PH 105 – Quantum Mechanics

Rohit Giri

23.09.12

6)

$\lambda' - \lambda = h(1-\cos\theta)/mc$

$\theta = \pi/2$

$\lambda' - \lambda = h/mc$

Compton shift in both cases is the same

$\Delta\lambda = 6.626*10^{-34}/(9.1*10^{-31} \times 3*10^{8})$

$\Delta\lambda = 0.024$ Å

Conservation of energy gives,

$hc/\lambda = KE + hc/\lambda'$

$KE = hc\,\Delta\lambda/[\lambda*(\lambda+\Delta\lambda)]$

For X- ray

KE = 0.295 KeV

For γ ray

KE = 0.37 MeV

% energy lost in collision

X-ray : 0.295 KeV/ $[(hc/\lambda)]$ = **2.37%**

γ ray : 0.37 MeV/ $[(hc/\lambda)]$ = **56%**