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THE CONSTANCY OF 'c' MEANS THAT 'TIME' CANNOT BE OBSERVER DEPENDANT

ABSTRACT

This paper provides a simple and straightforward demonstration that the constancy of the speed of light determines that differing inertial frames of reference for observers *cannot* influence 'time' itself.
The concept whereby two spatially separated events occurring at the same time *is* absolute.

KEY WORDS

Einstein, clocks, speed of light, thought experiments, trains, lightning, time dilation, Twin's Paradox..

CONTENTS

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BACKGROUND Time dilation; common explanations.

"In physics, from Henri Poincaré, and later from Einstein's special theory of relativity, the *relativity of simultaneity* is the concept whereby two spatially separated events occurring at the same time is *not* absolute, but depends on the observer's reference frame".
"An object in motion experiences time dilation, when measured by a clock that is stationary, relative to it. Therefore, Time dilation is the *difference in elapsed time* as measured by two clocks, due to a relative velocity between them".

"Special relativity indicates that, for an observer in an inertial frame of reference, a clock that is moving relative to them will be measured to tick slower than a clock that is at rest in their frame of reference. This case is sometimes called special relativistic time dilation".

Physics also confirms that the speed of light is constant and independent of all inertial observers.

The speed, or direction, travelled by an observer, either towards or away from a particular light source, *does not alter* the speed of that light, relative to those observers. That is; their personal speed *cannot be* added to, or *deducted from* the speed of that light.

But if a pulse of light (providing a tick) was sent from a particular source, at regular intervals, say every second, *all* observers, no matter where they are, relative to the source, and no matter at what speed they are travelling, relative to the source, *all* must receive the ticks at *exactly the same intervals*. That is; every second.

So now I take a common example of an observer (with a clock) travelling on a train, whilst passing a second observer, (also having a clock) being stationary; (relative to the train!) on a railway platform. The claim is that *both* purport to 'perceive' each other's timepiece as reading 'slow'.

THOUGHT EXPERIMENTS (1)
Imagine that there is a very bright strobe-light on this station's platform, programmed to flash once every second. Both the observer in the train and the observer on the platform *must* see the strobe light flashing every second.

Each observer has a silicon solar-cell which can convert each light-flash into an electrical signal, which, in turn, can provide a 'tick', able to be consecutively recorded on a timing device. I.e. a clock.

In this instance, both observer's clocks, therefore, must run in sync with one another.

