How a Gamma Ray Photon Forms an Electron

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Abstract

We take a gamma ray photon and bend it round in a circle so that its front face is connected to its back face. We thus form an electron with rest mass energy 0.511 MeV .

We take a gamma ray photon with momentum mc and bend it around in a circular loop,

$$\int_0^{2\pi r} mcds = mc(2\pi r) \tag{1}$$

We take the right-hand side of (1) and multiply numerator and denominator by frequency ν ,

$$\frac{mc(2\pi r)\nu}{\nu} \tag{2}$$

In the numerator, we move the frequency to the inside of the parentheses:

$$\frac{mc(2\pi r\,\nu)}{\nu} \tag{3}$$

which provides

$$\frac{mc(c)}{\nu} \quad , \tag{4}$$

still further providing

$$\frac{mc^2}{\nu} \tag{5}$$

We recognize this as equal to the Planck constant, *h*:

$$\frac{mc^2}{\nu} = h \tag{6}$$

Thus we have

$$E = mc^2 = h\nu \tag{7}$$

which allows us to see that the gamma ray photon wrapped around in a circular loop furnishes us with an electron of rest mass energy E=0.511 MeV .

Bibliography

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