On the Role of the Field in Relativistic Phenomena

Carl S. Reiff

Abstract

The extent to which relativistic phenomena occur can be accurately calculated/predicted. However, why or how they physically occur isn't necessarily clear. For example, what is it about matter (physically speaking) which causes it to rather noticeably experience process slowing when moving at substantial speeds? With respect to what must it be moving, and why does it matter? Herein, physical reasons are presented as to why and how various phenomena occur.

The Field

In simplest terms, the field is gravity – or, more specifically, the gravitational field – which is ubiquitous throughout the universe. Ubiquitous doesn't exclusively mean betwixt all things, but also through all things. Similar to how light passes through transparent objects, like glass, the effect of gravity extends right through all objects. Consider how astronauts inside the Internation Space Station float in concert with the station. They do so because the same gravitational intensity acting on their bodies also acts on the station around them – right though the walls thereof.

Gravity is mass based, and the gravitational effects of any given mass is infinite in terms of reach/distance. Perhaps to state this more clearly, gravity/gravitation is a property of mass. Without mass, there wouldn't be any gravity/gravitation. They are inexorably interconnected. They (mass and gravity) are two aspects of the whole.

Gravitational bodies like moons, planets and stars have domains of supremacy. When it comes to Earth's moon, Earth is supreme, not the sun. And when space ships like the Apollo command modules orbited the moon, the moon was supreme, not Earth. For an object orbiting the sun with the same period as Earth, the L1 Lagrange point is a position where neither Earth nor the sun has supremacy.

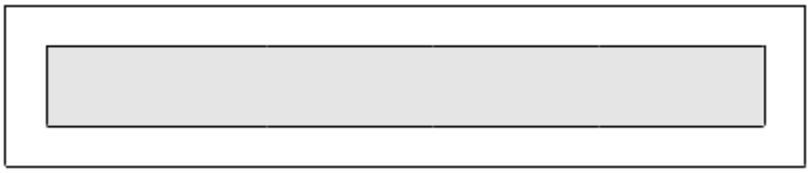
Photons

Visible light is photon based, and although photons are not known to have any internal structure, they nevertheless exhibit wavelike characteristics. These characteristics manifest in electric and magnetic aspects, which can be visualized as tracing out orthogonal sine waves along the line/axis of propagation. Thus visualized, they are in phase, meaning that they reach maxima (crests/troughs) simultaneously with each other. It is postulated here that photons have a structure which is based on a composition of these two aspects.

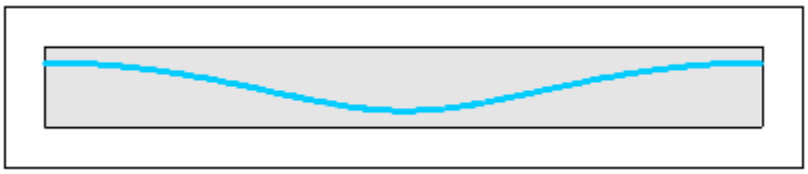
Consider one end of a spinning baton ablaze in a pageant on a dark night. The electric component (hereafter, electrino) of a photon behaves in a similar fashion as the fire ball – perpetually cycling. It's the same for the magnetic component (hereafter, magnetino). The planes of their cycling paths (think of them each as "orbiting" through the interior of their own torus) are perpendicular to each other and coincide with their (the photon's) direction/line of travel.

The speed of all electrinos and magnetinos (hereafter, collectively/generically photinos) along their cycling paths is the same, regardless of wavelength. What differs is the radius of their cycling paths. The radius of the cycling photino paths of 650 nanometer (nm) red light is larger than those of 450 nm blue light.

Consider a wide (panoramic) pane of frosted glass, along one side of a long rectangular box.



The interior of the box is dark. Inside the box is an apparatus with a rod having a light on one end – similar to the baton mentioned previously. The midpoint of the rod is affixed to a rotating shaft. With the light now tracing out a circular path, the apparatus (just behind the glass) is quickly moved from one end of the box to the other. If time lapse photography was used, the resulting photograph would show that the light traced out the basic shape of a sine wave.



This is an example of how photons can exhibit wavelengths.

Photons and Speed Limiters

The speed of light is fastest in a vacuum. It is considerably slower in various translucent substances, glass for example. Glass is not a medium for light, at least not in the sense that is necessary for the propagation of light. Instead, it's simply a speed limiter. Similarly, the field is just another speed limiter for light. Other than limiting the speed of light to *c*, it plays no other role in the propagation of light.

Because photons are massless, the instant they are emitted, they are traveling at whatever speed the limiter imposes. If in a vacuum, they are instantly traveling at *c*. If under water, then they are instantly traveling at approximately three-fourths *c*. And, if they pass from one limiter to another, say water to glass to vacuum, they instantly travel at the new limiter's speed. There is no time spent accelerating (or decelerating).

The Essence of Matter

According to $E=mc^2$, matter contains energy, and the splitting of atoms corroborates this. The most readily observable type of energy involves motion. It is postulated here that all matter, way down below the subatomic level is composed of energy in motion. The motion is circular, similar to photinos – if the

photinos were stationary. The speed of the cycling energy (hereafter, cyclon) along its circular path is *c* (the speed of light). Even the tiniest subatomic particles (say, electrons) are composed of untold numbers of cyclons.

