

HPGe detector mass calibration with a dissolved uranium source

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The aim of this study was to determine the mass of a high-purity germanium (HPGe) detector, similar to that used in the ν GeN experiment, and to compare this estimate with the manufacturer's specified value. Experimental measurements were performed on a low-background setup using a dissolved uranium calibration source. Mass estimates were obtained from Monte Carlo simulations implemented in Geant4.10. This approach utilizes the well-characterized mass activity of U-238 calibration source (12440 Bq/g) to provide an absolute calibration scale. Experimental spectra and simulated detector responses were analysed and compared. The mass estimated from the measurements and simulations is in good agreement with the manufacturer's specification. As a result, uranium calibration sources with certified mass activity provide a practical alternative for HPGe mass calibration and for validation of Monte Carlo detector-response models.

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