

Re: Circular motion in SR

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On Mar 14, 5:29pm, mL <mL.bey...@xxxxxxxxxxxxxx> wrote:

ram.rac...@xxxxxxxx wrote:

I'm trying to write the equations for circular motion according to SR laws of motion. I'm doing some kind of mistakes, because I'm not getting real solutions to the equations.

This is what's going on: You have an body of mass m_0 circling around a stationary center point that is a distance of r from the body. There is a force F that attracts the body towards the center point, making it move in a circle around it. What's the velocity v of the object?

OK, you have a central force field, $\vec{F} = f(r)\vec{n}$, where the unit vector \vec{n} points towards a fix point.

Use the equation $dE/dt = \vec{F} \cdot \vec{v}$, to show that the energy E and the speed $v = |\vec{v}|$ are constants when the particle moves in a circle $r = R$.

> I've used these equations:

>

> $v = \sqrt{a \cdot r}$

> $a = F / (m_0 \cdot \gamma^3)$

> $\gamma = 1 / \sqrt{1 - (v/c)^2}$

>

> I keep getting only imaginary solutions for v . What am I doing wrong?

The force-equation is wrong. For cases with constant rest mass m , you have in general,

$$\gamma \dot{\gamma} F = (\gamma) m a + (\gamma)^3 m (v \cdot a) v / c^2,$$

which for circular motion, $r = R$, reduces to

$$\dot{\gamma} \gamma f(R) = (\gamma) m a, \text{ where } \dot{\gamma} a = v^2 / R,$$

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– note that $v \cdot a = 0$, i.e. $a \perp v$, according to comments above.

/mel

My question about all of this is, since a clock in rotation supposedly runs slower than a clock around which the moving clock is rotating, then since the Lorentz equations give the velocity as being the same in both frames of reference, does the altitude of the rotating clock differ from one frame of reference to the other?

This is not a complicated question. Scientists have claimed that they put a clock in a satellite and recovered it, and the clock from the satellite showed less time than an identical clock on earth, so this proved that Einstein's theory was true.

Any way you look at it, the velocity of the moving clock is the same from either frame of reference according to Einstein's theory. So with the distance contraction, the circumference of the orbit is less from the frame of reference of the satellite than from the frame of reference of the earth. How does a shorter orbit relate to the altitude of the satellite?

I have posted this question many times, and, so far, science seems to be silent about this, just as they are silent about many things with regard to Dr. Einstein's famous theory.

Robert B. Winn

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