19a-PA1-29

# Calculation of Scattering Properties from Radioactive Sources with Back-Scatter Layout

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When radiation detector is calibrated, it is desirable to calibrate for wide energies. For example 200 keV energy region is important because some detector response is too high and scatter photon energy tend to be that energy even if incident energy is 662 keV or 1.25 MeV. In our previous work, a backscattered layout can provide a uniform photons field spectra and dose rate with an energy of 190 keV by using affordable intensity Cs-137 gamma source. From calculated photon spectra, by adding 5 cm thick iron blocks onto concrete floor could lower the Compton part (< 150 keV) almost 98.4 % and increase the peak to total ratio 38.9 %.

In the present work, we compare different radioactive sources to see the energy dependence of backscattered photon field. Then we calculate the 662 keV back scattered photon dose and spectrum for several concrete area. Monte Carlo code for radiation transport (EGS5 code) was used for these purpose.

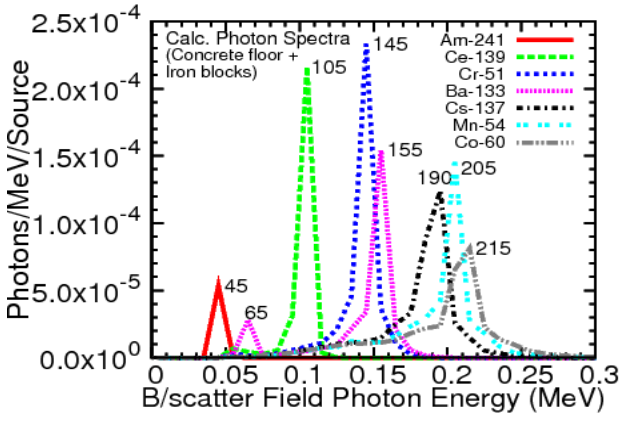


Fig. 1: Calculated back scattered photon spectrum from concrete floor+iron blocks for several sources.

Fig. 1 shows the calculated back scattered photon energy as a function of source energy. The higher intensity for lower energy components for high energy source may contributed by multiple scattering effect of the concrete floor. The calculated ambient dose increase almost linearly with backscatter energy.

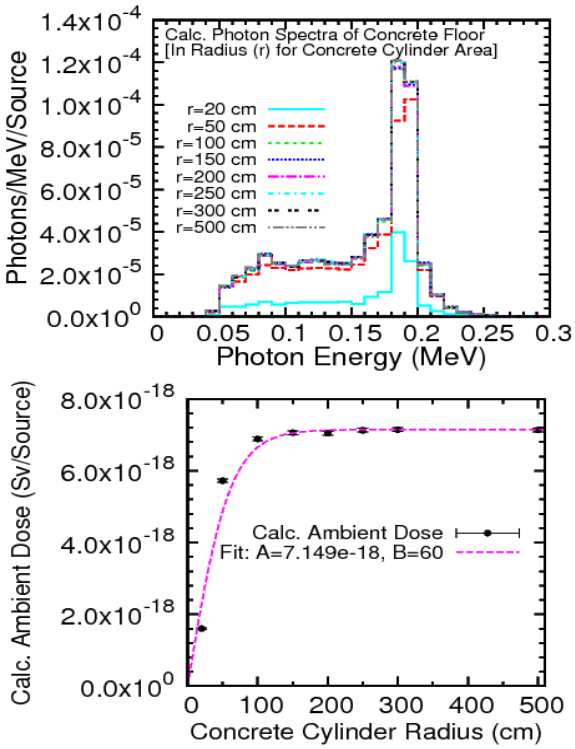


Fig. 2: Calculated of 662 keV back scattered photon spectra & ambient dose vs concrete area.

Fig. 2 shows the calculate back scattered photon spectrum and dose from several area of concrete floor. The saturated photon spectra and ambient dose for radius of concrete cylinder was above 200 cm.