Re: Are *observed* SR effects real?

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- *From*: Darwin123 <drosen0000@xxxxxxxxx>
- *Date*: Tue, 5 Aug 2008 10:11:51 −0700 (PDT)

On Aug 4, 11:44 am, "Spaceman" <space...@xxxxxxxxxxxxxxxxxxxxxxxxxx>
wrote:

> Darwin123 wrote:
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> The details are what matters.
> In fact it is the biggest thing that matters for finding "physical" causes.

This is not true. I will give an example of a case where it
didn't matter. The details of the force of gravity did not matter for
centuries. What did matter is the fact that gravity always points to
the center of the earth.
Gravity has several interesting properties. One feature is that
its magnitude is governed by the inverse square law. Another feature
is that it is spherically symmetric. It points to the mass that
generates it. My argument is that the spherical symmetry of gravity is
sufficient to designate it a physical cause for most things on the
surface of the earth. The inverse square law is a detail that on the
surface of the earth is totally unimportant.
The physical cause that objects fall when you let them drop is
called gravity. I believe it was called gravity even before Newton
discovered the law of gravity. Before Newton, it was known that the
earth was round. Gravity was known to always point toward the center
of the earth. Yes, they knew that the gravity on the surface of the
earth was spherically symmetrical. Navigational and survey instruments
were designed based purely on the fact that gravity was spherically
symmetrical on the surface of the earth. The details of how strong the
gravity was didn't matter.
Buoyancy always points in the opposite direction as gravity. The
physical reason that objects don't sink below the surface of the ocean
is buoyancy. Buoyant forces on average point away from the surface of
the earth. This is mostly why the surface of the earth is round. It is
the spherical symmetry of both gravity and buoyancy that that is
important for preGPS navigational methods. The magnitude of these
forces doesn't really make them a physical cause for the shape of the
earth, it is their symmetry.
Yes, they knew the earth was round even before Megellan. When

making maps, cartographers were already building globes based on the fact that the contact forces on average point away from the center. In other words, they used the fact that the contact forces of the ground and oceans is approximately spherical around the center of the earth. The law of buoyancy and displacement is not necessary for navigating as long as you accept the fact that buoyancy is spherically symmetric on the earth.
Newton discovered the inverse square law of gravity. Newton discovered that every mass, not merely the earth, generates a gravitational force. This inverse square law is important, and in his formulation provides us with orbital mechanics. The inverse square law provides us with a lot of other things. However, Newton did not discover gravity. He discovered gravity was a physical cause of the planetary orbits, which was a big breakthrough. However, Newton did not discover that gravity was the physical reason that apples fall.
Megellan sailed around the earth before Newton. However, Megellan did not discover the buoyancy forces. His boat floated by means of buoyancy, a well known contact force. He and his boat−makers knew that buoyancy always pointed upward from the center of the earth. Without once calculating the strength of the buoyancy on the ocean, the survivors of his crew managed to circle the earth. However, they did use the fact that buoyancy on earth is spherically symmetric.
When fixing cars, you use both gravity and contact forces to manipulate the car. The only thing about gravity that you use is the fact that it points downward, toward the center of the earth. You never use the inverse square law. Yet, you quite rightly consider gravity a physical cause.
Gravity as a physical cause for things falling was not discovered by Newton. The fact that the earth is round was an important breakthrough, but it happened well before Newton. The discovery of relativity by Einstein and the others is analogous to discovering the world is round.
The strength of gravity and the force of buoyancy does not automatically make them physical causes for the earths shape.

> Sheesh.
> Get a clue!

Relativity in the centripetal force is analogous to spherical symmetry in gravity. The strength of the centripetal force is analogous to the inverse square law of gravity. For purposes of describing the HK experiment, the strength of the centripetal force is not important in understanding the HK experiment.
In fact, it is so unimportant that Hefele did not explicitly have to mention it. All he had to do was say that the polar axis of the earth was in an inertial frame. He did say that in his 1972 paper. This is another way of saying that the centripetal force followed the laws of relativity.
The reason that other people keep on harping on the shape of spacetime is to emphasize the idea that relativity describes the shape of the universe. It is not a description of how strong forces are. It

is a theory a symmetry that governs the universe.
In point of fact, the dynamics of the atoms used in an atomic clock are still being studied. Relativistic quantum mechanics turns out to be a better description of these atoms than Newtonian physics or even nonquantum relativity. It really will be great to know exactly how atoms behave. However, what is really important is the fact that the world of atoms obey the rules of relativity. That is analogous to saying the earth is round. The roundness of the earth and the relativity of measurements are both about symmetry!
Yes, the centripetal force is the cause of the effects of the HK experiment. The description of the HK experiment in terms of the space time continuum is not a mutually exclusive description. Embedded in the spaetime continuum explanation is the centripetal force. For my part both are accurate descriptions of the HK experiment. The centripetal force is embedded in the spacetime description. Relativity is about the symmetry of forces, not about their magnitudes!
Get a clue! Sit down and learn some physics! Take a physics course! Do the laboratory experiments! Car mechanics isn't the entire world, let alone the universe!
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