

# Universal Specificity Investigation 7: The Theory of Everything That is Light

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Prior investigations into the theory of universal specificity (or specificity for short) found a proper conception of time missed in common practice; which lead to discovering the cause of kinetic time dilation; which lead to revisiting the relativistic kinetic energy, mass and total energy model; which allowed for the integration between potential and kinetic time dilation and an updated total energy model comprised of internal potential, external potential and kinetic energy; which lead to a theoretical experiment capable of detecting the universal inertial frame (UIF).

Specificity accepts all observations predicted by relativity, and the appearance of the validity of the conclusions drawn from relativity, but not their actual validity. Specificity asserts that all existents exists in some specific state and in some specific place at any given instant, and nothing exists outside of that. The last remaining question about this theory to be invested is: if the bending of spacetime does not cause gravity, and it is not responsible for kinetic time dilation as an environmental affect on objects, what then causes everything in the same reference frame to be effected by time dilation in the same way? Addressing that question is the focus of this paper.

## 1. EVERYTHING IS LIGHT

What if light were the atom, the fundamental building block of matter, sought over a millennia ago by Aristotle? What if matter as we know it, are simply photons structured in such a manner to produce it? That is the theory of everything that is light.

If everything were made of light, then it would explain why everything is effected by time dilation in the same way. Time dilation would fundamentally be something that affects light, which then means it affects everything. It also would explain why specific work done is the cause of total time dilation because each particle of light needs the same amount of work done to it to have the same effect, thus, work is required to scale with the quantity of photons.

### *Obstacles to the Theory*

The theory that everything is light is not conclusive. It lacks a method of agreement and method of difference experiment that allows for a conclusive induction of this grand generalizations [1]. Only certain evidences are available to suggest that it might be true, not that it is true; however, the evidence is compelling enough to warrant the creation of a theory.

Certain obstacles stand in the way of this theory seeming plausible. Light, we are told from relativity, only travels at a constant speed,  $c$ , for any reference frame. This is a problem because massed objects (normally not considered to be structured photons) cannot achieve,  $c$ ; therefore, it presents

a paradox of how could this be a case where light is not moving at a constant  $c$  simply because of its structure.

Another obstacle is light, we are told from relativity, has no mass. This is a problem because what is implied by the theory of everything that is light is that structured light has mass; therefore, it presents a paradox of how could structured light achieve mass when unstructured light has no mass.

Given these obstacles, this theory seems ridiculous from the perspective of relativity, but let us see what specificity has to say. For the first obstacle, specificity gains access to two key pieces of evidences, which relativity is blocked from, that shows light does not always travel at  $c$  for every reference frame. For the second obstacle, the theory of specificity (or specificity for short) gains access to a total energy model that explains why light actually does have mass. Not to mention there are other observations that support the notion that everything is light.

### *Light Slower Than $c$*

The two key pieces of evidence that light can travel slower than  $c$  are in the case where it is moving through a gravitational potential, and moving through a medium, which amounts to the same thing.

Relativity explains gravity with the bending of spacetime which allows the light to travel a further distance to counteract the fact that it takes more time for light to travel through it, thus, keeping  $c$  constant. Specificity does not accept spacetime as a thing that actually exists; it is only a useful model to explain predictions, like assuming a flat earth to predict trajectories, or Ptolemy's model to predict celestial motion. According to specificity, therefore, nothing is actually bending since only units being measured are changing giving the appearance of a bend. This means light is actually traveling slower than  $c$  inside a gravity potential. A prior investigation integrated the total energy equation with changes in gravitational potential energy, and it was discovered that the velocity of objects (including light) slow down in the gravity potential by a factor of  $\sqrt{1 - \frac{\Delta e_P}{e_T}}$ .

As far as light inside a medium, I believe relativity has nothing to say about refraction; they are treated as separate branches of physics. A common explanation for why light slows down inside of a medium is because it bounces back and forth between atoms, essentially taking the scenic route, which is just wrong [2]. Another common, and more plausible, explanation is the effective wave, due to electromagnetic (EM) interference to the original wave from the wave generated by moving electrons (moved by the original wave), makes the effective wave appear slower [2]. This last explanation relies on the EM waves produced by the moving electrons to move slower than light, to create the desired

slower wave, which just sweeps the problem under the rug.

Specificity, however, addresses light speed inside a medium head on by integrating the effect of a time dilation gradient with the bending of light in refraction. The index of refraction,  $n$ , relates to gravitational time dilation as follows:

$$\frac{dt}{dt'} = \sqrt{1 - \frac{\Delta e_P}{e_T}} \quad (1a)$$

$$\frac{dt}{dt'} c = v \quad (1b)$$

$$n = \frac{c}{v} \quad (1c)$$

$$\therefore n = \frac{dt'}{dt} \blacksquare \quad (1d)$$

This means  $n$  relates to  $\tau$  as follows:

$$g(r') = \lim_{dr' \rightarrow 0} -e_T \nabla \tau^2 \quad (2a)$$

$$\text{Where : } e_T = \frac{1}{2} c^2 \quad (2b)$$

$$\nabla \tau^2 = \frac{\tau^2}{dr'} \quad (2c)$$

$$\tau^2 = \left( 1 - \left( \frac{dt}{dt'} \right)^2 \right) \quad (2d)$$

$$\therefore \tau^2 = 1 - \frac{1}{n^2} \blacksquare \quad (2e)$$

What this tells us is that at the threshold, from one medium to another, there is a time differential gradient which causes the light to refract and slow down, as it does within a gravity potential. Now, the values of  $\tau$  for gravitation were extremely small. For example, in the studied case on earth's surface  $\tau = 4.67 \times 10^{-5}$ , which means  $n \approx 1$ . In contrast, consider the material with highest discovered index of refraction, which is 38.6 [3], which would mean  $\tau = 0.9997$ , or five orders of magnitude higher than the earth's gravity case.

