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# of PSD methods in simultaneous discrimination of alpha-gamma radiations

Radiation spectroscopy of radionuclides is of concern in various applications. Much radionuclides of interest could be attributed as alpha-gamma-emitters which makes it possible to be distinguished by alpha-gamma coincidence methods. . Phoswich is a technique which is based on making a coincidence between different time behaviors of sandwiched fast and slow scintillators. Here, a phoswich system has been designed and constructed by making use of a BC400 scintillator as the fast signal, and a CsI(Tl) for the slow signal. A GEANT4 application has been developed for simulation studies in the design phase to optimize various factors dealing with the efficiency and resolution of detector. Pulse shape discrimination (PSD) is an essential part of the procedure and can be performed with analog or digital methods. In this project alpha and gamma discrimination was performed using phoswich detector and digital PSD method. Three deferent digital PSD methods have been compared: Rise Time Discrimination (RTD), Constant Time Discrimination (CTD), and Charge Comparison method (CC). Experiment have been showed that the CTD method with less than 0.25% error has a better performance in gamma classification than other methods.

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