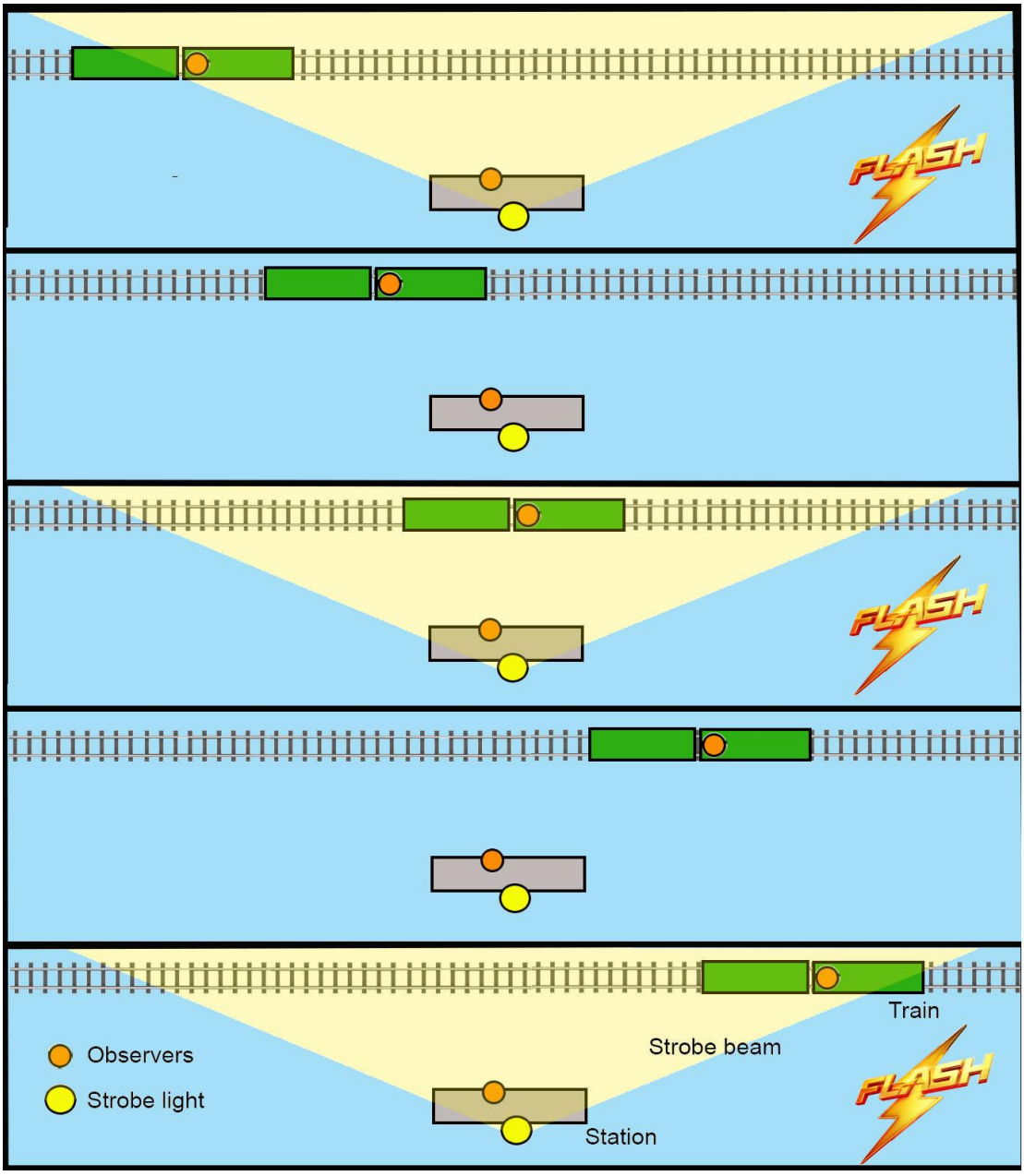


Diagram 1; Both observers are within the strobe-light's beam, which flashes once per second. Each must perceive the same interval between the flashes.

Clearly the light flash takes slightly longer to reach the train observer due to distance, but the *light-speed intervals* can never change. A common clock has been set up between them.

In this situation time is obviously not dilated for, or between, either observer.

THOUGHT EXPERIMENTS (2)

For a thought experiment on a grander scale, I consider the light-source being the Sun, as we know that the light from the Sun can reach for billions of miles/ light-years.

Now, with a great leap of imagination, I situate a gigantic shutter, which, from the Earth's point of view, entirely obscures any sight of the Sun.
The shutter is set to open and shut extremely quickly, every second, thus sending a powerful flash of light Earthwards. Every object within that beam of light's path must record flashes at one second intervals, as *the speed of light* is not observer dependant.

