23.

TIME

What I have proposed herein is a basic dynamic nature of matter that goes beyond the variable quality of matter defined by relativity. The essence of this dynamic behavior is a relentless, positive, slow expansion of all matter. The birth of this "expanding matter" perhaps began with the Big Bang when all matter went from infinitely small volume and was thrust out into the Universe. Did the "flow" of time also begin with the Big Bang? If a person is open to considering the idea of "dynamic matter" it may be a comfortable connection to recognize that this expansion is completely analogous to "time" in its behavior.

The physical dimension of time, the existence of time, the concept of time, has held a special position in the field of physics by maintaining an independence from the other seemingly interdependent ingredients of our Universe. It has basically remained a philosophical question; what is time? If matter is relentlessly and slowly expanding in a forward positive direction, it may be that this expansion is the "engine" of time. We know from Relativity that time is linked to *motion*. An inherent expansion of matter yields a relentless forward *motion* of matter thereby establishing an undeniable link to time.

If space is traveling at the speed of light in the heart of every atom and this motion is sustained by the conversion of space to matter, then this establishes our universal clock. We have defined a motion of matter relative to space that resides within the atom. If our ponderable mass resides in empty space, then its rate of time would be the basic rate of time for the universe. If motion and the effects of special relativity are applied to this ponderable mass, then a slowing of time occurs.

Lorentz transformations-length, mass and time

The physical mechanism for the force of gravity is currently not defined in physics. And likewise, the question; "Why the quantum?" remains unexplained. The physical mechanics that produce time dilation, length contraction and variable mass, also are currently not defined. The Dynamic Matter postulate provides a physical explanation for length contraction, variable mass and time dilation, as well as gravity and the quantum.

If the theory presented herein is to be considered for addressing unexplained phenomenon that exist within our current knowledge of physics, then it should be possible to extend it to the three Lorentz transformations associated with high velocity: **length, mass and time**. In section 16, page 67, it was mathematically demonstrated how the velocity of space, per the Dynamic Matter conversion of space to matter, terminates at the speed of light in the heart of the atom. This postulate has several applications to current unresolved physics.

Length Contraction

As defined by Special Relativity, at high velocities, lengths will contract in the direction of travel. Again, we can apply the Dynamic Matter postulate. This basic postulate outlines a steady, forward expansion of matter that began following the Big Bang. The expansion of our most basic matter is likely fueled by a conversion of space. In addition, as each elementary particle expands, the expansion likely happens in quantum increments per Planck's constant. See section 21, page 58. Special relativity shows that time slows down as our velocity approaches the speed of light. Per Dynamic Matter, the matter will be expanding at a slower rate with a reduction in the rate of time. Now we have the matter, in the line of travel, expanding at a slower rate. After a given amount of time, this matter has a shorter length. It is significant that the Dynamic Matter postulate can be applied to provide a mechanism for length contraction.

Mass Increase

Our second Lorentz transformation deals with the increase of mass. For this application of Dynamic Matter we will use an increase in velocity for our model. An often overlooked aspect of Special

Relativity is how acceleration must be applied. To increase from velocity "a" to velocity "b" invokes the physics of acceleration. A fundamental explanation of Special Relativity often brings up an argument of "paradox." If one rocket departs from another rocket in free space then how does an observer know or measure which rocket is in motion? They are both moving away from each other in a relative sense. If we apply this to the example of twin brothers, then which twin ages more slowly? It is the one who is in the rocket that has accelerated to achieve a velocity in a direction away from the other rocket. The mass that has been accelerated experiences the effects of Special Relativity and this resolves the perceived paradox.

This example shows that acceleration, even in Special Relativity, is fundamental to our Lorentz transformations. Applying this to the increase in mass we invoke our space-to-mass conversion. The Dynamic Matter conversion outlined says that space, which is in an accelerated state at the heart of the atom, is being converted to mass. Hence, it would follow that a ponderable mass in an accelerated state in free space would be converting space to mass, and thus becoming more massive. At a given constant velocity for our rocket, i.e. motion without acceleration, the expansion at the heart of every atom is happening at what we call "**basic dynamics**." When that ponderable mass is accelerated we now have an increase of space to mass conversion due to our acceleration. We will call this "**accelerated dynamics**." Our "basic dynamics" deals with the physics of gravity and general relativity. Our "accelerated dynamics" is applied to the acceleration phase of achieving higher velocities within the framework of special relativity.

