

Quasi-monoenergetic Photon Field of 200keV using Radioactive Source with Back-Scatter Layout

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The ¹³⁷Cs (662 keV) was commonly used as a standard source for calibration of radiation detector or dosimeter for its energy response. For energy response measurement however there is no monoenergy source around 200 keV. The main objective of this study is to obtain the monoenergy radiation around 200 keV using radioactive source with back-scatter layout.

Figure 1 shows vertical experimental layout that was chosen to achieve the uniformity of backscatter field in wide area and to reduce the position dependent of the detector.

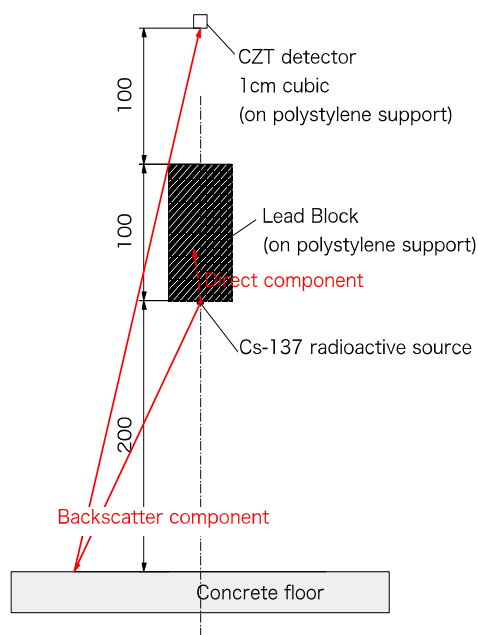


Figure 1: Experimental arrangement (vertical)

The ¹³⁷Cs source (662 keV) of 0.208 MBq strength was placed at 20 cm above the floor concrete followed by a 10 cm thick lead slab (5cm x 10cm) directly after the source, then at a distance of 10 cm above the lead, we placed a 1-cm³ CZT detector (KROMEK GR1).

Figure 2 shows pulse height spectrum of the CZT, backscatter peak at 186 ± 11.6 keV (FWHM) and dose rate of $4.4\mu\text{Sv/hr}$ was obtained under the layout.

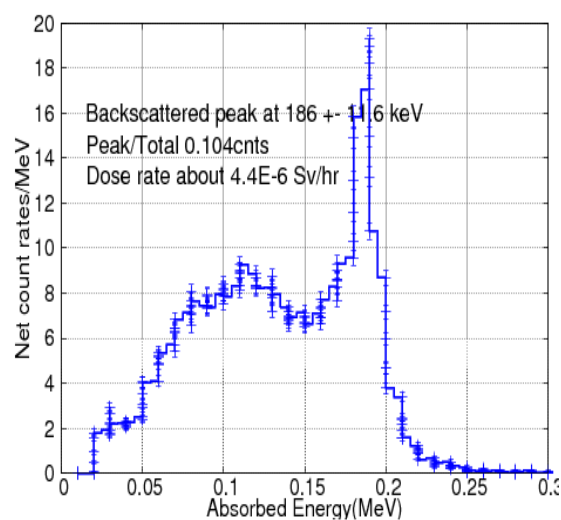


Figure 2: Back-scattered spectra of Cs-137.

The result is studied using Monte Carlo code (EGS5) to enhance the backscatter peak and reduce the Compton components.