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Background Spectrum Analysis of the PULSTAR Reactor using a HP Ge Detector ELON PRICE, ALBERT YOUNG, North Carolina State University — Background radiation can often be a significant issue with large scale nuclear physics experiments. A background spectrum for the PULSTAR reactor can be vital information for ongoing projects like UCN nEDM, Neutron Activation Analysis, and *Neutron Radiography of turbine blades for jet engine manufacturing (to name a few). High-purity germanium detectors are used for gamma-ray spectroscopy and are more efficient and sensitive than standard 3" x 3" Na(Tl) detectors. I used a 2001A Canberra HP Ge detector and conducted several 24 hour runs in the reactor bay. Using ROOT, I generated a smoothed histogram and fitted the data with a Guassian and linear model. Using the known Ar-41 and K-40 peaks (energies 1293 keV and 1460 keV), I was able to produce a calibrated spectrum which allowed me to find other gammas like Na-24 and Th-232. Currently I'm working with Geant4, to subtract the compton scattering portion of the spectrum. The resulting product will be a well-calibrated background spectrum of the reactor including the total and peak efficiency.*

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