160(6): Reduction of the General Formula to the Usual Compton Effect Formula.

The general formula is:

$$x_2 = \frac{\omega\omega'}{\omega-\omega'} - \left(\frac{x_1^2 + (\omega^2 - x_1^2)^{1/2}(\omega'^2 - x_1^2)^{1/2}\cos\theta}{\omega - \omega'} \right) \quad -(1)$$

where $x_2 = \frac{m_2 c^2}{\hbar}$, $x_1 = \frac{m_1 c^2}{\hbar}$. $\quad -(2)$

This reduces as follows to the usual formula if:

$$x_1 \rightarrow 0. \quad -(3)$$

Then:

$$x_2 = \frac{\omega\omega'}{\omega-\omega'}(1-\cos\theta) \quad -(4)$$

i.e.

$$\omega - \omega' = \frac{\omega\omega'}{x_2}(1-\cos\theta) \quad -(5)$$

or

$$\frac{1}{\omega'} - \frac{1}{\omega} = \frac{\hbar}{m_2 c^2}(1-\cos\theta) \quad -(6)$$

Finally use $\omega = 2\pi f$, $f\lambda = c$, $\omega = \frac{2\pi c}{\lambda}$ $\quad -(7)$

to find:

$$\lambda' - \lambda = \frac{h}{m_2 c}(1-\cos\theta) \quad -(8)$$

which is the usual formula, QED. The usual formula is true only if $m_1 \rightarrow 0$. $-(9)$

In the case of the electron this is not true, so the theory fails.