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Refining signal decomposition for GRETINA detectors[1] V.S. PRASHER, Department of Physics, University of Massachusetts Lowell, Lowell, MA, USA, C.M. CAMPBELL, M. CROMAZ, H.L. CRAWFORD, A. WIENS, I.Y. LEE, A.O. MACCHIAVELLI, Nuclear Science Division, Lawrence Berkeley National Laboratory, Berkeley, CA, USA, C.J. (KIM) LISTER, E. MERCHAN, P. CHOWDHURY, Department of Physics, University of Massachusetts Lowell, Lowell, MA, USA, D.C. RADFORD, Physics Division, Oak Ridge National Laboratory, Oak Ridge, TN, USA — The reconstruction of the original direction and energy of gamma rays through locating their interaction points in solid state detectors is a crucial evolving technology for nuclear physics, space science and homeland security. New arrays AGATA and GRETINA have been built for nuclear science based on highly segmented germanium crystals. The signal decomposition process fits the observed waveform from each crystal segment with a linear combination of pre-calculated basis signals. This process occurs on an event-by-event basis in real time to extract the position and energy of γ-ray interactions. The methodology for generating a basis of pulse shapes, varying according to the position of the charge generating interactions, is in place. Improvements in signal decomposition can be realized by better modeling the crystals. Specifically, a better understanding of the true impurity distributions, internal electric fields, and charge mobilities will lead to more reliable bases, more precise definition of the interaction points, and hence more reliable tracking. In this presentation we will cover the current state-of-the-art for basis generation and then discuss the sensitivity of the predicted pulse shapes when varying some key parameters.

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