

Re: Search for Higgs Boson not dangerous.

Source: <http://sci.tech-archive.net/Archive/sci.physics/2004-09/0066.html>

From: Bjoern Feuerbacher (feuerbac_at_thphys.uni-heidelberg.de)

Date: 08/31/04

Date: Tue, 31 Aug 2004 10:51:53 +0200

TomGee wrote:

> *Bjoern Feuerbacher* <feuerbac@thphys.uni-heidelberg.de> wrote in message
news:<cgv98n\$agt\$1@news.urz.uni-heidelberg.de>...

>

>>*TomGee* wrote:

>>

>>>*Bjoern Feuerbacher* <feuerbac@thphys.uni-heidelberg.de> wrote in message
news:<cgnosr\$41\$1@news.urz.uni-heidelberg.de>...

>>>

>>>

[snip]

>>>*And just how does does inertia fix them in place?*

>>

>>*Inertia is the resistance of objects if one tries to change their
>>state of motion. If something rests, it will stay resting unless
>>a force acts on it. The analogy in cosmology: if the coordinates of an
>>object do not change (i.e. it is comoving with the cosmological
>>expansion), it will not suddenly start changing its coordinates.*

>>

>

> *I know what inertia is. I want to know how comets are "fixed" in the
> expanding space of the universe,*

They aren't. I never said they are. I said above that if the coordinates of an object do not change (i.e. it is comoving with the cosmological expansion), it will not suddenly start changing its coordinates. Comets obviously are not comoving with the cosmological expansion.

> *and how the Earth is fixed in the*

> *space around the Sun which according to you expands and moves bodies
> along with it.*

The Earth also is obviously not comoving with the cosmological expansion.

> *Did you forget about comets and gravitation?*

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No, not at all. But apparently you are unaware that on such small scales as our solar system, the cosmological expansion is totally irrelevant; the motions of objects in our solar system are determined by a Schwarzschild metric (well, actually a Kerr metric, but the differences are negligible), which is embedded in the cosmological Robertson–Walker metric.

>>>>> *The theory which says that the universe "carries" objects with it as it expands is called General Relativity.*

>>>>>

>>>

>>> *No, that is incorrect. GR says no such thing. References, please.*

>>

>> *That follows from the equations of GR. See below.*

>>

>

> *Oh, I see. It follows....*

Yes. As I explained below.

>> *Do you know these equations?*

Hello? Do you know them or not?

>> *BTW, there is also a somewhat similar effect, which is currently measured by the Gravity Probe B: moving matter can drag spacetime along with it.*

>> *<http://einstein.stanford.edu/gpb_intro.html>*

>>

> *Yes, I am aware of that claim and the recent "proof" of it.*

Huh? What proof? The experiment is still in progress, no data was yet obtained, AFAIK.

> *But since*

> *spacetime is not a real place, it is not spacetime which is being*

> *dragged.*

That sentence is largely meaningless. "real place" is not a physical term, and I don't see how the second part of the sentence should follow from the first part.

BTW, what is it then which is being dragged?

>>> *But doesn't that contradict the basis of the spacetime diagram where distance remains the same through time? (Kitty Ferguson, "Stephen Hawking Quest For A theory Of Everything", Bantam Books, 1991, pp 100–105).*

>>

>> *Sorry, I have no clue what you mean here. What does "distance remains the same through time" mean, and what has that to do with the "basis of*

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>>the spacetime diagram"?

>>

>

> No clue, huh? As an object moves in space, it also moves in time, and
> these movements can be calculated by using a spacetime diagram, a math
> construct, an imaginary graph of an object's movement through time and
> space.

Yes, that's clear. And now please tell me what that has to do with what you write above, especially with that phrase "distance remains the same through time".

>>Hey, I am even not sure what sort of spacetime

>>diagram you mean – that term is rather ambiguous!

>>

>How coy! Read up on them, why don't you.

sigh I told you just above that the term is ambiguous, i.e. one can label several different types of diagrams "spacetime diagram". I just wanted to know what exactly you mean. Why did you feel the need to insult me instead of just telling me?

>>I don't have the book you mention above available here – could you

>>please quote some relevant passages?

>>

>

> Sure, but she includes a basic spacetime diagram with x and y axes

Probably you mean x and t axes?

> where she plots a young lady moving from her desk to another place
> where she stops momentarily then moves again. The author explains how
> We can plot her position in time and space at any particular event.

Clear.

But I *still* do not see what that has to do with "distance remains the same through time", and how anything what I said about the expansion of space contradicts this stuff.

> Now, perhaps you referred to the concept of a homogeneous expansion of
> objects in the universe,

No. I referred to the expansion of space itself, as shown by the Robertson–Walker metric:

$$ds^2 = c^2 dt^2 - a^2(t) (dx^2 + dy^2 + dz^2)$$

> used to explain why it seems that all bodies

> are moving away from us,

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A homogeneous expansion of objects in the universe could not be used to explain why it seems that all bodies are moving away from us.

