Understanding GRETINA using angular correlation method

MADELINE AUSTIN, Argonne National Laboratory — The ability to trace the path of gamma rays through germanium is not only necessary for taking full advantage of GRETINA but also a promising possibility for homeland security defense against nuclear threats. This research tested the current tracking algorithm using the angular correlation method by comparing results from raw and tracked data to the theoretical model for Co-60. It was found that the current tracking method is unsuccessful in reproducing angular correlation. Variations to the tracking algorithm were made in the FM value, tracking angle, number of angles of separation observed, and window of coincidence in attempt to improve correlation results. From these variations it was observed that having a larger FM improved results, reducing the number of observational angles worsened correlation, and that overall larger tracking angles improved with larger windows of coincidence and vice-verse. Future research would be to refine the angle of measurement for raw data and to explore the possibility of an energy dependence by testing other elements.

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