Calvision

Calvision is a consortium of universities and Department of Energy laboratories focused on advancing state-of-the-art calorimetric measurements for all types of particles with a higher level of precision. The program prioritizes the development of homogeneous calorimeters that maximize the use of available information. Calorimeters are particle detectors which are used to measure the energy of particles by capturing the energy released by them as they interact with the detector material. Key aspects of this program include harnessing dual readout of scintillation light signals and Cherenkov radiation (special radiation produced when a particle moves faster than the speed of light in that medium), utilizing timing to distinguish between these two types of light signals, creating new particle flow algorithms tailored for these calorimeters, and integrating cutting-edge machine learning techniques.

The current phase of the program is centered on developing an electromagnetic calorimeter that maximizes information usage, making it suitable for future lepton colliders such as the Future Circular Collider - electron positron (FCC-ee). As part of this initiative, the CUA's high energy physics group plans to establish a crystal testing facility to characterize candidate crystals for use in the calorimeter. This classification involves studying characteristics of the crystal such as, transmission spectrum, linear uniformity of light yield, and X-ray excited emission spectrum of the crystals. In this talk, I am going to share some of the results I obtained using these tests for Bismuth Germanate (BGO) crystal samples and discuss the future scope of this work.

-Bhavya Singhal