efficiency. One way is to cover the interior of the detector with the best possible reflector material. A prototype was built to investigate possible optimizations of light collection for low aerogel refractive indices. Different reflective materials were used on its inner walls and the resulting average number of photoelectrons detected by a photomultiplier tube (PMT) compared. The coincidence trigger for these tests was constructed using two scintillator paddles. This configuration ensures that only cosmic rays passing perpendicularly through the setup are recorded by the computer. The PMTs used in this setup were calibrated using a blue LED, where the PMT is most sensitive. I will discuss the effect of the different reflectors on the average number of photoelectrons recorded, as well as other possible optimizations of light collection including wavelength shifters, and the effect of absorption and scattering on the detector's performance.

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