

Fabrication and performance test of the silicon photo-strip detector coupled with a crystal scintillator

We develop silicon photodetector coupled with a crystal scintillator.

The silicon photo-strip detector consists of a single crystal and two silicon photo-strip sensors.

The photo-strip sensor is designed and fabricated based on concept of a AC-coupled single-sided silicon strip sensor but modified the incident layer to detect scintillation light.

The two photo-strip sensors sandwiching opposite face of one crystal scintillator are oriented orthogonal to each other. When a particle enters a crystal, the scintillation light is emitted and converted into electron-hole pairs in the silicon photo-strip sensors. This detector configuration provides the two-dimensional position information and a depth of interaction by measuring signal ratios between the first and second photo-strip sensors.

This detector concept can be applied in radiation and medical applications and nuclear medical cameras.

These sensors are fabricated on a 5-in., 380 μm -thickness, n-type, high resistivity silicon wafer and the prototype sensors.

The leakage currents and capacitances of the fabricated sensors are measured as a function of the reverse bias voltages. We also measured the photo response of fabricated sensor for the wavelength range from 350 nm to 1000 nm. The performance measurements of the photodiode and photo-strip sensor coupled with a CsI(Tl) scintillation crystal are also presented by using alpha and gamma source.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

http://baeri.knu.ac.kr/kah_VC10.pdf

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