Returning to our ponderable mass traveling at velocity "a" we have only the "**basic dynamics**" occurring and all mass in this state of rest is increasing at the basic rate. During the acceleration phase of our mass to velocity "b" we have entered the realm of "**accelerated dynamics**." What this means is that the mass of our rocket has an additional increase during the acceleration phase. And as per Lorentz, the mass of our rocket is greater at velocity "b" than it was at velocity "a."

Mass and Matter

Mass and matter are separate attributes for our ponderable mass. Matter is the term used to describe the physical manifestation of our ponderable mass. We can think of this in terms of length, width and height which define our object. Mass is the attribute assigned to the inertial value of our physical object. The amount of force required to accelerate our object defines the value of mass. By contrast, it seems instinctive to believe that matter and mass would change at the same rate. Countless analysis of collapsing stars and black holes has demonstrated otherwise.

The intense gravitational field of a black hole reduces the rate of time. Applying the outlined effects of Dynamic Matter, we can physically account for the reduction in length by the slowing of time. This explains the shrinking volume of the black hole. Simultaneously the mass is increasing. The effect can be self-perpetuating and can continue until all matter is reduced to a singularity. The point emphasized here is that mass can increase while size decreases. This is described to help understand how our rocket or ponderable mass can lose size and gain mass at the same time. What we surmise is happening is that the space/velocity field of our forward motion, combined with the micro flowing space field at the heart of the atom both contribute to the gain in mass.

Time Dilation

Special Relativity has shown us that a person in a rocket travelling at high velocity will experience a slowing of time. His internal clock, as well as the clock in his rocket, is powered by space flowing into the nuclei of all the atoms per the Dynamic Matter postulate. Per special relativity, his high velocity is affecting these clocks.

How does the Dynamic Matter postulate explain the physical mechanics behind time dilation? Dynamic Matter outlines a perpetual growth of matter that began immediately following the Big Bang. This growth is fed by a constant inflow of space into the heart of atoms. This flow of space is in an accelerated state. Conveniently, this postulate also provides a definition of the physical mechanics of gravity. We surmise that this perpetual growth of matter at the heart of the atom happens in Planck sized pulses.

In a special relativity example, the acceleration phase toward increased velocity results in:

1. a decrease in the matter (length contraction)
2. an increase in mass and
3. a subsequent reduction in the rate of time.

With our "basic dynamics," the rate of conversion of space to mass appears to happen at a constant rate associated with mass in a "rest state." With "accelerated dynamics" the increased flow of space from forward velocity is being converted to mass. This likely results in matter becoming increasingly dense. This higher level of density likely affects the rate that space is being converted to matter. If space is being converted at a rate slower than the basic rate this would result in a slower rate for the passage of time. It is significant that the Dynamic Matter postulate can be applied to provide a mechanism for time dilation.

Summary

Within this study, we have extended the equivalence principle to say that inertial force for an accelerating object and the force for an object in a gravitational field are caused by the same effect: relative motion of mass to space. Returning to special relativity, we can see that when velocity approaches velocities near the speed of light; time slows, lengths contract and mass increases. The Dynamic Matter postulate explains the physical mechanics behind these transformations.

Within the realm of special relativity we are limited to the magnitude of acceleration that one can attain. The speed of light is our velocity limit. Therefore, a high magnitude of acceleration, coupled with our increase in mass, will cause us to reach our practical limit in a given amount of time. By contrast, the physics of a black hole can create limitless magnitudes of acceleration with the intense growing gravitational field. If we did not have an acceleration limit in special relativity then we can see how the physics of special relativity could produce a singularity as is produced by general relativity. This is further validation that it is correct to extend Einstein's equivalence principle to 100% equivalence.