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Simulation of Gamma Rays Attenuation Through Matters Using the Monte Carlo Program GEANT4

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This research focuses on simulation of the radiation attenuation using a Monte Carlo program called GEANT4. In the simulation, properties and geometries of the shielding system, which are the thickness, shape and element of the shielding material, can be varied. The radiation in gamma rays regime is considered to be emitted from the isotropic radioactive sources that are Cs-137, Co-60 and I-131. The count rate of the gamma photons at specific energy is calculated to compare the ability of radiation attenuation for different shielding materials with variable thickness and shape. The study results show that the higher atomic number material can attenuate the radiation better than the material with lower atomic number. Moreover, the attenuation rate of gamma rays depends greatly on the thickness and shape of the shielding system. This is agree well to the theoretical suggestion. The results from Monte Carlo simulation using GEANT4 can be used to design the radiation shielding system for radioactive laboratories, particle accelerator institutes, radiotherapy area in hospitals, nuclear power plants, etc.

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