

# Photon Physics without Metaphysics

*The corpuscular view of light cannot explain the celerity of light. This was Newton's theory of light, renewed by the photon of the relativistic theory. The celerity of the photon is regarded as a law of Nature. Relativists think it is perfectly futile to seek an explanation.*

Jean de Climont

## Photon Structure and Dynamics

Circlon Synchronicity is an experimental principle of the mass, space, time, and gravity of atoms and photons. It is based on the circlon shaped physical mass structures of electrons, protons and photons. Circlon synchronicity means that all electrons, protons, and photons in the Living Universe have identical parameters and are in perfect synchronicity with one another in time and space. All atoms have an individual relative momentum vector of  $p = mv$  and all photons have an absolute momentum vector of  $p = mc$  relative to the zero momentum photon rest frame.

## Aether Theories

Einstein's postulate for the constant speed of light has led many theorists to believe that some form of universal medium such as an aether or field must be required for all photons to move at the same speed of light  $c$  within the same universal reference frame. This is the way sound waves move in air and water with their speed depending on the temperature and density of the medium.

Just because a photon has wave characteristics, does not mean it has to have a medium to travel through. The photon itself is its own moving mass medium. It travels through empty space at  $c$  and  $C$  on its own inertial momentum and angular momentum  $p = mc$  &  $I\omega = m\lambda C/2\pi$ . Photons are made out of the same coil shaped mass structures as atoms.

Although Einstein claimed not to believe in aether as a carrier of photon waves, he invented a similar aether-like field substance called a spacetime continuum for his massless photons to travel through. Since then, Einstein's critics have invented many different unmeasured metaphysical types of aether and fields to transmit massless photon wave units through space in a process analogous to the way that sound waves are transmitted through air and solid matter. None of these theories is ever physically complete because there is never any experimental verification of the aether itself. We can measure many things about atoms and photons but no one has ever been able to measure anything about aether without claiming that all measurements are about aether.

Some dissident theorists propose separate aethers for photons and gravity, while others try to invent a single aether that does everything. The most commonly proposed aethers are either rigid or elastic solids. Others propose massless continuous fluids, while still others imagine their aether to be composed of countless, either stationary or rapidly moving unmeasured particles to which each theorist gives his own peculiar pet names. Some theorists even propose their aether to be composed of a stationary lattice of electron/positron dipoles that are packed into space, back to back, wall to wall, and treetop tall. Some claim them to have an overall universal density similar to a neutron star. Ordinary matter has the miraculous ability to pass through this dense material lat-

tice without any resistance. Still others claim that these “positron/electron” dipoles are massless because they imagine that while electrons have mass, antimatter positrons must have “anti-mass” and when they combine together into a neutral dipole they are massless. One theorist even claims that the universe is filled with otherwise indefinable and undetectable “black boxes” that are filled with “fibers” that vibrate as photon waves pass through them. The one thing that all of these postulated aether, field and particle mediums have in common is that none has ever been detected by an experimental measurement.

Electric and magnetic fields have been measured, but always in connection with electrons and protons and never in connection with the empty void of space itself. Electric and magnetic fields are structural stationary photon-like extensions of electrons and protons and have nothing to do with aether.

Surprisingly, few of Einstein’s critics have ever questioned his initial metaphysical assumption that the photon is a massless wave/particle duality that moves as a wave disturbance through the spacetime medium. The photon is considered by convention to be massless even though photons are measured to carry momentum, angular momentum, and energy as they travel through space. The only thing that we can ever measure about a massless photon is its momentum.

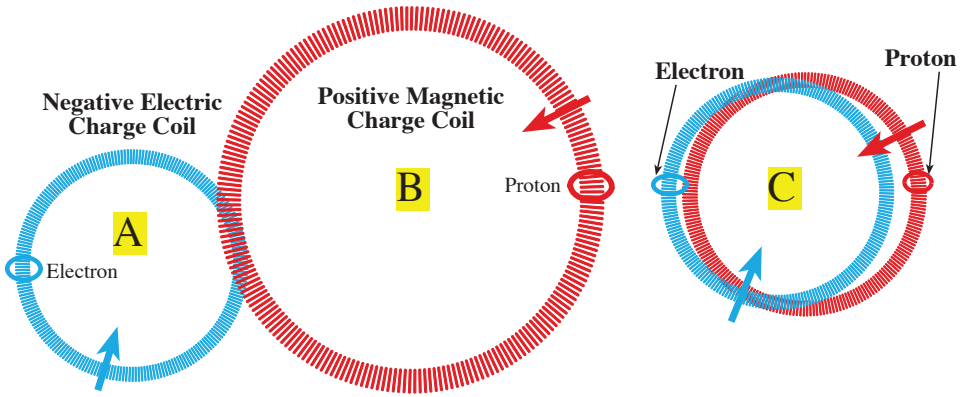
In contrast, if photons are allowed to have mass, they can travel and spin from one end of the universe to the other under the power of their own inertia. Photon dynamics can be understood from the simple results of experimental measurements and there is no need to invent elaborate metaphysical theories to understand how photons move through the void of empty space. They are just like rifle bullets that contain the separate energies in their moving ( $v$ ) and spinning ( $V$ ) mass. The kinetic energy of a rifle bullet is  $e = mv^2/2 + mVr^2/2$ .

