Efficiencies and Characterization of Hexagonal Scintillator Detector

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Most scintillation gamma-ray detectors currently are formed from inorganic materials, that have relatively high densities of electrons and can be employed to build bulky array detectors with large-scale light output. The degree of gamma-ray detector performance work included the efficiency of the detector as a main function depending on the crystal geometry and its surfaces that deal with the radioactive source positions. Besides it works to obtain an energy resolution in good shape by allowing the maximum number of photons to be recorded within the actual real volume of the detector itself. In the current study, the scintillation hexagonal detector design efficiency and resolution are investigated to improve the detector response function to gamma-ray radiation, based on the source position related to the detector surface, which is considered all the time as an essential element in the characterization and optimization of scintillation detectors. This factor is one of the high-significance parameters for the hexagonal type of scintillation detectors, in which scintillation pulses are induced within the crystal by the interaction of the photons with enough high energy. This study gives an exceptional about the energy resolution manners using the response from the scintillation channels. The output features build a good idea about the measurement setup geometrical conditions that can be chosen in the scientific experiment with good ability to the detector response based on the position, where a certain geometric parameter, such as a geometric solid angle improves the efficiency of the hexagonal scintillation crystal.

Keywords: Scintillation Hexagonal Detector, Geometrical Solid Angle, Detector Efficiency and Energy Resolution.

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