1) 159(7): Compton Scattering at 90°

In this case

$$\cos\theta = 0. \quad -(1)$$

Therefore eq. (6) of note 158(10) becomes:

$$v^2 = \frac{B}{\omega^2}. \quad -(2)$$

where:

$$B = \frac{1}{2}\left(A - c^2\left(1-\left(\frac{\omega}{\omega'}\right)^2\right)\omega'^2\right) \quad -(3)$$

$$A = \left(1-\frac{\omega'}{\omega}\right)^2\omega^2 c^2\left(1 + \frac{2Mc^2}{\hbar\omega}\left(1-\frac{\omega'}{\omega}\right)^{-1}\right) \quad -(4)$$

The photon mass is:

$$m = \frac{\hbar\omega}{c^2}\left(1-\frac{v^2}{c^2}\right)^{1/2} \quad -(5)$$

In general,

$$m = m(\omega, \omega') \quad -(6)$$

at 90° scattering angle. For a given ω and ω' these equations show that m varies with frequency. This means that the de Broglie Einstein theory fails fundamentally.

In ECE theory, the wave equation of electrodynamics is:

2)

$$\left(\Box + R \right) A^a_\mu = 0 \quad -(7)$$

For each a, this reduces to the Proca equation if:

$$R \rightarrow \left(\frac{mc}{\hbar} \right)^2 \quad -(8)$$

In general:

$$R = q^\lambda_a \partial^\mu \left(\Gamma^a_{\mu\nu} - \omega^a_{\mu\nu} \right) \quad -(9)$$

and as in UFT 62, eqns. (8.20) ff. (www.aias.us) the tetrad and connections are functions of frequency. So eqn. (5) becomes:

$$\frac{\hbar}{c} R^{1/2} = \frac{\hbar \omega}{c^2} \left(1 - \frac{v^2}{c^2} \right)^{1/2} \quad -(10)$$

$$\boxed{R^{1/2} = \left(\frac{\omega}{c} \right)^2 \left(1 - \frac{v^2}{c^2} \right)} \quad -(11)$$

in units of inverse square metres. The $\hbar$ factor has cancelled out, leaving a classical R. From Table 1 of UFT 158, at 90° scattering:

$$\left. \begin{aligned} \omega &= 1.0052 \times 10^{21} \text{ rad s}^{-1} \\ \omega' &= 4.416 \times 10^{20} \text{ rad s}^{-1} \end{aligned} \right\} \quad -(12)$$