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THE DUAL VELOCITY THEORY OF RELATIVITY

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The special theory of relativity enjoys its unusual status because certain conclusions were made by Einstein that a rational mind has difficulties digesting. There is a saying that many physics theoreticians are correct in their mathematics but err in their interpretations.

The object here is to correct Einstein's misinterpretations and clear up some of the misunderstandings. Rather than analyze the said misinterpretations, we simply present the proper interpretations and let the reader draw his own inferences.

First, we must recognize that what happens to length, mass, energy, momentum and time is simply an observation. These parameters in their own co-ordinate system do not change. There they are known as "proper".

LENGTH

Let us consider length, say the length of a rod. As its co-ordinate system approaches the speed of light, the length of the rod appears to foreshorten. Next we recognize that length and distance are synonymous. We also recognize that velocity is distance/time. Therefore, we are drawn to the conclusion that if the observation of a length contracts, so does the observation of a velocity.

So what we have, then, is the dual situation of proper length and observed length -- and likewise, we have proper velocity and observed velocity, thus, the dual velocity that is the subject of this writing.

We shall refer to the proper velocity as "Newtonian" for that is what it is -- and the observed velocity as "relativistic" because that is what *it* is.

Next, we note (after proper investigation) that as the velocity of the moving co-ordinate system approaches infinity, the observed relativistic velocity approaches c. The relationship can be written as
V x sqrt(1-v^2/c^2) = v, where V = Newtonian velocity, v = relative velocity, and sqrt(1-v^2/c^2) is the Lorentz
transformation -- for which, henceforward, we shall use the letter, R.

Thus we have V R = v.

MASS AND MOMENTUM

Amongst other things this posit clears up the old bugaboo of relativistic mass which was inferred from the expression for relativistic momentum, p:

$$p = mv/R$$

In this expression, as v goes to c, p goes to infinity. And it was concluded that since v had the limit c, the only way p could go to inifinty was if the mass, m, increased. So Einstein concluded.

But in the light of dual velocities, we see another explanation. Instead of R modifying m, (m/R) it modifies v, (v/R) -- and we see that v/R = V. So it is the Newtonian velocity that goes to infinity.

TIME

We start our examination of the time dilation concept by going to its source -- Einstein's paper, On the Electrodynamics of Moving Bodies. We refer to his gedanken experiment of moving clocks. One of two identical clocks remains at rest while the other moves away and returns. When Einstein perceived the difference of the clock readings in his calculations, he stated the moving clock "was slow by ...". The immediate perception by the public was that he meant if a clock was "slow by" – it had to have run slower. He also said the moving clock was “behind” the inertial clock by ... . These two statements do not mean the same thing. If one clock is running slower, then it is running slower, and that has only one meaning.

On the other hand to say one clock is behind the other is open to alternative explanations, eg, the moving clock could have traveled a shorter world line -- or may have traveled faster than observed. In either case the clock would maintain its normal (proper) rate but for a shorter duration than the inertial clock and thus be behind. At any rate the accepted version is that the clock ran slower and thus was born the concept of time dilation which led to the famous Twin Paradox.

We see here the answer to the problem is that the moving clock traveled faster than observed. The clock in the moving system kept proper time but did so for a shorter duration than experienced by the stationary clock because its velocity (Newtonian) was faster than the observed relative velocity. To conclude that the moving clock kept proper time (which it does) and dilation (slower) time simultaneously is a reductio ad absurdum.

We shall illustrate -- and in doing so, we shall also illustrate the existence of super c velocities.

We assume a co-ordinate system that travels at the rate of 1.732 c. By VR = v we see the relative (observed) velocity to be .866c. {R can be obtained from V by sqrt{1/(1+V^2)}.

We set the conditions as follows: The traveling system ,S, will travel a distance of 1.732 light seconds (LS). Since the velocity is 1.732 LS/sec, the clock in the system will record the transit as taking one second. One second up and one second back equals 2 seconds for the round trip.

The observation in the inertial system is different. There, the observed velocity (relative) is .866 LS/sec, and the round trip will occupy 4 seconds -- two seconds each way.

However, that is not the way the inertial system actually observes. One has to take into account that in observing a moving co-ordinate system, the time for radiation to transmit the record of it has to be included. So the actual subjective description can be mathematically described as follows:

(where c=1)   v_ diverging = v/(1+v),   v_converging = v/(1-v).

Thus in our illustration the subjective observed velocity in recession is .4641c -- and the transit time is
1.731 LS/.4641c = 3.732 sec.

The subjective observed velocity in approach is 6.4641c -- and the transit time is
1.732 LS/ 6.4641c = .26795 sec.

Adding the recession time to the approach time gives us a 4 second round trip, for the inertial observer whereas it is 2 seconds for the moving observer.

One last consideration. Now that we have established super c velocities, what are the complications?

Let us, as a means of clearer illustration, use the Twins example. We shall call them Astronaut and Astronomer.

We see that to the Astronaut the round trip is two seconds, whereas to the Astronomer it is four seconds. (Let us transpose seconds to years).

