

39. If E is the original energy of the photon and E' is the energy after scattering, then the fractional energy loss is

$$frac = \frac{E - E'}{E} .$$

Sample Problem 39-4 shows that this is

$$frac = \frac{\Delta\lambda}{\lambda + \Delta\lambda} .$$

Thus

$$\frac{\Delta\lambda}{\lambda} = \frac{frac}{1 - frac} = \frac{0.75}{1 - 0.75} = 3 .$$

A 300% increase in the wavelength leads to a 75% decrease in the energy of the photon.