## **Photon Doppler Shift Measurements**

All photon measurements show that when atoms moving with different relative velocities emit photons, their motions have no effect on the velocity  $c$  that the photons travel through space. The atom’s individual motion produces Doppler shifts in the emitted photon’s momentum and wavelength but has no effect on its angular momentum or its constant velocity  $c$  that all photons move through empty momentum space.

Since all photons are Doppler shifted by the absolute motion of the atoms that emit or reflect them and Doppler shifted again by the absolute motion of the device that measures them, there is no experimental way to determine the separate absolute motions of either source or observer. However, the sum of these Doppler shifts can always be used to measure the precise relative velocity between them. Also, even though the photon’s relative velocity between source and observer will almost always be less than or greater than  $c$ , the average two way velocity between them will always be measured at exactly  $c$ .

Each photon measurement contains a pair of unknown Doppler shifts that can only be resolved as a single relative motion. While one way measurements of photon velocity  $v$  are always Doppler shifted at  $c+/-v$ , two way measurements of photon velocity cancel all Doppler effects and always show  $v$  at exactly  $c = (c+v) + (c-v)$ . One way measurements of photons show their relative motion with matter and two-way measurements show their absolute motion with other photons.

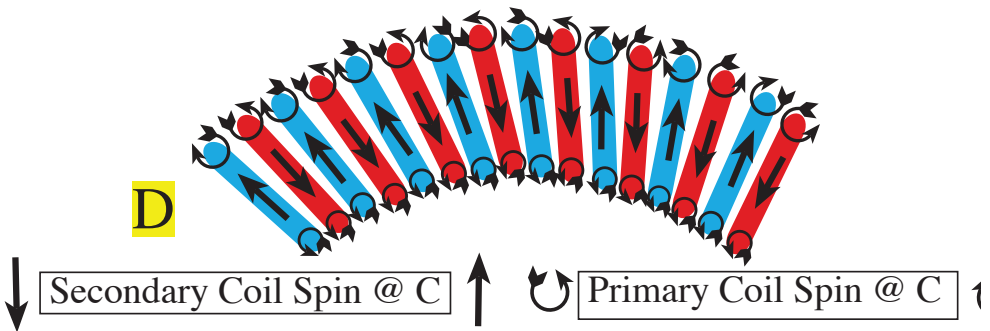


### Charge Coil Dynamics and Photon Emission

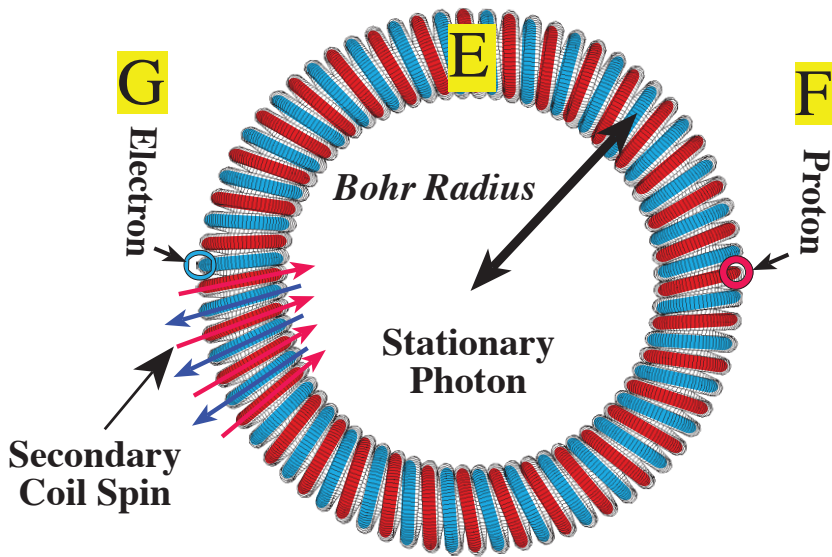
What theorists call electric and magnetic fields are actually structural parts of the electron and proton that extend outward from their edges and are not “fields” existing as separate entities within space. Electric and magnetic fields are large etherial particles extending out into space from each electron and proton respectively.

When the expanding negative electric charge coil of an electron (A) comes in contact with a proton’s positive magnetic charge coil (B), they intertwine with one another and pull the two particles together (C).

