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Short Communication

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The Caveman from Space Paradox

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A caveman; a primitive human from a prehistoric era. 10 thousand to 40 thousand year old man.

Einsteins theory of relativity states that nothing with mass can move faster than the speed of light, and that space and time are not independent. So what does this mean for space travel?

Sometime in the future a spaceship and its crew launched from Earth in hopes to explore a possible inhabitable planet. As the crew comes up on 14 years on their ship they arrive to the Earth like planet, called Planet X.

Sargent: Finally some dirt to sink my feet into. 14 years of stomping metal floor does a number on your ankles.

Marine 1: Feels good. Can't believe we were in that tin can for so long. Captain: You have no idea.

Sargent: Well boys, let's get these podlings unloaded onto their new home and get the heck outa here!

Captain: you won't be going anywhere til' shields are up, area scanned and surveyed, and new colony is ready. That's our mission.

Sargent: Area's clear, terra-domes and shields are up. Pods are ready for colonization. Good luck to all of you staying behind! Captain: There's one small problem with that Sarge..

Remember how we were on that ship for 14 years? A minor detail was left out. We were travelling at 99.9999% speed of light.

Sargent: Great, ya, I'll be back home in 14 years.

Captain: No.. you'll be back in another 10 thousand years. Sargent: What? Whats that mean another!?

Scientist 1: Time is relative and passes at different rates to different observers, depending on certain factors.

Special relativity states that time slows down for anything moving, including people. The faster we go; the more time is affected. This is called time dilation.

Using the Lorentz transformation, we can calculate the time dilation.

$$\Delta t' = \frac{\Delta t}{\sqrt{1 - \frac{v^2}{c^2}}}$$

T =t0 /√1−(v2/c2).
T = observer time. (earth time) (Delta t')
t0 = Proper time. Time in observers own frame of reference. (travelers time) (Delta t) v = the speed of the moving object
c = the speed of light in a vacuum or (3 × 108 m/s2)
Let's say ship A is going to do 99% speed of light in place of variable V now. v = .99c,
t0 = 10 years and we will solve for t which is the time that the earth experiences.
T =t0 /√1−(v^2/c^2) T =
10/√1- [(0.99)(3 x 10^8)]^2 / (3 x 10^8)^2 T =
10/√1- (0.99)^2 T =
10/.1414T = ~ 70
years (Earth time)

Scientist 2: Exactly now captain mentioned we were doing 99.9999% not just 99% speed of light. We know we traveled at that speed for 14.14 years giving us this equation;
T = 14.14/√1- [(0.999999)(3 x 10^8)]^2 / (3 x 10^8)^2
T=10,000.01 years (Earth time)

Sargent: No way! I'm going back! Make it go faster!

Captain: It doesn't matter how short of time it takes you. You'll appear in the Earth sky 10,000 years from now. You'll be a caveman from space to them.

Sargent: I Don't believe you. we can do Light Speed!

Scientist 1: Its true. Speed of Light is actually a constant. Going faster only effects the travelers time.

For example, if you turn on a flash light, you see the beam turn on and is going light speed or C. Now if you start running at 10mph and turn on the light C does not go C+10mph. it is still C. But something must be effected, and it is actually time that will slow down. You cannot reach 100% speed of light because as you get closer to it your mass increases and time itself will slow down for you to compensate for this universal speed limit. The result is Time Dilation.

Scientist 2: He's right. See, we know light is a constant and travels at: (shows image)
speed of light=C

c=YU (wavelength x frequency) c= 3.0x10 ^(8th)
c= 299,700,000 meter/second c=300,000 km per second
300,000 x .62(km/mps) =186,000 mps 60(seconds) x 60(minutes) x 186,000= mph mph=670,000,000
c=670 million mph

Sarge: Someone please speak ENGLISH.

Scientist 1: So, looks like we've travelled a distance of 10 thousand light years.

Sarge: what!? Light can't be a time. How can it be? We made up what a year consists of.

Scientist 2: Well you're right, LIGHT doesn't equal time. In fact, light doesn't experience any time. For a photon itself, travel time is always instant, or 0.

Scientist 1: We did come up with days, months, years, but they are based on our rotations. One year is one rotation around the sun.

