

Mechanism by which Photons Lose Energy as they Translate ¹

by

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During the late 1960's a research group at the McDonnell Douglas Corporation (later The Boeing Company) Santa Monica, Calif. Division was developing a theory of physics based upon a postulated kinetic particle universe. It was postulated that one type particle, the brutino, made up everything in the universe. The background speed distribution of the brutinos is Maxwell-Boltzmann for which the ratio of the *rms* speed v_r to the mean speed v_m is $v_r/v_m = \sqrt{3\pi/8}$. Further, the numerical value of $[(v_r - v_m)/v_m]^2 = (\sqrt{3\pi/8} - 1)^2 = 0.0729348$ was noted to be close to the fine structure constant; see the paper by Brown, Harmon, and Wood [1] and Chapter 2 of Brown [2]. Through the years members of the group discovered that $(v_r - v_m)$ is the electromagnetic velocity "c" and v_m is the strong nuclear velocity; again see Chapter 2 of [2]. Thus, the square of the ratio $(v_r - v_m) / v_m$ was shown to be the ratio of the electromagnetic force to the strong nuclear force. Also, this ratio gave us the velocity of the brutinos since

$v_r - v_m = c = (\sqrt{3\pi/8}) v_m - v_m$. Thus

$$v_m = c / (\sqrt{3\pi/8} - 1) = 2.998 \times 10^8 / 0.08540 = 3.510 \times 10^9 \text{ m/s.}$$

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At the beginning of the research we did not know the brutino speed, mass, diameter, or mean free path. We did know that the (conventional) expanding universe theory was untenable with our postulates. Moreover we knew that a photon must consist only of brutinos (since everything in the universe is postulated to be made up only of the kinetic particles called brutinos). Thus a photon energy must be the number of brutinos making up the photon times the mass of each times the square of their velocity, which is c^2 . We assumed that the photon lost one brutino for each wave length; i.e., the minimum it could lose. Now using an observable universe radius of 10^{25} meters we determined that the brutino mass was in the order of 10^{-66} kg (see Chapter 6 of [2]), which is close to the magnitude we discovered by other methods, see Appendix A of [2].

We propose the following mechanism for the limitation of the extent of the observable universe. In the atom the photon predecessor has an angular momentum of h about the atom center (where h is Planck's constant). As the electron drops from one orbit to a lower orbit the atom ejects a "string" of brutinos which makes a wave with half amplitude equal to the electron orbital radius and a length equal the orbital circumference. The atom proper loses an angular momentum of h but this angular momentum is maintained by the photon with the two electrical fields (i.e., the photon and electron) holding it together as it translates from the atom center. The angular momentum of the translating photon about the atom center is produced by the photon "mass", i.e., brutinos undulating up and down as their distance from the atom increases. As the distance increases and since the velocity is constant (i.e., c), the photon mass must decrease in order to maintain the angular momentum at a constant value, i.e. h .

The following computations show the mass decrease. Let E_i , be the photon energy after i wave lengths of travel from the atom. Now $E_i = M_i c^2 = hc / \lambda_i$ where M_i is the photon mass at the i th wave length from the atom, h is Planck's constant, and λ_i is the i th wave length. Also $E_{i+1} = M_{i+1} c^2 = hc / \lambda_{i+1}$. We have

$$E_i - E_{i+1} = M_i c^2 - M_{i+1} c^2 = (M_i - M_{i+1}) c^2 = mc^2$$

where m is the mass of one bruto and it is assumed that the smallest amount of mass that can be lost will be lost. We also note

$$E_i - E_{i+1} = \frac{hc}{\lambda_i} - \frac{hc}{\lambda_{i+1}} = hc \left(\frac{cM_i}{h} - \frac{cM_{i+1}}{h} \right) = mc^2$$

The foregoing analysis shows a plausible mechanism for the *tired light theory* cause of the Hubble red shift. The plausibility of this theory should be compared with the plausibility of the expanding universe theory. One final comment, it is noted that the photon, electron field, and the proton field are a connected system throughout the photon's travel to the edge of the (visible) universe.

References

1. Brown, J.M., Harmon Jr., D.B., and Wood, R.M., "A Note on the Fine Structure Constant," McDonnell Douglas Astronautics Company Paper MDAC WD 1372 Huntington Beach, CA, June 1970.
2. Brown, Joseph M., *The Grand Unified Theory of Physics*, ISBN: 0-9712944-6-1, Basic Research Press, 120 East Main Street, Starkville, MS 39759, USA, 2004.