As these two charge coils pull together (C), they align and adjust to form a stationary photon that reaches synchronicity when they become the same size and occupy the same space while spinning in opposite directions (D). The stationary photon’s secondary coils spin in opposite directions while maintaining their centers on a single two-dimensional plane and the 11.7 times smaller primary coils spin in opposite directions with their centers on an infinite number of different two-dimensional planes.



These two equal and opposite charge coils combine to become a stationary photon (E). It is the stationary photon link at the Bohr radius that holds the proton (F) and electron (G) together within the hydrogen atom.



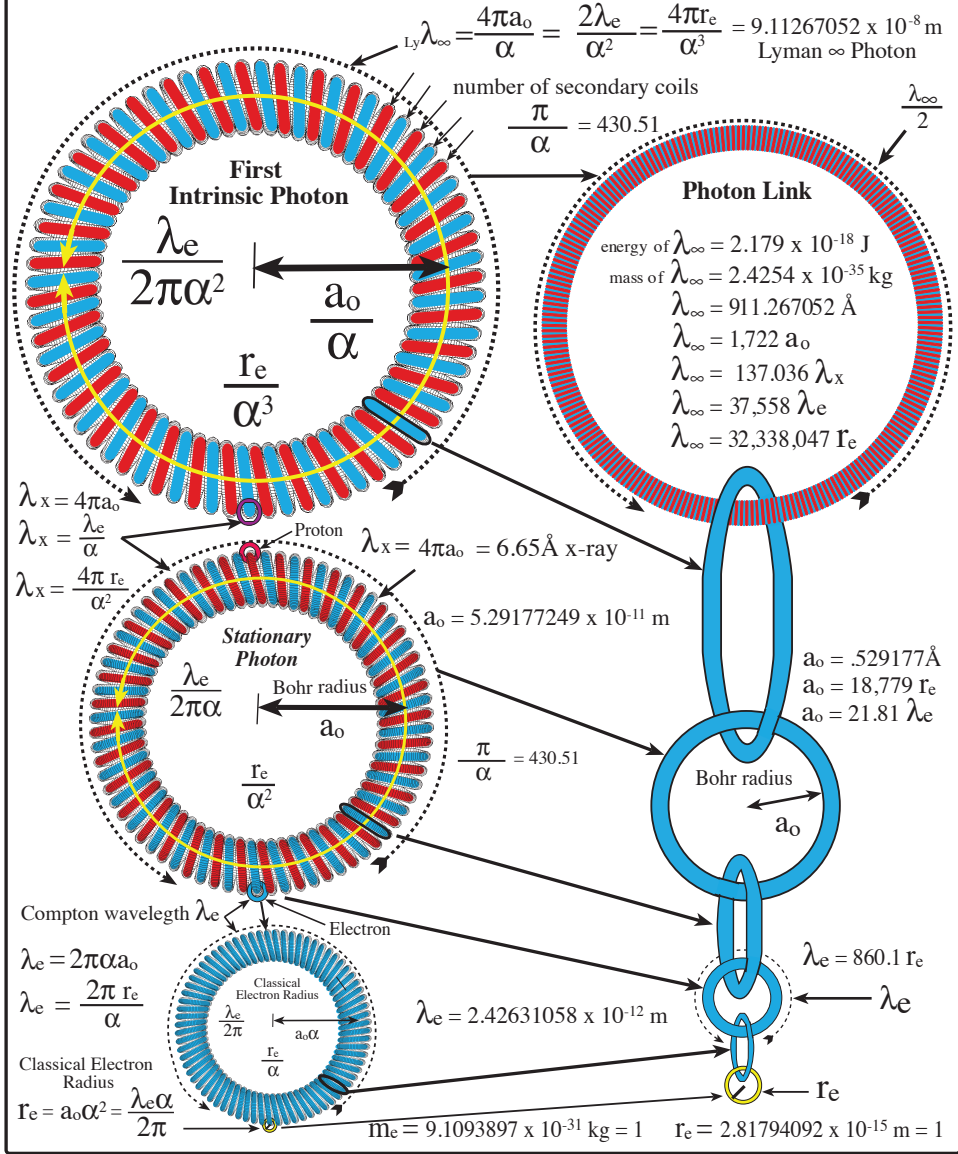
When this alignment process reaches synchronicity, the negative electric coil structure of the electron and the positive magnetic coil structure of the proton combine to form a stationary electric/magnetic photon. This photon has a mass = 2, a wavelength =  $1/2$  and an angular momentum of  $h/\pi = m\lambda c/\pi$ . It has an energy of  $e = mc^2 = 2$ , Half of this is the rotational kinetic energy =  $mc^2/2 = 1$  from the primary coils spinning at C on all planes and the other half is from the rotational kinetic energy =  $mc^2/2 = 1$  of the secondary coils spinning in opposite directions at the speed at C with their centers on a single plane. The tertiary coils move in one dimension, the secondary coils move in two dimensions and the primary coils move in n dimensions.