Example, you travel 24 light years in one day, observing the earth as you travel, you will watch the earth circle the sun once every hour. each hour will equal 1 earth year. time will dilate at that rate.

Sargent: That's great. Just great. Thanks guys.

Crew Member 1: What about hostiles? How long til' we get help? Captain: That may take a while. We are prepared.

Crew Member 2: What about Supplies, Food, Water!? Marine 2: Nope

Crew Member 3: what about our Family and friends back home? Marine 2: Gone

Crew member 4: We've only been travelling for 14 years, what about our children?!

Marine 3: Yes Charles! It's been 10 thousand years. Everyone any of us ever knew are gone. I'm guessing your bloodline didn't make it. Sorry Charlie.

Captain: LOOK! Backup will be here in 10,000.01 years at best. Our mission is to report progress on the quantum radio. The plan is to set up a fully functioning civilization with all the kinks worked out and ready for them.

Crew Member 2: So, we are supposed to do all the dirty work so the people that potentially burned their planet to the ground can move here?

Captain: Yes, thank you. Get to work. Marines follow me. Marine 1: Captain what's the indigenous hostiles protocol?

Captain: We are equipped with our best of weaponry and defense technology. If there is life, we are to make contact, if they are hostile, Earth has 10 thousand years to prepare for their possible arrival.

Marine 4: And if they are friendly?
First mate: That possibility may be unlikely, as interstellar travel may just be for colonization due to the impossibility of galactic leisure travel between solar systems.

Marine 3: So, no space tourism?
First mate: You could, but you'd be travelling into the future each time and turn into, well a caveman again. And no one wants tourist cavemen roaming around. This also means multi-species group councils of diplomats are unlikely.

Captain: Ok, get to it, set up exploration teams and move out in rovers, report back to me.

First Mate: (To Captain alone) So what are the protocols for our possible problems? Captain: I have some tricks up my sleeve.

First mate: Like?
Captain: If we really need help this ship has power to get back to Earth. Which means we can orbit the planet at the same speed for same time as the ship trying to reach us. instead of waiting the 10000 years, we will both travel 99.9999%C for 14 years and land back on planet X at the same time. That's an emergency strategy I will be keeping secret.

I'm not worried about extraterrestrials. I am worried about what Earth men may do to OUR project when they get here. But I have plans for that as well. Which I may follow through with regardless.

First Mate: And that is?
Captain: Separate from Earth and cut all ties. We run our civilization the way we want to, when they get to planet X they will be dumb as rocks. I don't think we will want to hand over our civilization to Earth. We will have centuries of different paths. Only time will tell, but for the next 10,000.01 years it's ours.

Marine 5: Captain! Sarge is attempting to take off with the ship!
Captain: Let him go, honestly, we have what we need.

Marine 5: Are you sure Captain?
Captain: Yes. Ive made up my mind..
We can check up on him once in a while. See ya' Sarge.

Conclusion

What does Einsteins theory of relativity and the connection between time and space mean for space travel?

Space and time are linked and cannot be separated, therefore are not independent, even when experienced independently.

As one expects to travel vast distances thru space, they must also expect to travel great amounts of time regardless of the time in their own frame of reference.

The milky way galaxy is around 100,000 light years across. Regardless of how minimal time passes in a travelers reference point, Earth will always experience at least 1 year per 5.875 trillion miles of travel.

Conundrum

A confusing and difficult problem or question. Riddle whose answer is or involves a pun.
Paradox;

A statement or proposition that seems self-contradictory or absurd but in reality, expresses a possible truth.

A situation, person, or thing that combines contradictory features or qualities.

As you increase speed, you inevitably move slower to your observer, which, is paradoxical and counterintuitive. From a travelling point of view, as you travel distances across space at fast speeds, all other objects, planets, and stars will revolve equally fast. When traveling at extreme speeds, thousands of years can go by for an observer, while through a telescope they will literally view a caveman frozen in space.

Additionally, due to time dilation, technology on earth may always advance faster than we are traveling.

When the distance is great, it doesn't matter how fast you travel, you will always be late. This is the Conundrum of time Dilation, the Caveman from Space Paradox.

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