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Prototyping of a Durable and Inexpensive RICH Detector[1]
THOMAS HORNING, Community College of Aurora, JAMIE PRINCIPATO, Arapahoe Community College, COMMUNITY COLLEGES OF COLORADO ROCKSAT-C TEAM — Ring Imaging Cherenkov Radiation Detectors are used to observe cosmic rays by recording images of light emitted when particles strike a refractive medium at relativistic speeds. A small, durable, and affordable RICH Detector would enable institutions with strict budget constraints to conduct higher energy radiation research when mass, volume and durability are a concern. The purpose of this project was to build a RICH detector that satisfies these constraints to observe cosmic rays during a suborbital rocket flight. The detector consists of a GoPro with a magnesium fluoride window held flush against its image sensor. The device was tested on a high altitude balloon and sounding rocket to assess its stability and efficacy. The images from each test were analyzed by visually inspecting those containing high energy zones relative to the background noise. The balloon test yielded images with large energy deposits and low relative background noise. Similar energy deposits were found in the images from the rocket test, though these also showed an increase in background noise. Further analysis is required to determine if the images from each test show evidence of Cherenkov radiation, and additional testing can be done to improve the design for rocket conditions.

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