The circumference of the Bohr link stationary photon is  $2\pi a_0$  and when it splits into a pair photon they each have a wavelength of  $4\pi a_0/\alpha$ . This is  $2/\alpha$  times longer than the Bohr link's circumference.

When a stationary photon bifurcates, the oppositely spinning magnetic and electric secondary coils break in two and separate their two spins at C into two opposite directions at c. As the two new photons unravel from the Bohr link's secondary coils, they stretch out to twice the secondary coils original length. The emitted photons are the stretched out lengths of oppositely spinning primary coils.

## Coil Structure of the Hydrogen Atom

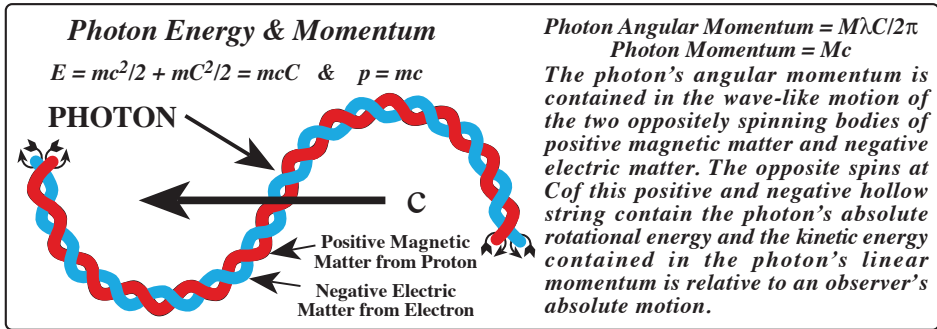
From Electron Radius, to Bohr Radius, to Lyman Intrinsic Photon



## Internal Coil Structure of the Hydrogen Atom

*It is quite difficult to make realistic drawings depicting the mechanics of the hydrogen atom because of the vast size differences between the different links in its radiation chain. Of the 7 links shown here, the photon link is the largest link in the chain and is over  $\sqrt{\alpha^7} = 32,000,000$  times larger than the electron's smallest classical electron radius link. Each consecutive link is  $\sqrt{\alpha} = 11.7$  times larger than the previous link.*

*The above drawings show two different ways of depicting the Hydrogen atom's circular shaped structural links. From the outside, the whole chain appears as just its largest link because the progressively smaller links are hidden inside of the atom's seven coils.*

