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Digital Timing Algorithm for High Purity Germanium Detectors KNOX ANDREW, University of Massachusetts Lowell, KRZYSZTOF STAROSTA, DAVID MILLER, CONSTANTIN VAMAN, PHILLIP VOSS, DIRK WEISSHAAR, MIchigan State University/National Superconduction Cyclotron Labratory — The next generation of  $\gamma$ -ray detector arrays will be composed of large volume high purity germanium (HPGE) detectors that are electronically segmented. These detectors will be able to track  $\gamma$ -rays as they Compton scatter within the crystal and between adjacent crystals, eliminating the need for Compton suppression detectors and improving angular resolution. The new arrays will have much higher sensitivity, but require a shift from analog signal processing (ASP) to digital signal processing (DSP). The scope of the current project is to test the resolution of digital timing algorithms, a critical component of any  $\gamma$ -ray tracking system. A  $\gamma - \gamma$  coincidence experiment was performed with a 60Co source and two small volume HPGE detectors using the Digital Data Acquisition System at the National Superconducting Cyclotron Laboratory. The resultant digitized waveforms were analyzed using multiple algorithms. These included digital models of ASP leading edge and constant fraction discriminators, and simple novel digital techniques.

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