A New Proof of the Constancy of Photon Mass Using Its Initial Energy

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If we consider electrons, it is clear that the mass of each electron is equal to that of other electrons and remains constant, i.e.:

$$m_{e_1} = m_{e_2} = m_{e_3} = \cdots = m_{e_n}$$

Furthermore, in a uniform environment, the velocity of each electron is identical and constant. Mathematically, this can be expressed as:

$$v_{e_1} = v_{e_2} = v_{e_3} = \cdots = v_{e_n}$$

From these two expressions, it follows that the kinetic energy of each electron ($^1/_2\, m_e {v_e}^2$) is always a constant quantity. Thus, we can conclude:

$$E_{e_1} = E_{e_2} = E_{e_3} = \cdots = E_{e_n}$$

It is well recognized, as previously discussed in earlier articles, that the electron serves as the genetrix of the photon, acting as its generating source. Consequently, the energy of each photon depends on the energy of its source, or the same electron. Thus, we can state that the initial energy of a photon is a fraction of the initial energy of an electron. Given that the energy of each electron is equal to that of any other electron, it follows that the initial energy of each photon may also be equal to that of other photons. Hence:

$$E_{P_1} = E_{P_2} = E_{P_3} = \cdots = E_{P_n}$$

$$^1/_2\, m_{P_1} {v_{P_1}}^2 = {}^1/_2\, m_{P_1} {v_{P_2}}^2 = {}^1/_2\, m_{P_1} {v_{P_3}}^2 = \cdots = {}^1/_2\, m_{P_1} {v_{P_n}}^2$$

$$v_{P_1} = v_{P_2} = v_{P_3} = \cdots = v_{P_n} = C$$

The constant c is eliminated from the expression, so:

$$m_{P_1} = m_{P_1} = m_{P_1} = \cdots = m_{P_1} = constant$$

The equations above demonstrate that the mass of each photon is equal to that of other photons and remains constant.

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