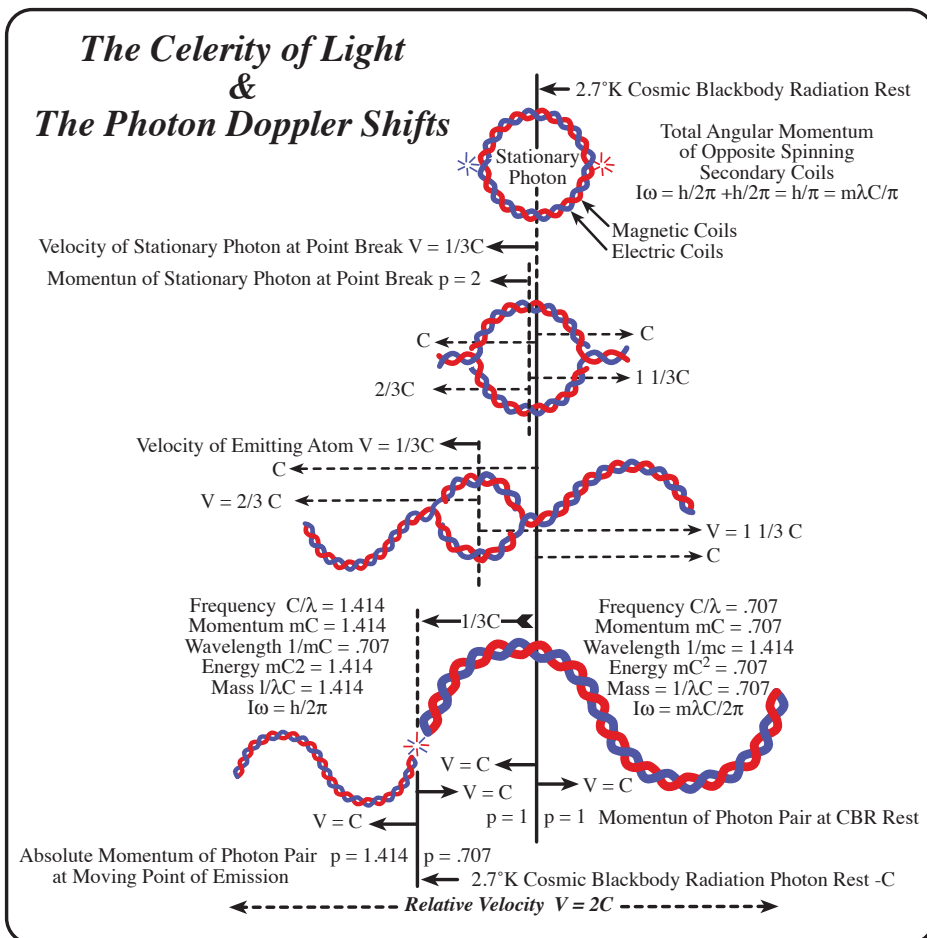


## Photon Dynamics

When synchronicity is reached within the stationary photon structure (E), it splits into two photons that have equal wavelengths, equal and opposite momenta and equal and opposite angular momenta on opposing planes. Each photon has  $m = 1$ ,  $\lambda = 1$ ,  $I\omega = h/2\pi = m\lambda c/2\pi$  and  $e = 1$ . This energy is one half the kinetic energy  $e = mc^2/2$  of the photon's vector at  $c$  and the other half is the rotational energy of its primary coils spinning at  $C$  on all planes and in opposite directions.  $e = mc^2/2 + mC^2/2 = mcC$ . When an atom emits a photon, there is no transformation between mass and energy. What happens is the transformation of two opposite rotational motions of mass at  $C$  into two opposite linear motions of mass at  $c$ . A quantity of angular momentum becomes two equal quantities of linear momentum.

The random relative motions (heat) of the electron and proton prior to the coupling of their charge coils produce the atom's initial quantity of angular momentum  $I\omega = mvr$  (A,B and C arrows). The number of  $I\omega = h/2\pi$  units determines the number of photons that the atom can emit until its angular momentum becomes less than  $2h/2\pi = h/\pi$  and it does not have enough  $I\omega$  to emit a pair of photons. The atom reaches its ground state when it can no longer emit any photons until it receives one or more units of angular momentum from another photon or from random mechanical motion (heat).

# The Celerity of Light & The Photon Doppler Shifts



## The Mechanics of Photon Motion C+ & C-

All photons are emitted as identical pairs from the common position of photon zero momentum rest. The stationary photon has zero net energy because the opposite angular momenta of its coils cancel and there is no relative energy between them. Individually, the coils have energy but together their energies cancel.

Within the stationary photon, the magnetic coils of the proton and the electric coils of the electron are spinning at  $C$  and in opposite directions while adjusting and aligning with one another. When they reach reverse synchronicity, both coils bifurcate and combine into two identical photons that move apart on a single vector at  $2c$ .

When the coils divide, the secondary magnetic coils from the proton combine with the opposite secondary electric coils from the electron. They stretch out into the electric/magnetic primary coil wavelength. Photons are  $2/\alpha = 274$  times larger than the stationary photon that emitted them. This is because when the secondary coils of a circlon shape are stretched out into a primary coil wavelength  $\lambda$ , they are  $2/\alpha$  times longer than the circumference of the stationary photon's tertiary coil. Opposite halves of the electric/magnetic coils combine to form a pair of identical photons moving in opposite directions.

When photons are emitted from a moving atom they share momentum with it but not velocity. During the time  $f$  the stationary photon is being transformed into a pair

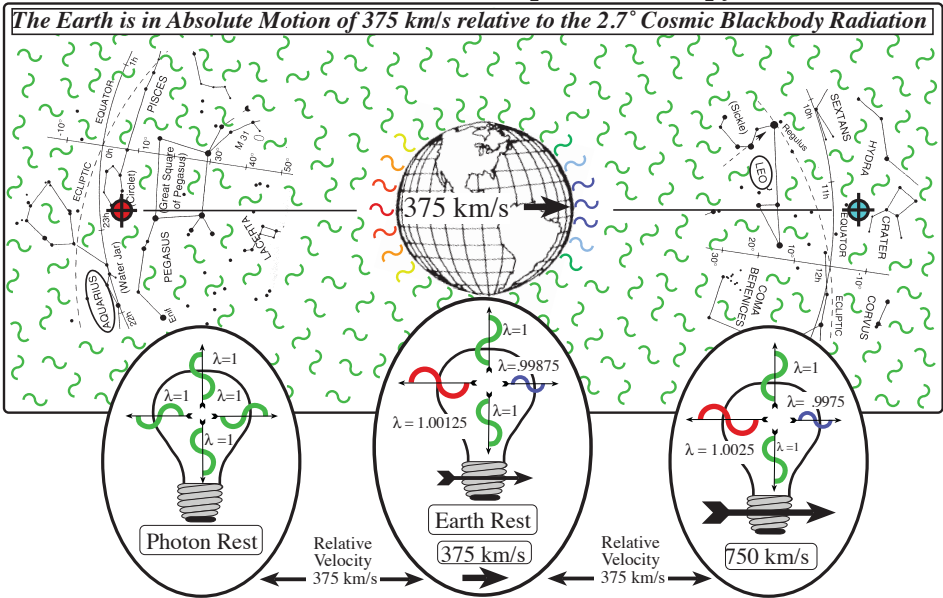
of photons, their wavelengths and momenta are being Doppler shifted by the atom's motion.

