Re: The other direction

Source: http://sci.tech−archive.net/Archive/sci.physics.relativity/2006−03/msg02015.html

- *From*: "ajiko" <ajiko2004@xxxxxxxxx>
- *Date*: Fri, 24 Mar 2006 17:30:46 −0800

"N:dlzc D:aol T:com (dlzc)" <N: dlzc1 D:cox T:net@xxxxxxxxxx> wrote in message news:twJUf.114$kT4.100@xxxxxxxxxxxxx

> Dear ajiko:
>
> "ajiko" <ajiko2004@xxxxxxxxx> wrote in message news:44225586$0$95986$742ec2ed@xxxxxxxxxxxxxxxxx
>
> > A recent lecture described the accounting of the matter in the universe. It went something like this:
> >
> > 1) Ordinary mostly luminous matter in galaxies <X>
> > 2) Dark matter surrounding galaxies <Y> (based on velocity distribution of the stars).
>
> Actually quite a quantity within the disk of spiral galaxies as well. Notice also that they are now finding quite a number of "quiescent" black holes at places other than the center of galaxies. These will also act like centers of Dark Matter...
>
> > 3) CBR indicating an overall flatness to the universe that then implies a total amount of matter (using GR).
> > 4) Leftover matter, about 80% must be somewhere. Exotic matter theories sprout up.
> >
> > It is considered that we are now capable of seeing all the galaxies in the universe using the HST.
>
> Not really. The most recent measurements indicate that inflation blew the Universe up beyond our visible horizon, based on reporter's understandings of what was said. Further expansion will have pushed even more over our horizon.
>
> > This is used to determine the matter in (1) above. I don't understand

> this. The sky is basically uniformly
> covered with galaxies in all directions. To me this has
> implications.
>
> Pick the farthest galaxy we can see, say about 13
> billion light years away.

Quasars, yes. Galaxies, I think only about 11 Gly away.

> We see it forming as a quasar 13 billion years ago.
> Imagine an astronomer in that galaxy 13 billion years
> later looking out toward us. He will see our galaxy as
> it is forming 13 billion years ago. What will he see if
> he looks in the other direction? Can WE see any of
> the galaxies he sees in that direction?

Possible, yes.

> To me, it seems like the relative directions of motion
> of all the galaxies are already basically determined
> at the time the galaxies start to form.

Makes sense.

> To me, it seems the energy−matter content of the
> universe must continue on quite a long way beyond
> that farthest visible galaxy.

This doesn't follow. It is entirely consistent with theory and observation that spacetime is a product of the mass−energy in the Universe, and that the total quantity of mass/energy is large but finite. Does the value for c derive from the Universe at large?

> We don't see the galaxies out there because they are not yet lit up −
> not quite separated out into galaxies.

We have very little observation history to go on. There are some places where new galaxies appear to be springing into existence, but there is a large quantity of matter there that is as you say "unlit".

> This cannot have been overlooked. So perhaps someone can describe how GR can make the sky also look uniformly distributed from the point of view of that astronomer far, far away while not having an enormous amount of additional energy or matter.

http://www.astro.ucla.edu/~wright/cosmo_01.htm

And since you asked:
"The laws of physics are the same for all inertial observers." This couldn't be true in a Universe that didn't see about the same things we see now, no matter where you did your observing from.

David A. Smith

Thank you for the thoughtful reply. The web page is quite helpful as well.

The following refers to the second diagram of part 4 from the web page you pointed to.

If we considering the horizon image that is superimposed on the full universe, then it appears that the full universe is 1000X or possibly much more larger than our visible universe. Also, the rest of the universe would be made up of much the same stuff that our visible universe is made of (at least if we consider it at its matured age that the diagram's larger sphere indicates).

The visualization of the universe as an expanding sphere is a long standing technique. Do you know if that model is an actual GR solution? My understanding is that the GR curvature cannot be modeled by simply embedding it in a flat space with one more dimension. Also, the spherical model implies a special connectedness nature. If it closes (as a sphere does), it indicates finiteness. If it doesn't, then either it is finite with a fuzzy edge somewhat like a galaxy has, or it is infinite.

The distribution of matter is not one of those fundamental laws of physics. Rather it is an observational piece of data that helps to discover those laws. What one sees in the sky is clearly NOT the same for all observers. That far away astronomer is much closer to the stuff "the other side".

Ned Phipps

.