The speed at which cyclons move along their paths is reckoned relative to the field (the ubiquitous gravitational field). When matter moves relative to the field, all the composite cyclons naturally and automatically orient themselves orthogonal to the direction of travel relative to the field – like the orientation of unfurled parachutes as they trail after their payloads. This orientation differs from photinos. For example, if the direction of travel is along the x axis, and the plane of the electrino in photons is the xz plane and the plane of the magnetino is the xy plane, then for cyclons the plane would be the yz plane.

As cyclons are accelerated in any direction of travel relative to the field, they begin to trace out a corkscrew path through the field. All the while, the cyclons maintain their speed of *c* relative to the paths they each trace out through the field. Therefore, as matter accelerates relative to the field, the corkscrew paths of the cyclons elongate, resulting in a decrease in cycle rates (frequencies). The effort required to alter the rate of the cycling motion of cyclons is akin to the effort required to alter the spin rates of flywheels. Thus, cyclons resist having their cycling rates (frequencies) altered – which is directly related to either elongating or contracting their corkscrew paths. This is how resistance to the acceleration of matter manifests.

Conversely, when cyclons have steady, consistent spin rates, they and the matter they comprise are deemed at rest – meaning their spin rates are not being altered due to acceleration. It doesn't matter if the matter they comprise is motionless relative to the field, or inertially moving through it. Both are considered rest states.

The change in cyclon spin rates (frequencies) for matter accelerating relative to the field proceeds according to $(1 - v^2/c^2)^{1/2}$. This degradation is directly related/causal to the phenomenon of process slowing. Furthermore, the greater the degree to which process slowing advances, the less susceptible matter becomes to external influences/effects. For example, the conventional reason given for the increasing difficulty of curving and accelerating particles near the speed of light in accelerators is relativistic mass increase. However, this is simply a perceptionary interpretation. The mass does not change/increase. It's simply that the ability to affect such rapidly moving matter diminishes/plummets as its speed increases. Therefore, even though huge increases of energy are applied to further accelerate and continue to guide the particles around the circular accelerator path, the particles are only able to be affected by a small fraction of it. The remainder is of no consequence/effect. Any matter that reaches speeds very near *c* becomes all but immune to outside influences/effects, and attempts to accelerate it to *c* is impossible for all intents and purposes. (Deceleration note: The process to reverse any previous slowing proceeds according to $1/(1 - v^2/c^2)^{1/2}$.)

Resistance to acceleration is actually two-fold. First, there is the flywheel effect mentioned above. Second, is the increased inability for matter to be influenced/affected by outside forces commensurate with the degree to which it is experiencing process slowing. The flywheel effect has more significance at non-relativistic speeds. Above that, process slowing increasingly dominates.

Gradient Acceleration

Matter is three dimensional, and cyclons are distributed throughout. Relatively strong gravitational fields centered around say, stars, planets and moons, exert their intensities in a gradient fashion according to $1/r^2$, where r is the radius from the center of any given gravitating body. Because such a local field is a gradient, the various cyclons in any particle of matter within the field are affected to differing degrees, and since $1/r^2$ plots out as a curve, this represents an imbalance.

The gravity associated with celestial objects like stars, planets, moons, etc., can certainly be modeled as an inward flow, with the speed of the flow at any altitude given by the escape velocity [$(2GM/r)^{1/2}$]. For cyclons, it doesn't matter whether they are passing through the field, or the field is passing through them. It is the same. As such, on average, the cyclons of objects on Earth's surface are corkscrewing according to the escape velocity of approximately 11,188 ±2 m/s, and are commensurately experiencing process slowing.

Consider a particle of matter. One half is deeper in the gravity well. Because of the gradient curve, the cyclons in that half will be affected to a greater degree than those in the other half. It is this imbalance which results in the observed effect of gravity on matter. The more acute the curve, the greater the imbalance, and therefore the acceleration. Far away from gravitating bodies, the curve is much flatter – making the imbalance much less acute.

Aberration

Light is subject to aberration because it has a finite speed. However, it does not (can not) experience process slowing. Rather, it is simply the measuring rod for determining degrees process slowing. Conversely, the field (gravity) is not subject to aberration, and its effects are universally instantaneous.

Consider a pane of glass with a small dot painted near its center. The dot represents a gravitating body, like a star, and the glass represents its gravitational field – throughout the entirety of the universe. Take another pane of glass and paint a small dot on it, but less close to its center. Overlay one pane on top of the other and move/slide the top pane around a little. As the paint dot moves relative to the dot underneath it, its universal gravitational field moves in perfect unison – just like the pane of glass.

Note that the panes simply represent the orientation and instantaneous reach of the gravitational field of gravitating bodies. The reach is universal and the orientation is fixed. For example, if the dot represented Earth which rotates on its axis, the dot would rotate but the pane would not. Also, in the vicinity of gravitating bodies, gravity (the field) is a flow. It flows directly inward – according to the escape velocity formula. The field (gravity) is not physical (like matter), so the concept of accumulation (like the Earth filling up with it) doesn't apply.

Conclusion

As described herein, the cyclons of matter account for the behaviors of matter in both stationary and inertial rest states, under the influence of linear and gravitational acceleration, and with respect to process slowing. Also, photinos account for the propagation of light (like waves with wavelengths)

without a medium of propagation. In addition, the speed of light is regulated by whatever speed limiter through which its propagating, and the universal field limits it to *c*.