1) 160(1): Electron Electron Compton Scattering at 90°

From note 159(15) the energy conservation law is:

$$\frac{mc^2}{\hbar} = \omega' + \omega'' - \omega \quad -(1)$$

and at 90° the momentum conservation law gives:

$$\left(\frac{mc^2}{\hbar}\right)^2 = \omega^2 + \omega'^2 - \omega''^2 \quad -(2)$$

If the electron mass m is taken to be constant, as it should be, then:

$$(\omega' + \omega'' - \omega)^2 = \omega^2 + \omega'^2 - \omega''^2 \quad -(3)$$

$$= \omega'^2 + \omega^2 - 2\omega\omega' + 2(\omega' - \omega)\omega'' + \omega''^2$$

So

$$\omega''^2 + 2(\omega' - \omega) - 2\omega\omega' = 0. \quad -(4)$$

i.e.

$$\omega'' = \frac{1}{2}\left(\omega - \omega' \pm (\omega' + \omega)\right) \quad -(5)$$

or

$$\boxed{\omega'' = \omega} \quad -(6)$$

Here ω'' = angular frequency of the initially static target electron after collision.

ω = angular frequency of incoming electron before collision.

If eq. (6) is not true experimentally the de Broglie Einstein theory fails catastrophically.