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Effects of Magnetic Fields on HPGe Tracking Detectors[1] I-YANG LEE, AUGUSTO MACCHIAVELLI, Lawrence Berkeley National Laboratory — We present a study of magnetic fields effects on the position resolution and energy response of hyper-pure germanium detectors. Our results provide realistic estimates of the potential impact on the resolving power of tracking-arrays from (fringe) magnetic fields present when operating together with large spectrometers. By solving the equations of motion for the electron and holes in the presence of both electric and magnetic fields, we analyzed the drift trajectories of the charge carriers to determine the deviations in the positions at the end point of the trajectories, as well as changes in drift lengths affecting the energy resolution and peak shift due to trapping. Our results show that the major effect is in the deviation of the transverse (to the electric field direction) position and suggest that, if no corrective action is taken in the pulse-shape and tracking data analysis procedures, a field strength 0.1 T will start to impact the intrinsic position resolution of 2 mm (RMS). At fields above ∼1 T, the degradation of the energy response becomes observable.

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