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Design, Construction and Performance Evaluation of a HPGe Detector Shield

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Abstract : A multilayer passive shield composed of low-activity lead (Pb), copper (Cu), tin (Sn) and iron (Fe) was designed and manufactured for a coaxial HPGe detector placed at a surface laboratory for reducing background radiation and radiation dose to the personnel. The performance of the shield was evaluated and efficiency curves of the detector were plotted by using of the various standard sources in different distances. Monte Carlo simulations and a set of TLD chips were used for dose estimation in two distances of 20 and 40 cm. The results show that the shield reduced background spectrum and the personnel dose more than 95%.

Keywords : HPGe shield, background count, personnel dose, efficiency curve
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