Even though these photons are identical at the point of photon break, they become red and blue shifted during the time of emission by sharing momentum with the atom. In the time  $c\lambda$  between photon break and emission, momentum is added to one photon and removed from the other. Photons share momentum with the moving atom but not its velocity relative to zero momentum rest. Photons get all of their velocity  $c$  from the opposite spins of the electric/magnetic secondary coils of the stationary photon. Photons get no velocity from the emitting atom's linear motion. All of a photon's velocity comes from the secondary coil spin velocities of the stationary photon C+ & C-.

Photons get all their velocity from angular momentum, and all of their Doppler shifts from momentum. The velocity  $c$  of photons is always constant because they get all of their velocity from the coils of matter spinning at C and none from the violent motions  $v$  of matter.

The absorption of a photon by an atom is virtually the same process in reverse.

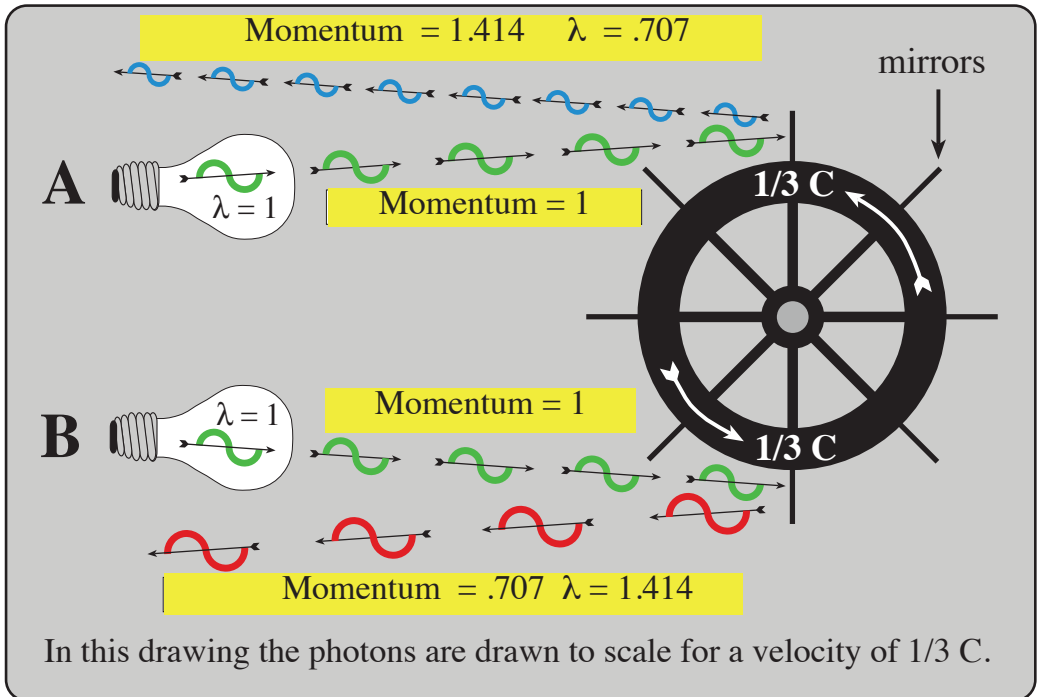
**The 2.7° CBR Dipole Anisotropy**



*This drawing shows the unseen Doppler shifts caused by Earth's absolute motion toward Leo relative to the Zero Momentum Rest Frame of the Cosmic Blackbody Radiation as measured by the CBR dipole anisotropy. A moving light bulb emits red and blue Doppler shifted photons on each side of the bulb along the vector of motion.*



# Photon Flywheel



For an example of how the change in a body's kinetic energy must also change its mass, consider a thought experiment in which a flywheel has evenly spaced mirrors attached to its outer surface like the fins of a paddle-wheel. The wheel is made of an exceedingly strong imaginary material and is spun so fast that the mirrors are moving at a velocity of  $1/3 c$ .

