Variable Time

Topic 050 Article 1

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Suppose that Einstein is right. What if the rate of time actually does change with speed? We've all heard it, the faster that an object travels the slower time passes for that object. What does this mean to us, what are the implications of this concept?

The story of the twins is frequently offered as an implication. As the story goes a set of twins grows up on Earth. While young men they split up, one goes on a long high speed space ship voyage, the other remains on Earth. Some fifty earth years later the twins are reunited. At the reunion the earth bound twin is then about 70 years old, but the traveling twin is only about 30 years old. Because of his high speed travel the voyager has aged less. The story is amusing but it does not go very far concerning the implications of the concept.

Is it true

Is it true? Does time actually slow down when you go faster? Apparently it does. Experiments have been done using two atomic clocks, one left stationary, and the other placed on airplanes and space shuttles. In every case post flight comparisons of the clocks showed that the traveling clock had recorded the passage of less time that the stationary clock. At the speeds attained the time difference was measured in billionths of a second, but the difference existed. So it looks like Einstein is right - again.

Is there a limit

Is there a limit as to how much time can be slowed down? Einstein did not think there is. His theory holds that the faster you go the slower time passes, at the speed of light time stops. But his theory also holds that nothing but light can attain the speed of light, so the only limitation on slowing down the passage of time seems to be the speed achievable.

A seldom asked question

A seldom asked question is "If time can be made to pass slower, can it be made to pass faster?". The answer is "Yes". If going faster makes the passage of time slow down, then logically, going slower will make the passage of time speed up. Going out on a limb a bit, if the rate of time passage stops for an object traveling at the speed of light, then the rate of time passage is infinite for an object that is absolutely still. The rate of time passage is variable between these two extremes. Conditions at the extremes are unknown, but conditions in between should vary from our daily experience only by degrees.

What is Absolute Still

What is Absolute Still? Is a rock lying on the ground experiencing "infinite time passage"? Does a person experience it while asleep? "No", neither rocks nor people experience infinite time passage. Neither rocks nor people are ever absolutely still, they may not be moving relative to their immediate surroundings but they are moving on a larger scale. The rocks and the people are on the surface of the Earth which is rotating around the earth's core, and the Earth itself is revolving around the Sun, the Sun is revolving around the galaxy's center, and the galaxy is…well it's doing something. Scientists have estimated that the Earth is moving at something like 300,000 miles per hour. Nothing on Earth is ever absolutely still.

Absolute Still is a condition of no movement. To achieve that condition from Earth something would appear to be moving away in a particular direction at 300,000 miles per hour. The "particular direction" has not been determined at this point, and the 300,000 miles per hour is highly suspect. But unless the whole universe does actually revolve around the Earth some speed in some direction is required to reach Absolute Still from here.

What happens at Absolute Still

What happens at Absolute Still? Does time really pass by infinitely fast? Is the "end of time" reached? "Unknown", that's a problem with "infinites" we just don't know. However, as an object gets closer to Absolute Still than the Earth is, the object's time speeds up relative to Earth time. Interestingly, from the objects point of view the Earth and everything on it slows down.

How would the time speed difference look

How would the time speed difference look? That depends on where it is being viewed from. Assume that an object approaching Absolute Still is a glass space ship with people inside and people on Earth have a powerful telescope and can watch them. Also assume that the space ship has a similar telescope pointed back at Earth.

To an earth bound viewers the earthly surrounding will appear normal but through the telescope they will see the voyagers moving incredibly fast. They will be working fast, eating fast, talking fast, thinking fast, reproducing fast, growing fast, and they will die fast, everything will be fast - like a film played at high speed.

To the voyagers the ship board surrounding will appear normal but through the telescope they will see the earth people moving incredibly slow. They will be working slow, eating slow, talking slow, thinking slow, reproducing slow, growing slow, and living a long time, everything will be slow - like a film played at low speed.

To an earth bound viewer everything on the ship will appear to happen faster, to include the laws of physics and chemistry. Things will fall faster, iron will rust faster, paint will dry faster, etc. To the voyager viewer everything on the earth will appear to happen slower, to include the laws of physics and chemistry. Things will fall slower, iron will rust slower, paint will dry slower, etc. (Actually the same laws apply but that is the subject of another Article.)

An interesting point

An interesting point about this reciprocal viewing is that the brightness will be different from each viewpoint. The earthbound viewer might have to wear sunglasses when looking at the spaceship and to the voyager the earth will be very dim. This brightness difference is caused by the time speed difference. Each "spaceship second" the spaceship emits a certain amount of light toward earth, since the "earth second" is longer the light from multiple spaceship seconds arrives on earth during each earth second. Of course the opposite is also true, the earth emits a certain amount of light toward the spaceship each earth second, but, since the spaceship second is shorter only a fraction of that light is observed each spaceship second.

What does this mean to us

What does this mean to us? Is there any practical value to knowing this? Yes, some of the value can be put to immediate use and some will be useful in the no so distant future.

To begin with it explains a few puzzling things. Astronomers have for years been aware of star like objects in the sky that emit thousands of times more light than the average star. They have observed these objects but have no explanation for the incredible light output. If the concept of time speed difference is applied these object become ordinary stars traveling at speeds near absolute still.

The folks listening for radio broadcasts from other civilizations should use this concept. They have concluded that it is logical to listen on frequencies that we can technically commercially achieve. Good thinking, except they aren't hearing anything. The frequencies they are listening on are logical at "earth time speed" but on planets traveling at different speeds relative to absolute still the same technology would be broadcasting on different frequencies from earth's point of view. If they would consider the speed of the objects in their particular area of surveillance they might have more luck.

In the future when human built spacecraft achieve speeds significantly different from earth, the direction of travel will become important. Speed in a direction that reduces the speed from absolute still will result in more rapid aging and failure of the spacecraft. Perhaps this is already occurring in some of the spacecraft bound for Mars.

Though humans might not find the prospect of aging more rapidly very appealing, it does have some attractive industrial applications. Atomic, chemical, and biological process that take too long to be of value could be sped up if allowed to happen on a spacecraft that spent some time at speeds near absolute still. A few weeks of travel could result in years of productivity.

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