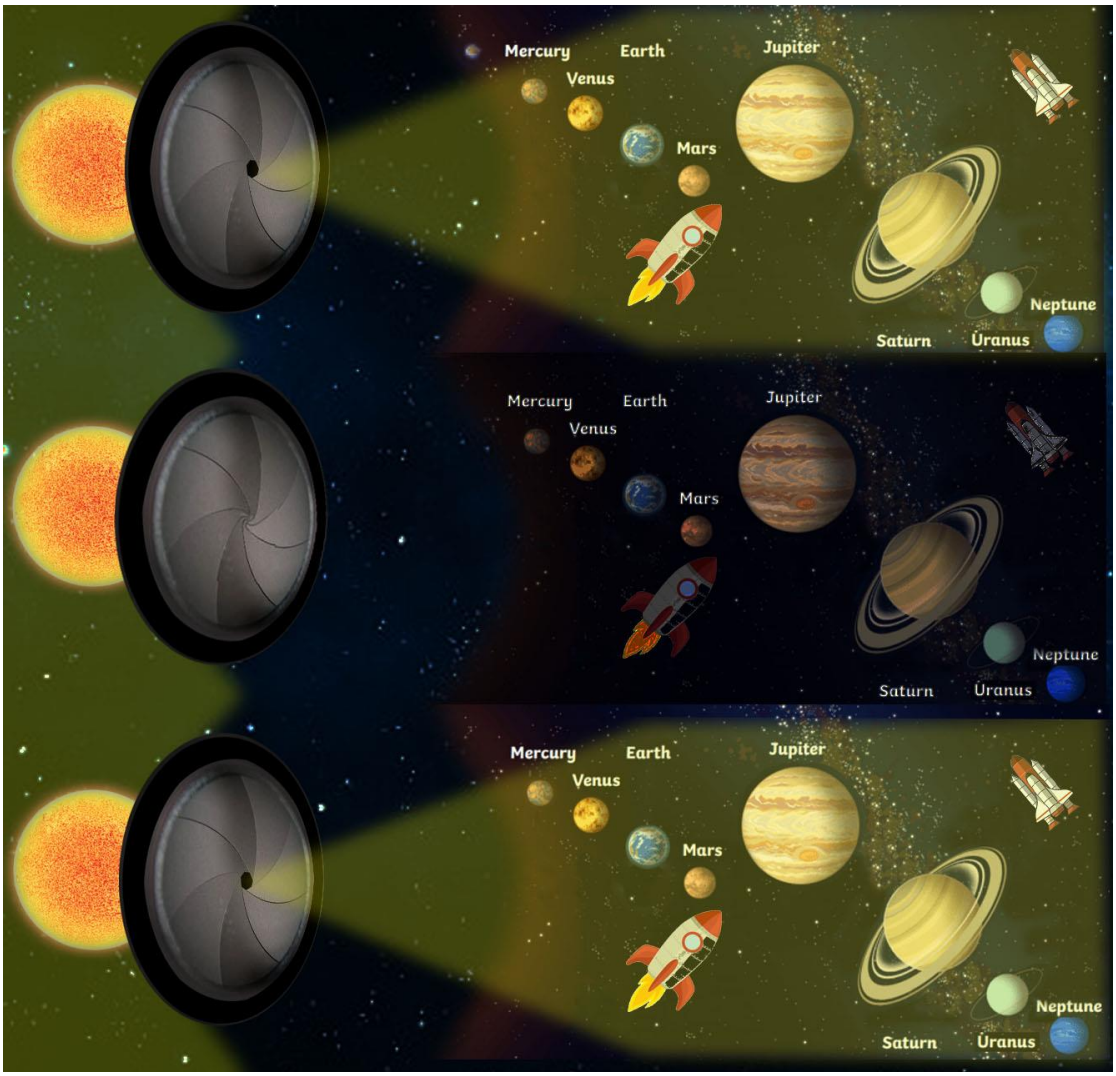


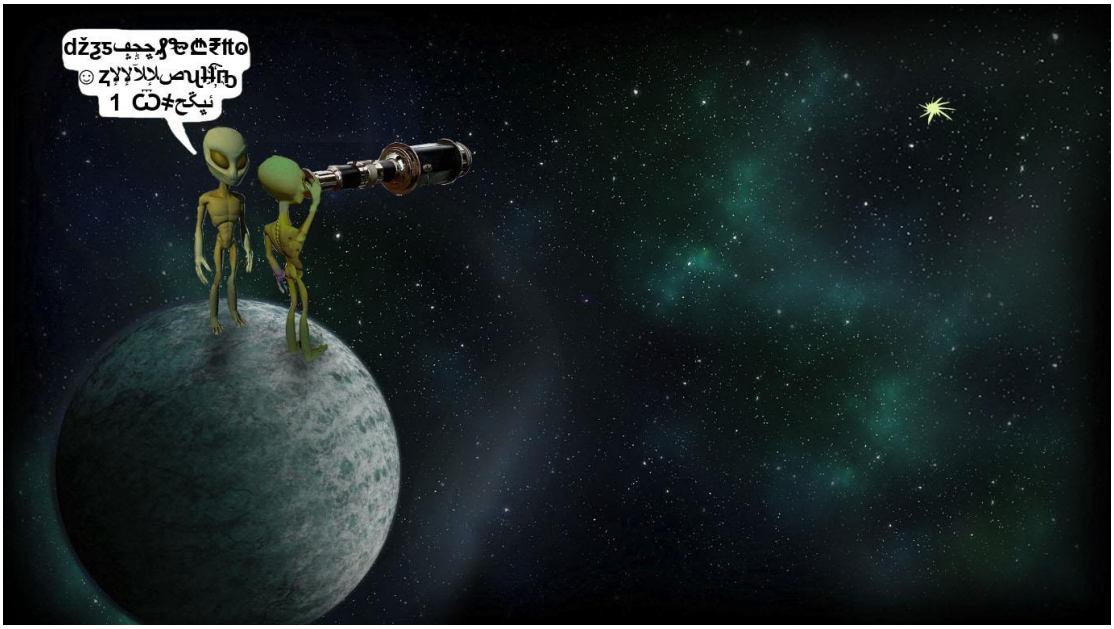
Diagram 2. One second flashes of sunlight reach much of our galaxy.

No matter how fast rockets may be travelling, relative to the sun, and no matter their direction, they will all record the flash-intervals as being of one second.

Other planets, in sight of those flashes, will, no matter how far away from the Sun are their orbits, they will also have to measure the *flash-intervals* at one second.
Each individual flash will take longer and longer to reach the more distant cosmological objects, nevertheless, the *intervals* between the flashes will always be of one second. All these light-flash clocks are, therefore, properly synchronised. They all match. They too are all ***not*** observer dependant.

A Twin (from the famous Paradox) in a fast moving rocket will perceive the same one-second-flash-interval as an observer on Earth. Their clocks must match also.
Once again each observer has a device for converting flashes into the 'ticks' of a clock. After a year, (or, of course, any length of time) the number of flashes and 'ticks' received, by all, must match.

From some far distant planet, where our sun is just the smallest pin-point of light, the flashes will still be arriving at one second intervals, which, however time is measured there, this non-time-dilated-light must provide a *universal* timing link.
Perhaps *Universal time* has been established?



Translation; "Hey! I think that far distant star is twinkling with exactly 1 second intervals!"

CONCLUSION

Surely what I am suggesting in this essay is *far more* acceptable; *so* much more *demonstrable*, than is the possibility of comparing two, simultaneously occurring lightning-bolts, striking both ends of a train carriage whilst it is travelling at a near-light-speed velocity?

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