Not to mention in our gravitation examples the distance measuring the time dilation gradient were on the order of kilometers, whereas the time dilation gradient at the threshold of two mediums is practically a step function, which explains the kink (apparent infinite acceleration) in the light path during refraction. The time dilation gradient explanation for refraction not only explains why light slows down inside a medium, but also why it only bends at the threshold—there is no time dilation gradient anywhere else.

Given the observations of light's speed change in a gravity potential and in cases of refraction we know that light can, and does, travel at slower speeds than  $c$  in any given reference frame.

### Light Has Mass

From studying the total energy model produced by specificity, shown in Equation (3), one is able to see that the rest mass of objects approaches zero as they approach the speed of light,

but the mass of the object (measured in the UIF) remains invariant. Recall that rest mass, according to specificity, is NOT the same concept as in relativity. Rest mass is the mass measured in the rest frame, but the change of units of all measuring instruments, caused by work done, is accounted for via calibration. Relativity, on the other hand, does not see a need to calibrate instruments when assuming rest mass is invariant, which gives the appearance that light is massless because its "invariant" rest mass is massless. Specificity on the other hand, asserts that the objects mass is invariant, while its rest mass, when properly calibrated, changes.

$$m = \frac{m_0}{1 - \frac{v^2}{c^2}} = \text{Invariant} \quad (3a)$$

$$\frac{1}{2} m c^2 = \frac{1}{2} m_0 c^2 + \frac{1}{2} m v^2 + m \int g(r) dr \quad (3b)$$

Relativity has another unchallenged issue with regard to light being massless. That is it lacks an explanation for why light has momentum, which prior to relativity was considered a property of things relating to its mass—relativity's solution is to equate mass with energy so momentum now relates to energy as well as mass. Specificity does not cross into this issue because light has mass—mass and energy remain two properties of an object, which have a physical relationship. The mass of light is its total energy divided by specific total energy, and its momentum is its mass times velocity, as shown in Equation (4).

$$m = \frac{E_T}{e_T} = \frac{hf}{\frac{1}{2} c^2} = \frac{h \frac{v}{\lambda}}{\frac{1}{2} c^2} \quad (4a)$$

$$p = mv = \frac{hf v}{\frac{1}{2} c^2} = \frac{h \frac{v^2}{\lambda}}{\frac{1}{2} c^2} \quad (4b)$$

$$\text{if : } v = c \quad (4c)$$

$$\text{then : } p = \frac{2h}{\lambda} \quad (4d)$$

### Other Observations

Other observations, serving as evidence supporting the notion that everything is light, will be quickly listed and described.

- All objects emit and absorb light constantly
- The food chain begins with light emitted from a process of fusion (turning matter into light)
- Objects become more like light the closer they get to  $c$
- light is eternal

It seems reasonable that when dissecting an object to determine what its made of, that the conclusion ought to be based on the makeup of the components you find. For all objects in the universe they absorb and emit light in accordions with Planck's Law and the spectral emissivity of its material. Does it not seem reasonable that this means all things are made up of light? To take it another step, all living organisms requires food for energy, which fundamentally can be traced back to the sun as its source via plants and photosynthesis. It has been said that living organisms are made up of star stuff and star food because of this observation, well the middle man is light—it is what transfers the energy from the sun to our food.

When objects approach the speed of light their rest mass approaches zero, as is the case for light. Light is said to not be charged, what if increased mass being measured by cyclotrons [], which uses the amount of magnetic force to move the object to estimate its mass, it the weakening of the object's charge as it was becoming more like light.

## 2. TRANSFORMING LIGHT INTO MATTER

The only way for light to transform into matter, if the total energy model is complete, is for light be within sufficiently close proximity to other light. That way both become entrapped by each others gravity potential, which is governed by the third set of terms in the right side of Equation (3). This occurs on a galactic scale all the time, when light is absorbed by objects, and during stray opportunities where light meets in the vastness of space.

## 3. CONCLUSION

In conclusion, it was shown that it is possible to detect the UIF if measurements are taken that do not nullify the effects of changes of units caused by work done. The designed experiment involving sending gravimeters hurtling towards the center of mass of a massive object is capable of such a detection.

The last question to be investigated by this universal specificity series is: if the bending of spacetime does not cause gravity, and it is not responsible for kinetic time dilation as an environmental affect on objects, what then causes everything in the same reference frame to be effected by time dilation in the same way? Addressing that question is the focus of the next and last investigation.

## REFERENCES

- [1] D. Harriman, *The Logical Leap: Induction in Physics*, NYC: Berkley, 2010.
- [2] fermilab, *Why does light slow down in water?*, YouTube, 20-Feb-2019. [Online]. Available: <https://www.youtube.com/watch?v=CUjt36SD3h8>. [Accessed: 16-Feb-2023].
- [3] *Metamaterial breaks refraction record*, Physics World, 29-Aug-2017. [Online]. Available: <https://physicsworld.com/a/metamaterial-breaks-refraction-record/>. [Accessed: 16-Feb-2023].