The transverse Doppler Effect is offset by acceleration energy

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ABSTRACT

This paper takes into account the transverse Doppler Effect is offset by acceleration energy. This is similar to be delayed the clock by acceleration in the twin paradox of Relativity.

MAIN

Wave speed and total energy of the object [1] to be resting at inertial system is,

$$w_0 = f_0\lambda_0 = c, \quad (1)$$
$$E_0 = M_0c^2. \quad (2)$$

Doppler Effect of Light

Wave speed and total energy of an object that has been accelerated to the particle speed (v) is,

$$w_v = (c^2 - v^2)^{1/2}, \quad (3)$$
$$E_v = E_0c/w_v. \quad (4)$$

When converted to the energy of the photon in the rest system, it is,

$$hf_v = hf_0c/w_v, \quad (5)$$
$$f_v = f_0c/w_v, \quad (6)$$
$$\lambda_v = \lambda_0w_v/c. \quad (7)$$

The light emitted from a moving object → Doppler Effect viewed from the rest system is,

$$f_d = f_vw_v/(c - v\cos\theta) = f_0/(1 - v\cos\theta/c), \quad (8)$$
$$\lambda_d = \lambda_v(c - v\cos\theta)/w_v = \lambda_0(1 - v\cos\theta/c). \quad (9)$$

Or is,

$$f_0 = f_d(1 - v\cos\theta/c), \quad (10)$$
$$\lambda_0 = \lambda_d/(1 - v\cos\theta/c). \quad (11)$$

This paper takes into account the transverse Doppler Effect is offset by acceleration energy. This is similar to be delayed the clock by acceleration in the twin paradox of Relativity [2].

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REFERENCES

[1] S. Hamaji, Equivalence principle of light's momentum harmonizing observation from quantum theory to cosmology, Int. J. Phys. Sci. **8**(38), 1885-1891 (2013).

[2] Kevin S Brown, "Doppler Shift for Sound and Light". Mathpages. pp.121–129. Retrieved 6 August (2015).

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