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Evaluation of LED-based Instrumentation for JLab Detectors[1]
STEPHANIE DURHAM, University of Virginia, RUHI PARVATAM, George C. Marshall High School — Light-Emitting Diodes have a multitude of uses due to their increasing efficiency, reliability, durability, and practical size. The wavelength-intensity properties of LEDs are important in the characterization of aerogel optical properties and thus the uniformity and performance of the Hall C threshold aerogel Cherenkov detectors at Jefferson Laboratory. LEDs are also practical for the PWO-based calorimeters at JLab for monitoring and recovering these crystals during and after exposure to radiation. This project is aimed at the construction and evaluation of LED-based instrumentation to characterize the optical properties of aerogel used in the JLab aerogel detectors and its application to future detectors. LEDs emit light at a nominal wavelength, but their spectrum covers a broad range. It is thus important to understand the LED spectrum. A spectrometer was constructed including a collimator, diffraction grating, and high-speed photodiode to measure the voltage, which was then converted into luminous intensity. This presentation will convey the results from measurements with LED-based instrumentation and discuss the application of LEDs covering wavelengths from the ultraviolet to near-infrared regions in future PWO-based detectors.

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