Re: Our Expanding Universe

Source: http://sci.tech−archive.net/Archive/sci.astro/2004−12/0390.html

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From: Bjoern Feuerbacher (*feuerbac_at_thphys.uni−heidelberg.de*)
Date: 12/06/04

Date: Mon, 06 Dec 2004 12:49:08 +0100

Alf P. Steinbach wrote:
> * *Bjoern Feuerbacher:*
> *
>> * *Alf P. Steinbach:*
>> *
>>> *No. There are a lot of issues, including the following. But note that*
>>> *that doesn't mean GR is necessarily entirely useless in this regard; it*
>>> *just means that GR'anians have not solved or explained the problem of*
>>> *the expansion limit; the argument you used is effectively hand−waiving.*
>> *
>> *I told you how one can quantify it: by studying the embedding of*
>> *a Schwarzschild metric into the Robertson−Walker metric. This is*
>> *covered, AFAIK, in most introductory textbooks on GR. So GR has a lot*
>> *more than hand−waving to say about this problem.*
> *
> *
> *Then please do.*

Pardon? Do you really expect me to present a really complex mathematical argument in a newsgroup post??? Why don't you simply look it up in a textbook?

> *I've raised precisely that question in other forums before, e.g.*
> *[sci.astro.research], and possibly you have been involved in those*
> *discussions −− I don't remember.*

Probably not. I only recently began posting there, and don't remember writing anything about that so far.

> *No consensus has ever emerged, no hard non−disputed numbers have*
> *emerged, no clear criteria have emerged, no correlations with*
> *observations have been put forward, in short: nothing concrete, just*
> *ever more frantic handwaiving and ever more subtle assertions, and*
> *disagreements about interpretations & validity of observations.*

Well, then try looking into a textbook... E.g. the one by Stephani discusses it, and MTW also, I think.

>>>(2) You cannot have a Universe where any small part is non−expanding and
>>>the total is.
>>
>>Huh? Why not?
>
>
> Perhaps you misunderstood 'any'.
>
> In that case, substitute 'every'; I'm not natively english−speaking.

Oh, yes, that was indeed the source of the misunderstanding. Sorry.

BTW, I'm also not a native speaker. Considering your name, you
are probably German? Falls ja, koennten wir ja auch per Mail auf
Deutsch weitermachen. ;−)

[snip]

>>>It is a conceptual tool only; for a finite universe with radius R(t)
>>>multiply (conceptually) every distance by 1/R(t).
>>
>>Coordinate transformations act on coordinates, not on distances.
>
>
> Do you understand that a transformation of coordinates can transform
> distances, and vice versa?

Yes. It was a nitpick, I admit.

>>Do you want to multiply all (spatial) coordinates with that factor?
>
>
> No, I do not "want" that. But you can do that as long as you remember
> that it's a conceptual tool only, and that that transformation affects
> other things (as any transformation). Is this viewpoint still unclear?

No, I understand now.

And I admit that I can't think at once about how one could distinguish
the two...

>>>What you're asking
>>>for is details that constitute some heavy−duty research and probably
>>>won't give any more clarity. IIRC some British researchers did however
>>>do the transformation (anything is worth researching) −− not long ago,
>>>they had an announcement that they later had to retract that the
>>>expansion could be explained non−relativistically simply by assuming a
>>>random set of speeds initially −− and possibly you can find that.
>>
>>The information you give here is a bit vague for a search, don't you think?
>

> *>*
> *> Yes it is. If you're interested in that you'll have to put in a*
> *> bit of work... I'm sure you have better resources for that than I. ;−)*

I have better resources for searching for research articles − but
searches in such archives usually require quite precise information.
"some British researchers" is way too vague.

> *> [snippety−snip]*
> *>*
> *>*
> *>>>Enlightenment, part II: chop the infinite Universe into an infinite*
> *>>>number of regions of size R(t). Run time backwards so that at t=0 each*
> *>>>region becomes a point as per R(t)=K*t for some constant K. Assume that*
> *>>>these points are still distinct, i.e. an infinite collection of points*
> *>>>that still constitute an infinite Universe: what does it look like?*
> *>>*
> *>>Like an infinite space. As it did look all the time.*
> *>*
> *>*
> *> Does it contain any matter (and if it does, in what form −− the*
> *> original particles having been squeezed down to zero size)?*

We don't know. The physics we have today does not work at such
scales.

BTW, according to the physics we have today, the elementary particles
already *have* zero size.

> *> Can we now apply the same procedure to the resulting infinite space (and*
> *> so on, ad infinitum)?*

Probably yes.

[snip]

Bye,
Bjoern