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Determining the charge sharing bias between pixels in Nab silicon detectors[1] MADELINE COPELAND, East Tennessee State University, LEAH BROUSSARD, Oak Ridge National Laboratory, THE NAB(NEUTRON 'A' 'B') EXPERIMENT TEAM, THE CALCIUM-45 EXPERIMENT TEAM — Precise measurements of the electron-neutrino correlation coefficient and the Fierz interference term in unpolarized free neutron beta decay are performed by the Nab and the Calcium-45 experiments for testing our understanding of the Standard Model's description of the weak interaction. These experiments use silicon detectors, segmented into hexagonal pixels, that collect the total charge deposited by the decay particles. We updated custom Fortran code to simulate charge collection in Nab silicon detectors using the Shockley-Ramo theorem. To study if the detectors accurately collect the total charge deposited, simulated waveforms were created based on the input energy of decay particles and simulated characteristics of Nab detectors. We studied the simulated waveforms' amplitude and shape dependence on the electron energy and position, focusing on the effect of charge sharing among the pixels. A change in the waveform shape can result in a bias in the detected energy due to charge sharing. We also studied the impact on low energy proton detection efficiency near pixel boundaries due to charge sharing. Ultimately, investigating charge sharing will aid the Nab Experiment and the Calcium-45 Experiment to set a limit on the size of the Fierz interference term.

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