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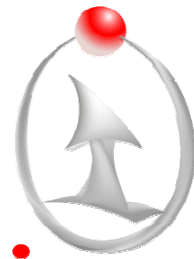
A NEW PARADIGM FOR RELATIVITY, LIGHT AND TIME.

The Strange Behavior of the Muon

By Terrence Wheadon

Muons are unstable particles created at altitudes of 6000 or more meters by cosmic ray particles colliding with nuclei of atoms in the earth's atmosphere, and at sea level in profusion, (muons have speeds up to 0.998 "c" where "c" is the speed of light), but they only have a tiny mean life span, during which despite their great speed, travel a distance of only 600 meters before decaying, thus making their arrival at sea level seemingly impossible. The orthodox explanation for this, in relativity terms is that in the muons frame of reference, the distance that it travels is shortened by virtue of the fact of its motion by a factor of $\sqrt{(0.998)^2}$ to 379m, well within its capacity to travel. Lets look a startling new possibility and where it takes us. Remember that the observed speed of the muon is 0.998 "c" . What if despite the observed speed, the real speed is, $\sqrt{(0.998)^2}$ by 15.8 times. or in other words it is not the distance the muon must travel that is reduced in its frame of reference, but rather that its speed is greater than we observe. In this case 15.8 times the observed speed of light, then it can travel the distance we observe actually before it decays,

Consider the photon, why would we be bold enough to contemplate such a paradigm shift, or to be bold enough to talk about speeds greater than the orthodox speed of light? Well, consider particles which comes in energy quanta, or packets called photons as well as electromagnetic waves. Imagine that we are one of these photons traveling at "C" , or for the purpose of the exercise, just a whisker slower than "C". The intrepid muon, applying orthodox activity, shows that the distance we need to travel to any point is shortened by our motion by the factor $\sqrt{1 - (v/c)^2}$, where v/c is that tiny whisker smaller than "1" clearly then, this factor is very close to zero, and as we move to the speed of light it becomes zero.



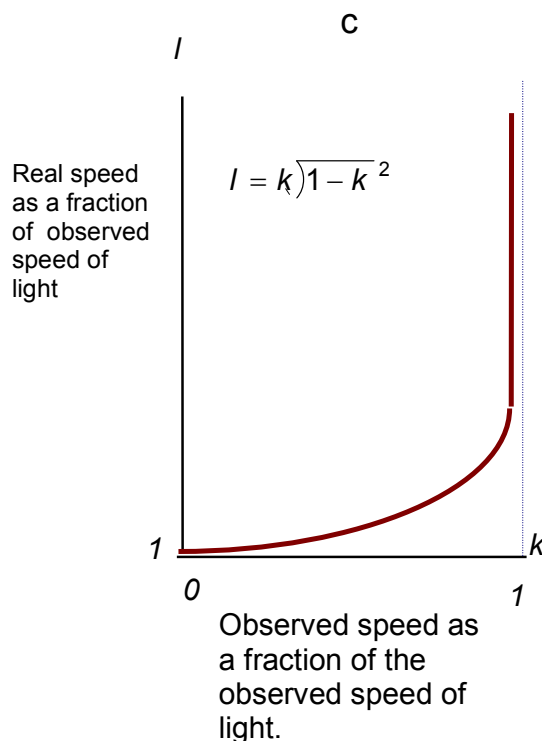
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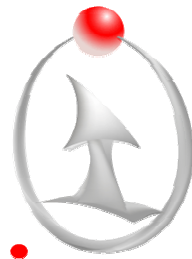
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This means that our photon, even if it had the most fleeting lifetime, could travel across the cosmos in no time at all, yet an observer could measure the speed to be “C”. If orthodox relativity, in explaining the facts of the muon, leads one startling point. Is it not a small step to propose a much more elegant explanation, namely that there is an underlying and observed real speed of the photon which is infinitely fast? The suggested real speed of the muon at 15.8 times the speed of light comes back to scale against the real speed of light which is infinite.

The new paradigm then revolves around there being two types of speed involved with objects in motion. One the orthodox, observed speed of the objects, and the other, its unobserved “real” speed. We can feel justified in describing this latter speed as “real” if we bear in mind that muons actually achieve the feat of reaching sea level. Alternatively if this is too concrete a description, we might use the experienced speed to make the distinction between that which is observed. Below we offer a diagram which conveys the relationship between these speeds Real (or, experienced speed) =

Observed Light Speed $\sqrt{1 - (\text{observed light speed})^2}$





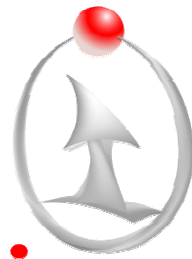
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As the observed speed of an object “ kc ” approaches “ c ”, its real speed approaches infinity. This new paradigm is totally constant with orthodox relativity, which applies unaffected in the observed world, but does not move beyond it. For example, the fundamental postulate that the speed of light in free space has the same value for all observers moving at constant velocity with respect to each other, can now be seen to be rooted in the idea that the real speed of light in free space is infinite. If we linger in this real world, before escaping back into the observable world. We notice many interesting things. For example, there is complete timelessness for the photon in free space, we could never see the clock tick but in its own time frame it can travel any distance in no time at all.

Successive photon emissions from a radiating body, say a far off star, follow as packets of energy hard on the heels of each other providing a pulse to the universe and hence an arrow of time. In their frame of reference they reach our planet as soon as they are emitted, just as the somewhat slower muon can easily travel 6000 m in its briefest of lifetimes instead of the 600 m it appears to have time to travel. Most interesting of all, there is no time in the photons frame of reference for it to disengage itself into an electromagnetic wave yet in the observable world light has a dual character, both as a photon and as a wave. This takes us to the nature of time, if the real speed of a photon is infinite, what is it that transforms its observable speed back to “ c ”? The answer must lie in the fact that in the observable world we have not only an arrow of time, but time itself, and we have not only photons of light but electromagnetic waves of light.

This leads to a conjecture that time is created in the observable world by the photon disengaging its energy and spreading it along a wavelength, as a pulse of photon emissions is turned into waves. The creation of the wavelength in the observable world between photo emissions, slows down the speed of light to “ c ” and literally creates observable time.



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In the observable world light travels across the cosmos in light years, not instantaneously. If the frequency of a light wave is “ f ” and its wavelength is λ then the distance that was traveled in forming it was λ meters, and the time was $1/f$ seconds. The speed at which this happened was λf meters /second, which is of course always “ c ”, the observed speed of light, and with time as we know it.

As if it were not enough for the new paradigm of the real and observed speeds of moving objects to lead one to a sharper understanding of the arrow of time, and then to the fundamentally new view of the nature of time, it also helps to explain the duality of light. Sometimes light behaves as mass-less particles and sometimes it behaves as a wave. To date, the explanations for this duality have been less than convincing. Under the paradigm, however, the duality is more natural. Photons are observable manifestations of the underlying nature of light in its own frame of reference. While electromagnetic waves are the buffer that bridges across into the observable world. Thus showing the observable speed of light to be “ c ” and therefore creating observable time.

In the bizarre world of quantum physics, photons behave as if they were waves, if no attempt is made to discern their path, but as particles if their path is discerned. Does this suggest paradoxically that the weirdness of the quantum world comes with the creation of waves and hence of observable time, and that any attempt to discern it takes one momentarily back to a sharper “real world”. Some such experiments suggest that is what Einstein called “Spooky action at distance”. Can the frame of reference in which photons in the “real world” and traveling at infinite speed, get mixed up with the frame of reference of the experimenter?