

181(5) : Equal Mass Compton Scattering

In the case of equal mass Compton scattering:

$$m^2 = \left(\frac{h}{c}\right)^2 \left(\frac{\omega^2}{c^2} - k^2\right) + m_0^2 \quad - (1)$$

where m_0 is the measured mass of the free particle and where m is its covariant mass, its mass during collisions. In UFT 160 eq. (49) it was found

that:

$$m = \frac{h \omega'}{c^2} \quad - (2)$$

where ω' is the measured scattered frequency.

So from eqs. (1) and (2):

$$\frac{h^2 \omega'^2}{c^4} = \frac{h^2}{c^2} \left(\frac{\omega^2}{c^2} - k^2\right) + m_0^2 \quad - (3)$$

so:

$$\left(\frac{\omega^2}{c^2} - k^2\right) = \frac{1}{c^2} \left(\omega'^2 - \left(\frac{m_0 c^2}{h}\right)^2\right) \quad - (4)$$

This result shows why m in eq. (2) is not a constant.
