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Characterizing a silicon detector alpha response for the Beta-decay Paul Trap[1] LOUIS VARRIANO, GUY SAVARD, Univ of Chicago, Argonne Natl Lab, JASON A CLARK, Argonne Natl Lab, NICHOLAS D SCIELZO, Lawrence Livermore Natl Lab, DANIEL P BURDETTE, Univ of Notre Dame, Argonne Natl Lab, MARY BURKEY, AARON GALLANT, Lawrence Livermore Natl Lab, TSVIKI Y HIRSH, Soreq NRC, RALPH SEGEL, Northwestern Univ — The Beta-decay Paul Trap (BPT) at Argonne National Lab studies the weak interaction with short-lived radioactive ions at low energies. The BPT measures the beta-neutrino angular correlation coefficient $a_{\beta\nu}$ in the pure Gamow-Teller decay of ^{8}Li and ^{8}B (decaying to ^{8}Be* with immediate break up to 2 alpha particles) to search for a tensor component of the weak interaction. By using double-sided silicon strip detectors (DSSSDs) to detect the decay products, the BPT has improved the tensor current limit from the low energy side for the first time in over fifty years. To further improve this limit, with a measurement goal of 0.1% uncertainty in $a_{\beta\nu}$, it is necessary to fully understand the DSSSD response to alphas across a broad range of energies, including all undetected energy losses. In addition, it is necessary to understand the calibration source alpha distribution, as the sources used by the BPT are not lossless. This work characterizes the source alpha distribution and the DSSSD alpha response, which can be applied to other experiments that rely upon an accurate measurement of alpha energy.

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