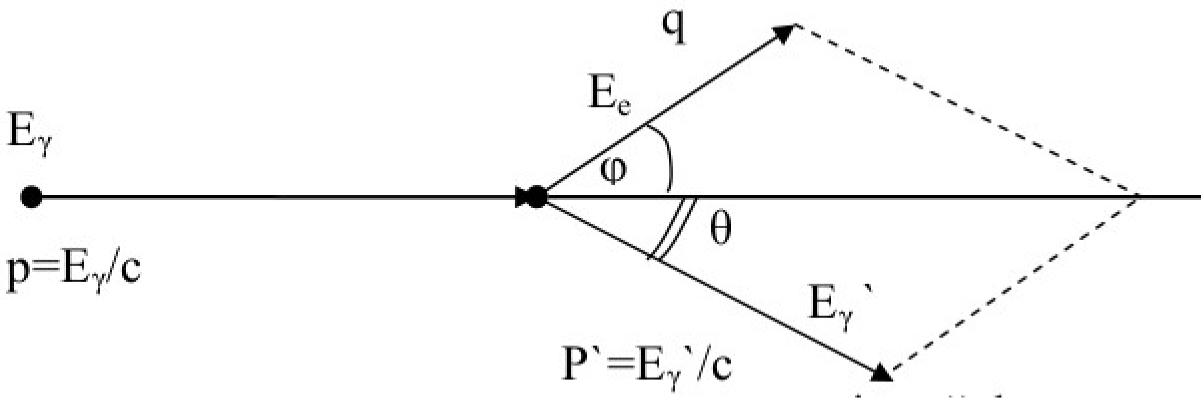
Answer on Question #46943, Physics, Quantum Mechanics



So we have three equations:

$$E_g=\frac{\sqrt{E_e^2-m^2c^4}}{c}\cdot\cos\varphi+\frac{E_g-E_e}{c}\cos\theta$$

$$\frac{\sqrt{E_e^2-m^2c^4}}{c}\cdot\sin\varphi=\frac{E_g-E_e}{c}\sin\theta$$

$$E_g-E_g'=E_e$$

We will introduce everything as functions of φ

$$E_e=\frac{1}{4E_g}\cdot\left(m^2c^4+4E_g^2\cdot\cos^2(\varphi)\right)$$ - final energy of the electron

if $\varphi=0$ => $E_e=\frac{m^2c^4}{4E_g}$ - this is minimal possible energy, that electron can obtain via Comptom scattering.

$$E_g'=E_g-\frac{m^2c^4+4E_g^2\cdot\cos^2(\varphi)}{4E_g}$$

if $\varphi=0$ => $E_g'=E_g-\frac{m^2c^4}{4E_g}$ - so we will have non zero energy, so non zero momentum along Y axis.

We can also calculate angle θ .

$$\sin\theta=\frac{\sqrt{E_e^2-m^2c^4}}{E_g'}$$ - also non zero angle.

Yes, θ won't be equal to 90 degrees.

ANSWER:

Electron will get it's energy from the photon.