Simulating Detector Efficiency in Hyperion and STARLiTeR[1]

RYAN BUECHELE, Case Western Reserve University, ANNA SIMON, University of Notre Dame — The study of γ-ray emission from excited nuclei plays a crucial role in nuclear physics by offering insight into the structure of nuclei and the formation of heavy elements in stars. To better understand the efficiency of γ-ray detectors, computer simulations can be built in Geant4 to model the interaction of γ-rays with the detector materials. Simulations like these allow researchers to quickly and easily determine the effects that changes in the detector setup have on the γ-ray spectrum recorded in experiments. This work aims to create a simulation to better understand and determine the efficiency of the γ-ray detectors in the Hyperion and STARLiTeR systems, which are detector arrays currently housed at Texas A&M University used in the study of astrophysical nuclear processes. The simulation is constructed to most accurately reproduce data taken in the STARLiTeR system for radioactive ^{137}Cs and ^{60}Co calibration sources and is used to calculate an efficiency function for the detector as a function of γ-ray energy.

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