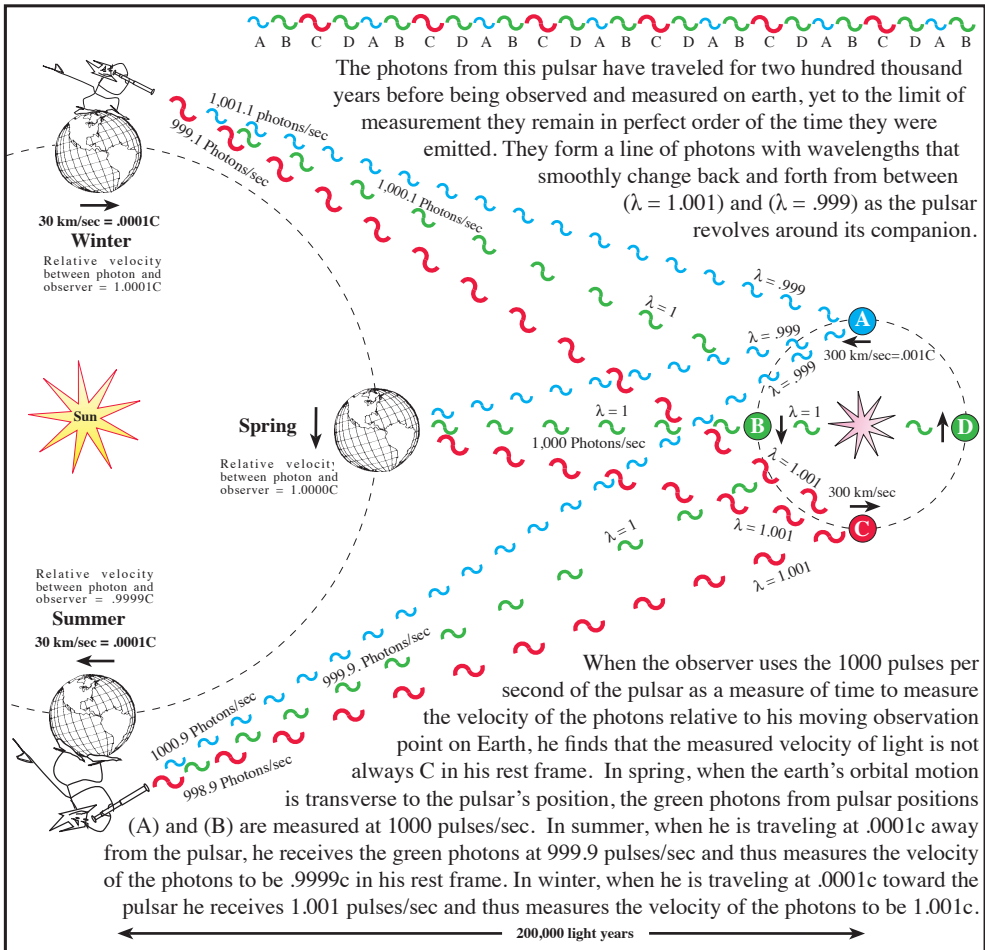
Two lasers, A and B, shoot photons at the mirrors on opposite sides of the wheel so that the mirrors are moving at  $1/3 c$  toward the photons from laser A and at  $1/3 c$  away from laser B photons. These photons are all emitted from the lasers with a wavelength, and momentum of exactly one, and all move at exactly  $c$  relative the same inertial CBR rest frame common to all photons. These photons reflect from the mirrors at the same velocity  $c$  that they had before striking the mirror. The velocity of the mirrors has no effect on the photons' velocity but does change their momentum and wavelength.

The  $\lambda = 1$  photons from laser A are blue-shifted to a wavelength of  $\lambda = .707$  as they reflect from the approaching mirror, and their energy and mass are increased to 1.414. In this process, the velocity of the spinning wheel is slowed as mass and energy are transferred to the reflecting photons.

The photons from laser B are red-shifted as they reflect from the receding mirror to a wavelength of  $\lambda = 1.414$  and a momentum of .707. In this case, the velocity of the wheel increases as energy/mass is transferred from the photons to the wheel. In both of these examples, momentum is conserved and both mass and energy remain separate and constant. Mass and energy are two sides of the same coin and always remain constant, conserved and equal.

