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Lorentzian time dilation and the electromagnetic future

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Abstract
Lorentz's theory of length contraction and time dilation has shown itself superior over Einstein's Special Relativity in real world applications such as GPS navigation. However, that's not enough to save the theory. A closer examination shows that the internal flaws of length contraction and time dilation, reveal a need for alternative viewpoints in order to advance modern physics beyond these quasi metaphysical concepts. The electromagnetic model proposed by Paul Marmet meets this criteria. This more recent electromagnetic theory is superior to what Lorentz or Einstein proposed; it changes our understanding of time dilation to a more tangible and realistic "change in magnetic energy and inertia". No magic clocks or bending spacetime needed.

Keywords
Time Dilation, Relativistic Mass, Lorentz, Einstein, Marmet, Percival, Electromagnetism, Aether, Ether, Babaoye.

From Length Contraction to Time Dilation

In the previous paper on Lorentz and Einstein [1], we discussed the fatal inconsistencies of Einstein's time dilation and the supremacy of Lorentz's asymmetric model of clock slowing. We showed that time dilation was not directly called for by the Michelson-Morley experiment and was instead later postulated by Lorentz as a consequence of length contraction. This leads us to the question "what exactly necessitated time dilation once length contraction was added to Lorentz's model?". To understand this let's look at his relevant work on the topic, *The Theory of Electrons* and *Electromagnetic Phenomena In A System Moving With Any Velocity Smaller Than That Of Light*, which discuss length contraction and time dilation at length [2,3].

Lorentz's time dilation turns out to have more to do with math than anything else. Long story short, it all comes down to Maxwell's equations which govern electromagnetic phenomena. You may recall that the Michelson-Morley experiment involves light recombining after running through a beam-splitter. It was this experiment that Lorentz based his initial length contraction hypothesis on. However, for these initial calculations, Lorentz states that "terms of the second order were neglected." [3]. So, for his next pass at the problem, Lorentz accounted for these second order terms that arise through application of Maxwell's equations and out popped time dilation. Let's look at that in slightly more detail for a better understanding.

Lorentz begins with the familiar set of Maxwell's equations:

$$\nabla . E = \frac{\rho}{\epsilon_0} \quad (1) \quad \text{Gauss' law}$$

$$\nabla . B = 0 \quad (2) \quad \text{Magnetic monopoles}$$

$$\nabla \times E = -\frac{\partial B}{\partial t} \quad (3) \quad \text{Faraday's law}$$

$$\nabla \times H = J + \frac{\partial D}{\partial t} \quad (4) \quad \text{Ampere-Maxwell law}$$

From here he devises the simple thought experiment of a single charged particle moving with respect to the aether in the x direction. The aether frame is the rest frame and the moving charged particle, in this case the electron, carries with it the moving frame denoted by the familiar x',y',z' notation.

Next the needed coefficients are added for the presumed length contraction in the direction of travel, x. This is the k coefficient where k^2 is equal to:

$$\frac{c^2}{c^2 - w^2} = k^2$$

And he modifies x like so: **x' = klx**, to invoke length contraction.

From here, in order for the mathematical integrations to work out as predicted by Maxwell's theory, t' must be modified with similar coefficients (we can ignore *l* for now since it ends up being equal to one). And voila time dilation in the moving frame:

$$t' = \frac{l}{k} t - kl \frac{w}{c^2} x$$

But therein lies a problem. Length contraction didn't *conceptually* lead to a "time slowing" based on a clear chain of events, rather, it was only there because the math demanded it. This raises alarm bells for me. We are starting with an unproven concept (the idea length contracts when moving) and that necessitates another even more outlandish idea to make the math work.

"But the math is useful for real world calculations, so it must be the truth!", some would argue. We must be careful not to confuse math with reality. Math is a tool used to imperfectly describe reality, while physics is ultimately about understanding that underlying reality and not simply applying math. So, though a fanciful assumption can lead to calculations that work under certain conditions, if your underlying physics is wrong, you've shot yourself in the foot with respect to future progress. The truth matters and the truth ultimately wins.

Problems with Lorentz

In the previous paper we laid to rest the Theory of Relativity and its application of "time dilation", leaving Lorentz as the apparent victor in all of this. Lorentz's asymmetric clock slowing is being used for GPS velocity-dependent adjustments, not Special Relativity, as noted by GPS specialist Ron Hatch

and physicist Nick Percival. This seems like a clear victory. Nevertheless, we have good reason to believe that the physics underlying Lorentz's math are also purely fictitious.

Lorentz himself told us that the idea of length contraction was in trouble. In his famous work "The Theory of Electrons" in 1905, he argued that length contraction of charged particles "looked very tempting" but that Kaufmann's experiments on velocity-dependent mass was "decidedly unfavourable to the idea" and that this idea should "very likely" be given up [2]. I'm inclined to believe this as well, and in the next section we discuss an alternative view.

Another issue with Lorentz's theory is time itself. Time is often defined by relativists as something measured on a clock which depends on the frame the clock is in. It's implied that the rate of progression of any process is equally affected as the time accumulation on a clock moving with the "frame" of said process. This vague quasi-mystical thinking removes any physical mechanism from the phenomena, replacing it with a mere abstract principle of "time" slowing or speeding up. In fact, Einstein was aware of this and made a distinction between "theories of principle" and "constructive theories", as noted by Weinstein [4]. Einstein defended his "theory of principle" as sufficient, but in reality, a theory of principle is merely a provisionary stand-in until a clearer underlying mechanism can be discovered. This is especially true with a theory as illogical and self contradicting as Relativity is, or what modern physicists euphemistically classify as "mind-blowing" or "mind-bending" physics. Perhaps it blows out the circuits in the brain that can recognize contradiction...

