



Contribution ID : 94

Type : **Poster**

Spectrometric Characteristics of a Silicon PIN Diode for Gamma-Ray Detection at Room Temperature

Tuesday, 27 October 2026 19:25 (5)

Semiconductor radiation detectors provide high energy resolution, with silicon PIN photodiodes being widely utilized due to their technological simplicity and affordability. This study investigates the feasibility of using the commercially available BPW34 silicon PIN photodiode as a low-cost semiconductor detector for X-ray and soft gamma-ray spectrometry. A method for determining the optimal reverse bias voltage was developed based on the analysis of ^{241}Am energy spectra. The optimal operating voltage was established at 60 V, ensuring the formation of a depletion region sufficient for complete charge collection while minimizing noise. Spectra of ^{241}Am , ^{133}Ba , ^{137}Cs , and ^{152}Eu sources were measured at room temperature using an experimental setup comprising a charge-sensitive preamplifier and an SBS-79 spectrometric analyzer. A linear calibration was performed based on photopeak positions within the energy range from 5 to 120 keV. The detector's energy resolution (FWHM) was found to be between 1.26 and 1.96 keV, depending on the gamma-ray energy. The results confirm the linearity of the response and the stable operation of the BPW34 PIN photodiode in spectrometric mode, making it a promising, cost-effective alternative to specialized detectors for scientific and educational applications.

Primary author(s) : MAKEEV, Alexander (National Research Nuclear University MEPhI, Moscow, Russia); OLSHEVSKY, Egor (National Research Nuclear University MEPhI (Moscow Engineering Physics Institute))

Co-author(s) : Mr. ALEXANDER, Velichko (National Research Nuclear University MEPhI, Moscow, Russia)

Presenter(s) : MAKEEV, Alexander (National Research Nuclear University MEPhI, Moscow, Russia)

Session Classification : Poster session

Track Classification : Facilities and advanced detector technologies