

Simulation of Gamma Rays Attenuation Coefficient for Some common Shielding Materials Using Monte Carlo Program

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Abstract : In this work, the simulation of the radiation attenuation is carried out in a photon detector consisting of different common shielding material using a Monte Carlo program called PTM. The aim of the study is to investigate the effect of atomic weight and the thickness of shielding materials on the gamma radiation attenuation ability. The linear attenuation coefficients of Aluminum (Al), Iron (Fe), and lead (Pb) elements were evaluated at photons energy of 661.7KeV that are considered to be emitted from a standard radioactive point source Cs 137. The experimental measurements have been performed for three materials to obtain these linear attenuation coefficients, using a Gamma NaI(Tl) scintillation detector. Our results have been compared with the simulation results of the linear attenuation coefficient using the XCOM database and Geant4 codes and reveal that they are well agreed with both simulation data.

Keywords : gamma photon, Monte Carlo program, radiation attenuation, shielding material, the linear attenuation coefficient

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