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## Simulating Gamma Ray Interactions to Determine Dead Layer of Germanium

Monday 23 August 2021 17:15 (15 minutes)

In this presentation, I will talk about my work simulating gamma ray interactions in a germanium detector. My aim was to determine the dead layer of the germanium detector. In the germanium crystal, there is a layer of lithium ions that extends some distance into the crystal. Any interactions in this layer are inactive and are thus not useful for detection of gamma rays. Calculating the dead layer will provide a more accurate picture of what interactions occur in active germanium. To do this, I needed to create a model of the detector. I used a program called Geant4, which is used in particle physics applications. I used a simpler application of G4 called g4simple that uses geometry description markup language (GDML). The model was created to be as close to the actual setup of the germanium detector as possible. Using this model, simulations were run with energies corresponding to the gamma decay of Ba133. The ratio of the events in the peaks was recorded for different values of dead layer (distance from edge of germanium). Data from the detector could then be collected and analyzed to determine the dead layer of the detector based on the ratio of events in peaks that corresponded to a specific dead layer value in the simulation.

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