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Using MCNP for Compton Scattering Calculations with BGO Scintillators JEREMY BOARD, PHILLIP WOMBLE, ALEXANDER BARZILOV, Western Kentucky University — Compton scattering is the process wherein photons scatter on the electrons within a material. In a detector, some of these scattered photons leave the detector with only part of their full energy. This creates a continuum which changes the signal to noise ratio with a gamma ray spectrum. For high resolution detectors such as high purity Ge (HPGe) solid state gamma ray detectors, a secondary detector surrounds the HPGe. The purpose of the secondary detector (made of a high Z material) is to detect the scattered photons. When both detectors have coincident photon events, a special circuit stops the data acquisition from acquiring the signal from the HPGe. Our goal is to design the optimal Compton "suppressor" using bismuth germinate scintillators for gamma rays whose energies are much larger than 1 MeV. Currently such suppressors are designed for energies less than 2 MeV. We are using the Monte Carlo N-particle code to calculate the amount of photon scattering in the HPGe into geometry of BGO surrounding the HPGe crystal. We are estimating both photon and electron fluence through the volume of BGO.

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