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Time resolution study through Geant4 for the configuration of plastic scintillators coupled with SiPMs as a function of its dimensions.

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Content

Using Geant4 software, it was made sixty simulations of coupled square geometry detectors to plastic scintillators with silicon photomultipliers (SiPMs): thirty of these simulations were made locating two SiPMs (2 Scores) on the scintillator's central sides, and the other thirty simulations locating one SiPM (1 Score) on the center of the scintillator's rear face. To characterize the time resolution, it was required to quantify the optical photons that reach the Scores in a certain time, which are generated by muons on the surface of the plastic scintillator. The simulations were made varying four parameters: The number of SiPMs per scintillator (1 or 2 Scores), the scintillator material "BC404 & BC422", its volumetrical size (100x100x20, 50x50x10, 40x40x5, 20x20x5 & 20x20x3 mm3), and the interaction location of the muons beam with the scintillator.

Key words: Radiation, plastic scintillator, Photodetection, SiPM, Time resolution, simulation, Geant4

Area of contribution

Simulations

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