

Abstract Submitted  
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**Improving Light Collection Efficiency in HAWC Detector Tanks<sup>1</sup>**

JONAH KUDLER-FLAM, Colgate Univ, HAWC COLLABORATION COLLABORATION — The High Altitude Water Cherenkov (HAWC) Observatory was designed to detect air showers produced by gamma-rays and cosmic-rays between 100 GeV and 100 TeV. The detector is composed of 300 water tanks with four photomultipliers (PMTs) located at the bottom of each tank. When charged particles from air showers enter the tanks, the Cherenkov light produced by the particles is detected by the PMTs. However, much of the Cherenkov light is lost due to the small collection areas of the PMTs. To increase the collection area of the photosensors, we investigate light collectors composed of wavelength-shifting fibers. We have constructed a simple concentrator in the lab using two silicon photomultipliers and 1 mm optical fibers coated with a wavelength-shifting layer, and simulated the response of the setup using PVTrace, a Python package designed to raytrace photons in luminescent concentrators. We compare our simulations to results obtained in the laboratory and find that the concentration gain of the fiber system scales linearly with the number of fibers.

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