- > *which makes it appear that we are the center*
- > *of of the universe. I do not disagree with the concept; I think it*
- > *works well. However, it does not claim "...that the universe*
- > *'carries' objects with it as it expands", as you claim GR states.*

sigh For the third time, at least: If the coordinates of an object do not change (i.e. it is comoving with the cosmological expansion), it will not suddenly start changing its coordinates. That is what the geodesic equation says.

- >>>*Remember that anything is possible with math constructs, as*
- >>>*Einstein proved with his "static universe".*
- >>
- >>*What has Einstein's static universe to do with "anything is possible*
- >>*with math constructs"?*
- >>
- >
- > *He proved that with math constructs, one can prove we live in a static*
- > *universe.*

Nonsense. He only showed that his equations have a static universe as one of their solutions. He did not prove that this particular solution describes our universe. Additionally, that does in no way show that "anything is possible with math constructs".

[snip a bit]

- >>>>*How else would you call that than "space carries objects along with it"?*
- >>>>
- >>>
- >>>*I have never heard it said that way.*
- >>
- >>*Well, I don't remember reading that anyway, too – but again: what*
- >>*else would you call the effect I described above?*

Hello? (hint: I am still talking about the predictions of the geodesic equation)

- >>>*I have heard it said that*
- >>>*objects move through space due to the effects of the BB,*
- >>
- >>*That's the point of view commonly presented in popular science*
- >>*descriptions of the BB – but from the viewpoint of GR, it does not*
- >>*make so much sense.*
- >>
- >
- > *Why not?*

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Because it contradicts the geodesic equation for the Robertson–Walker metric.

>>>*and that*

>>>*space, and thus our universe, is expanding due to the BB, but I have*

>>>*not heard it said that space carries objects along with it as it*

>>>*expands. You either have a new theory or you are not quite*

>>>*comprehending the essence of that which we speak.*

>>

>>*Well, what is your knowledge of GR?*

Care to answer that?

>>*Why do you think you are qualified to judge if I understand it or not?*

>>

>

>*Because you may be saying that your idea is that space carries objects*

>*along with it as it expands, and that idea is new to me.*

So what? If an idea is news to you, why do you simply assume that it is wrong?

>*If you read*

>*it somewhere, I asked you to guide me to it's source. There are no*

>*qualifications for asking that you support what you say.*

I supported it by explaining to you how this follows from the equations of GR. You keep ignoring these explanations.

[snip]

>>>*As the space expands, objects would separate all the more*

>>>*as more space is added.*

>>

>>*Right. Your point?*

>>

>

>*Then your claim that objects "stay where they are" is false,*

Err, I did not say that objects stay where they are. I said that their coordinates stay the same (if they are comoving), but nevertheless the distance between them increases.

>*since you*

>*admit the objects involved would move and not stay where they are.*

I admitted nothing like that. I only agreed with your statement above that objects would separate all the more as more space is added. That has nothing to do with admitting that they actually move (i.e. that their coordinates change).

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>>>*BTW, where do you propose all the new space is
>>>coming from?*
>>
>>*Huh? Why does it need to come from somewhere?????*
>>
>
> *Well, one can't just make up anything one wants, can we?*

If there is no conservation law for a particular quantity, there is no reason why it shouldn't increase with time. Do you also ask where the additional entropy comes from in irreversible processes?

>>>*If it is not from the BB, how is it created and expanded?*
>>
>>*Simple answer: we don't know.*
>>
>
> *I believe that our space was once space empty of everything the BB put
> into it, and so space was already here when the BB occurred.*

That totally contradicts the actual Big Bang theory, based on General Relativity.

If you think that your interpretation agrees with the math of GR, feel free to explain how.

[snip]

>>>*I also think that space is absolute*
>>
>>*In what sense?*
>>
>
> *In the sense that if the BB emptied out into nothingness, that
> nothingness could have been absolute space (which is simply space
> devoid of anything in it).*

"absolute space" means "space devoid of anything in it"?

> *Others claim that the BB emptied out space
> as well, but I can't accept that as easily as thinking that space was
> already here.*

Well, that's what the math actually says, sorry for you.

>>>*except where the BB has emptied
>>>out (and apparently is still emptying out)*
>>
>>*Huh? Do you want to claim that the BB is still happening?*
>>
>

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- > *Well, haven't you heard that it was recently shown the universe is*
- > *expanding even more rapidly than was expected previously?*

I am fairly aware of that, yes.

- > *And that thus the BB seems to be not halfway over as yet?*

Huh??? How on earth does that follow???

What do you *mean* when you say "Big Bang"? Apparently you use another meaning for that term than its standard meaning (which is something like "the initial singularity of the universe").

- >>>*positive and negative*
- >>>*energies into empty space which is now not empty but filled with such*
- >>>*energies of which some have been converted into mass, and that space*
- >>>*is now our universe.*
- >>
- >>*Sorry, I don't understand what you mean by saying that the BB "empties*
- >>*out energies into empty space".*
- >>
- >
- > *Visible and dark matter are also described as positive energy and*
- > *negative energy.*

Wrong. Dark matter has positive energy. Dark *energy* has negative energy.

And my question above was not about the "positive" and "negative" energy. I did not understand what you mean by "the BB empties out energies".

Bye,
Bjoern