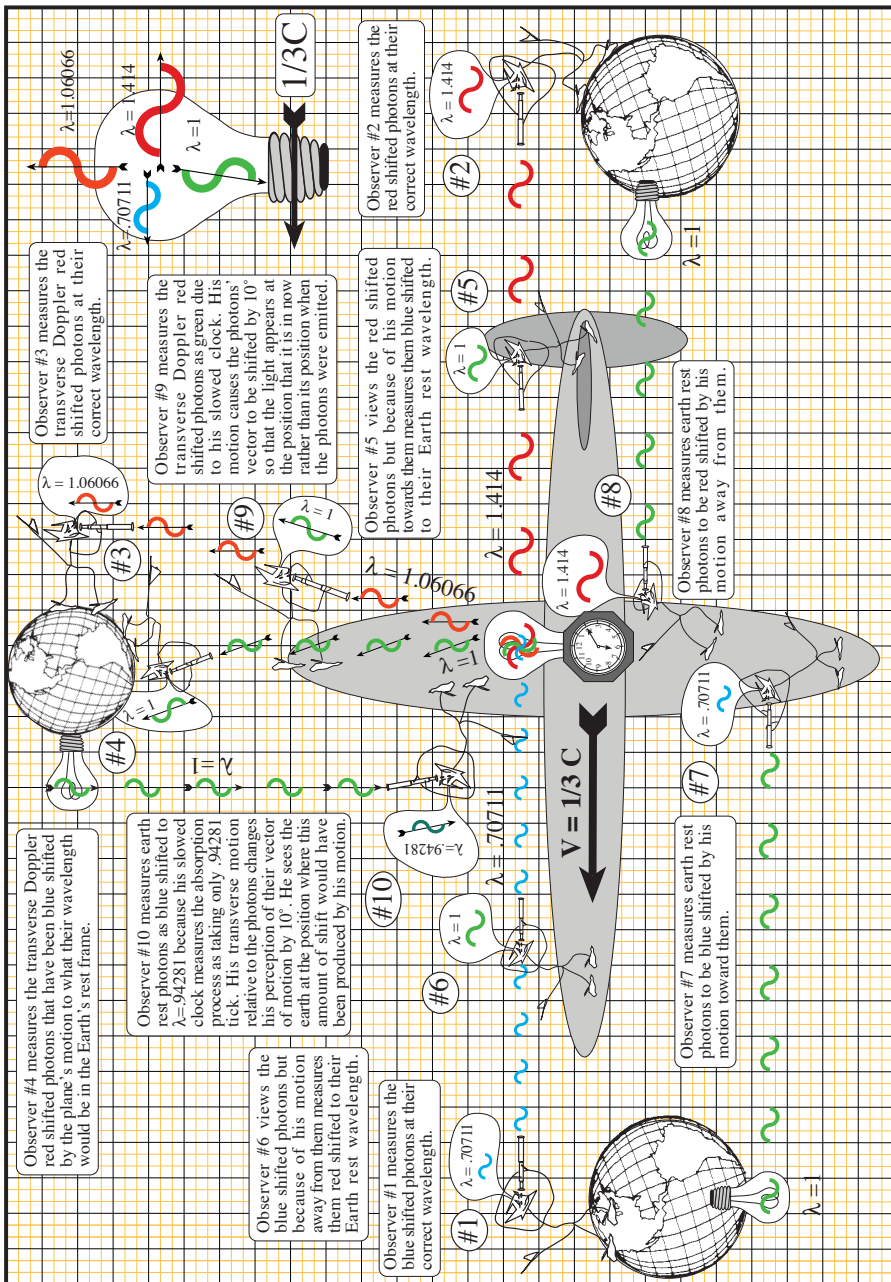
If we attempt to explain this experiment in terms of massless photons then the conservation of mass and energy is lost. The photons from laser A take energy away from the wheel and decrease its mass. Laser B photons transfer energy to the wheel and increase its mass. In both cases, energy remains constant but mass either vanishes into or appears from nowhere. How can mass and energy be equivalent if energy remains constant but mass does not? If the energy of moving mass produces extra mass how can the energy of moving photons not have mass?

## Binary Pulsar Observations



## Binary Pulsars

The observation of binary pulsars offers very convincing experimental evidence that all photons move at exactly  $C$  within the common reference frame of Zero Momentum photon rest. A binary pulsar emits rapid bursts of X-ray photons at very regular intervals as it revolves around a companion star. When photons from a pulsar are carefully measured, it is found that they are blue shifted when the revolving pulsar is moving toward the earth and red shifted when the pulsar is moving away. Even though the pulsar may be two hundred thousand light years from earth, the photons remain perfectly lined up in their order of emission. They are observed as repeating sequences of first red shifted photons and then blue shifted photons. If the changing motion of the revolving pulsar had any effect on the photons' velocity of  $c$ , then the photons could never have remained in their sequence of emission for two hundred thousand years. If any of these photons moved even slightly faster or slower than  $c$ , they would be observed as a jumbled up mixture of red and blue shifted photons.



*This is a scale model of photons being Doppler shifted in ten different situations by one third of the speed of light. Photons emitted with the motion of the plane have half the wavelengths and twice the energy of the photons emitted against its motion.*

*The above drawings all reproduce experimental measurements of photon force and motion and do not involve any "theories" of photons proposing aethers, fields, dimensions and any other unmeasured parameters or metaphysical media.*