THE PHOTON IMPULSE EQUATION

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By using of the Newton formula

$$F = \frac{dp}{dt} = \frac{d(mc)}{dt} \tag{1}$$

together with the Einstein formula $E = mc^2$ the following equation can be received:

$$F = \frac{d(mc)}{dt} = \frac{1}{c} \cdot \frac{d(mc^2)}{dt} = \frac{1}{c} \cdot \frac{dE}{dt} \tag{2}$$

In [1,2] was shown: $-dE/dt = P = hf^2$ (3). The solution of the equation system (2,3) delivers the expression for the photon force:

$$F = -\frac{1}{c} \cdot hf^2 = -\frac{hc^2}{c\lambda^2} = -\frac{hc}{\lambda^2} = -\frac{hf}{\lambda} \tag{4}$$

With Eq. (2) and (4) the following relationship can be presented:

$$\frac{d(mc)}{dt} = -\frac{E}{\lambda} = -mc\frac{c}{\lambda} \tag{5}$$

The Eq. (5) let us to derive the photon impulse equation finally:

$$\frac{dp}{p} = \frac{d(mc)}{mc} = -f \cdot dt \tag{6}$$

References

1. About the calculation of the photon power. S. Reissig, Bulletin of the APS, March Meeting 2004, Part I, Montreal, Vol. 49, No.1, p. 255
2. The Photon Power and Stefan-Boltzmann Radiation Law. S. Reissig, Bulletin of the APS, March Meeting 2004, Part I, Montreal, Vol. 49, No.1, p. 255

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