

Abstract Submitted
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GRETA Pile-Up Recovery¹ WHITNEY BROOKS — The proposed Gamma Ray Energy Tracking Array uses Ge detectors to track interactions by each gamma ray detected. Tracking determines which interactions belong to which gamma rays using the energy and position of the interaction found properties of Compton scattering. Detectors are connected to a pre-amplifier which puts out a pulse signal when a gamma ray is detected. The pre-amplifier is connected to a Digital Signal Processor which digitizes the pulse shape using a 10 ns sampling time, showing an image of the pulse. The rise time for the signal is 100-200 ns. The signal decays with a time constant of about 50 microseconds. The height of the pulse is proportional to the energy of the gamma ray. Sometimes a second gamma ray is detected before the pulse signal of the first one has fully decayed, creating a pile-up of pulse signals. LBNL's current data analysis system performs "Pile-Up Rejection" where it discards any data not deemed a single pulse. My code performs Pile-Up Recovery, enabling us to get more data instead of rejecting useful data. The code uses derivatives and regression lines to tell if a pulse is a single pulse or a pile-up pulse. If a pile-up is detected, the two are separated and the energy of each is found.

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