What happens when the Astronaut lands and strolls over to stand shoulder to shoulder with the Astronomer? He must necessarily see the same as does the Astronomer. What would that be? And would that violate any laws of physics? He realizes that although only two years have elapsed for him, it has been four years for his brother, the astronomer.

To illustrate further, we can imagine a similar situation. We contemplate a galaxy a million light years away. It is agreed that as we observe it, we observe it as it was a million years ago – we are looking into our past.

Should a creature from a planet in that galaxy suddenly appear, we would conclude that he came from over a million years in our past. There is no conflict with known physical laws.

The question arises, what about the accepted concept that one can never chase a light beam and catch up to it? *

Consider the following: As one increases their velocity in this pursuit, the beam gradually reduces in frequency – until at the speed of light, there is no frequency at all. Note that the reduction in frequency does not alter the fact of the beam always preceding the observer at c until the frequency reaches zero. That would be c on the relativistic scale and infinitely great on the Newtonian. Thus we conclude it would take an infinitely great Newtonian velocity to catch a photon – which disappears at that velocity because the observer is keeping pace with the EM transmission.

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* **CHASING A LIGHT BEAM**

For an observer to chase a light beam means to chase photons that have recorded his existence and are proceeding in the same direction as he. Since c is a constant, we conclude that the photons will always precede the observer at that speed and he can never overtake them. We therefore conclude that superluminal velocities are impossible. However, we recognize that super c velocities are. We distinguish one from the other. A super c velocity is a Newtonian velocity greater than 3x10^10 cent/sec whereas a superluminal velocity is greater than light – which is potentially infinitely great.

Above, we mentioned time dilation – another misconception by Einstein. He asserted than whether receding or approaching, the moving clock ran slower. The nightly observations of astronomers belies this.

Any known constant frequency is a clock (A certain vibration of the excited cesium atom is the new standard for the second.). Constellations and stars contain excited atoms of known, constant frequency. They are in effect clocks.

We note that, in effect, when these clocks are receding, the observed frequency slows. That means the clock is observed to keep slower time. Conversely, when the clock is approaching, it is observed to run fast. Thus, we are drawn to the conclusion that time dilation as Einstein proposed it is in error for in that concept the clock is running slower.

Not only that but in its own co-ordinate system it would have to keep slower time – and simultaneously keep proper time, as we said before, a reductio ad absurdum.

Another fact that unseats the time dilation concept is that the rate for the two systems are different. The frequency system just described is also known as the Doppler effect. Now "Doppler" is just the name describing the mechanics of it. This does not alter the fact that Doppler rate is observed time rate. I call it "Doppler time". If one examines the figures given in the illustration above, they will discover that the transit times are of the Doppler rate. When used in the Twin Paradox situation, the paradox never appears.

ENERGY

We write generically $E = m\,a\,d = mv^2$ (m = mass, a = acceleration, d = distance)

For kinetic energy we write $E_k = mv^2/2$

This is the Newtonian expression and valid for very low velocities.
By considerations not displayed here the factor 1/2 is replaced by

$$1 /R + R^2$$

Thus we write the expression for kinetic energy as

$$E_k = \frac{mv^2}{(R + R^2)}$$

It will be found this is exactly equal to Einstein's

$E_k = (1/R - 1)mc^2$ and good for all velocities.

We note that the expression for the kinetic energy of radiation is
$E_k = h\,\nu = m_{photon}\,c^2$, which is of the form mc^2.

The mass of the photon is derived from Einstein's $m = E/c^2$.

Total energy is $E_t = mc^2/R$

We also note that in the form, $E = mc^2$, there is no modifying factor as there is for ponderous bodies. We take this to mean that the Lorentz transformation is not applicable to radiation (except where there is an interaction between radiation and matter in motion).

In the Newtonian case, we also note that the factor ½ is only applicable at very low velocities. In the kinetic energy equation above --- good for all velocities --- we have the factor $1/(R + R^2)$ replacing ½.

Note that at very low velocities, R is 1 --- and the factor $1/ (R + R^2)$ becomes ½. As we go up the scale of velocities, this factor goes to infinity as does the velocity.

As stated before every Newtonian velocity has a corresponding relative velocity. It should be noted the parameters of momentum, kinetic energy and transit time found in the Newtonian velocity are associated, unchanged, with the corresponding relative velocity. In short, they do not undergo the Lorentz/Fitzgerald transformation.
It is this phenomenon that accounts for much of the mystique of special relativity --- to wit --- at c velocity the energy and momentum go to infinity, while transit time goes to zero. Recall that the Newtonian velocity corresponding to c is infinitely great – and we would expect the momentum and energy to go to infinity. At infinite velocity, the transit time to anywhere is zero, so the clock in the moving co-ordinate system is assumed to have stopped.

As to length, that does undergo the transformation – which, with respect to inertial time, shows up as a reduced Newtonian velocity which is our relative velocity. (As a seeming contradiction, we note that inertial time times R equals the transit time in the Newtonian velocity, but the fact remains that transit time with the Newtonian velocity is the time attributed to the relativistic velocity.)

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