

Cross-Section Measurement of In-coherent Scattering from Annular ^{241}Am Gamma Ray Source

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Abstract: Compton scattering of gamma-rays has been carried out with the aluminum target at a fixed angle of $65^\circ \pm 2.5^\circ$. ^{241}Am gamma ray source, having 59.57 KeV energy and a long half-life of 432.2 years has been used to carry out the scattering. The strength of the source is 1000 mCi and it has an annular geometry. Scintillation detector NaI (Tl) of type 708 having a crystal size $1 \frac{3}{4} \times 2''$ connected to a Multichannel Analyzer (MCA) has been used for this study. MCA was calibrated using ^{133}Ba , and ^{137}Cs sources through ACCUSPEC software. The data accumulated was used to estimate the energy of the backscattered peak of the said sources and compared with their respective theoretical value. Spectrums were accumulated directly from ^{241}Am and the shift in the photo-peak of ^{241}Am with the aluminum scatterer. Data was used to calculate the scattering cross-section and compared with its theoretical value using Kline and Nishina's equation. A good agreement is found in theoretical and experimental values.

Keywords: Compton Scattering, Differential Scattering Cross-section, Multichannel Analyzer, ^{241}Am Gamma Ray Source.

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