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Reconstruction of Radiation Source Locations Using Goodness-of-Fit Tests on Spectra Obtained from an HPGe Detector LEN EVANS, University of North Carolina — High purity germanium (HPGe) detectors are ubiquitous in nuclear physics experiments and are also used in numerous low radioactive background detectors, including the proposed MAJORANA experiment. Spatial reconstruction of the location of radiation sources from spectral distortions could be used to locate unwanted backgrounds or "hot-spots" inside the detector shield. The effect of the position of ^{60}Co and ^{137}Cs point sources on the shape of spectra were studied with both Monte Carlo and HPGe detector measurements. We briefly confirm previous work on the position dependence of relative heights of peaks. Spectra taken with the radiation sources placed at locations around the detector were then compared using the Kolmogorov-Smirnov (K-S) goodness-of-fit test. We discuss the position reconstruction accuracy of this statistical method, which is promising.

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