With such an approach to theory, it is not necessary any connection between "time dilation" and known fundamental laws of nature must be established. The time dilation concept is a principal unto itself living on its own island of physics. This would be like discovering the laws of thermodynamics but having no model for how particles in a gas make these principles manifest as real physical mechanism. By inventing an abstract principal and accepting it as gospel, physicists have fragmented physics itself, making it impossible to form a coherent unified model so long as such theories are adhered to. For example, theoreticians have worked for over a century trying to reconcile quantum mechanics and relativity to no avail. The core issue seems to be the fact this notion of Lorentzian time dilation / length contraction at the heart of relativity simply isn't real (to say nothing of spacetime which deserves its own paper).

Moreover, it can be shown that time dilation, even when applied asymmetrically / non-relativistically, is not self-consistent. If "time" is slowed down by an increased velocity relative to some preferred frame (the ECI frame in GPS for instance), this would not only apply to internal processes inside the moving "frame" but to the entire frame itself and its velocity relative to the stationary frame. In other words, moving faster would move you slower, which is a contradiction in terms, but such a scenario is required if all "time" in that vicinity is truly slowing. Instead, it stands to reason that there is some mechanical explanation for a mere *apparent* time slowing being manifest here; one that is based on known fundamental principals.

An Electromagnetic Alternative

To find a solution, let's first abandon the abstract notion of "time" that somehow an abstract "frame" brings with it traveling through the even more abstract notion of "spacetime". Instead let's think back to fundamentals and mechanism. All molecules are composed of charged particles: electrons, protons, and neutrons which are composed of electrons and protons. Ignoring for now the plethora of alleged sub-atomic particles in the modern lexicon, these are the fundamental base units making up our visible world. Then, we must ask, what laws govern charged particles? The laws of electricity and

magnetism, of course. So with that in mind, let's look into the literature for anyone offering alternative, electromagnetic explanations for time dilation phenomena.

The phenomenon in question is one which some might not know is related to time dilation at all: relativistic mass. Relativistic mass is fairly straightforward; it was observed that charged particles moving at speeds near the speed of light interact differently with electric and magnetic fields, as if their mass were increased. Relativity derives this relativistic mass by modifying the time variable using the t' discussed earlier, resulting in the equation $\mathbf{m = \gamma m_0}$. Here γ (gamma) is just 1/k from the previous math for t'. Now, Lorentz's math did sort of work, but Kaufmann noted his own experiments showed better agreement with Abraham's theory [5]. The Lorentz-Einstein model also suffered from a discrepancy between theoretical longitudinal vs transverse effects on mass compared to experiment. The experiments show a difference between inertia acting in the direction of motion (longitudinal) and perpendicular to that motion (transverse), which Lorentz-Einstein did not predict. It's also worth noting that Abraham's model saw this increase in mass as a purely electromagnetic phenomena, which is moving us in the direction of fundamental base mechanism.

Unfortunately, Abraham's model was ultimately discarded, and to avoid getting lost in the nuanced history of Kaufmann, Abraham, Bucherer, Lorentz and others involved in this discussion, we will skip ahead to what appears to be the most valid electromagnetic explanation to date. In his 2003 paper "Fundamental Nature of Relativistic Mass and Magnetic Fields", Paul Marmet makes the calculation for a moving charged particle's magnetic energy by way of the Biot-Savart law. The Biot-Savart law normally applies to currents flowing through a wire, so Marmet had to modify this math to make it applicable to a single point charge moving on its own [6]. The result, as Marmet demonstrated, was that this total energy exactly equals the increased mass calculated using the Lorentz-Einstein gamma factor applied to mass in the longitudinal direction. Quite a coincidence isn't it?

In my view, this is a eureka moment; it opens up the possibility that what we're seeing isn't to do with "time" after all, but an electromagnetic energy / inertial change. For example, let's consider the oscillations of an atomic clock used to confirm time dilation in satellites. An increase in magnetic energy / inertia of the cesium atoms would slow down their oscillations, leading to an apparent slow down of "time" as measured by the clock. That is a simple and logical mechanism for one of the main "proofs" of time slowing down.

And what about the famous muon decay experiments in which muons from Earth's upper atmosphere "prove" time slowed down at high velocity? Well, muons are also electromagnetic particles, so it would stand to reason an additional magnetic inertial energy could physically constrain the particle and reduce the chances of it flying apart, thus increasing the average lifetime. Or it could be argued that within the internal structure of a muon, a certain amount of oscillations take place before it flies apart, like some sort of spring loaded machine unwinding itself over a series of oscillating steps. In that case, like with the atomic clock, the added magnetic inertia slows down that process and extends the lifetime of the particle. So far, that accounts for the main "proofs" of time dilation, without invoking time directly.

In conclusion, the ideas of length contraction and time dilation, even the purely Lorentzian variety, have run their course and need to be revised to something with clear unambiguous mechanism using existing fundamental laws. Since magnetic inertia is energy from a known source and can plausibly explain what was described by a vague metaphysical concept, then logic and proper scientific discipline would lead us to favor this new theory over the old. The rationale of "it makes the math works" is no substitute for "it reconciles with common sense and known fundamentals". I'm optimistic

that the electromagnetic theories of Paul Marmet and others will lead us to a better future in physics, one without the vague abstractions of bending spacetime, undetectable dark matter, or time slowing down to suit one's particular frame of reference. However interesting such concepts are for science fiction writers, it's time for physics to find its bearings again and come back to reality.

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