Re: Questions about the expansion of space

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>>>>> "I" == Ike358 <drzhivago@bellsouth.net> writes:

I> I am trying to improve my conceptualization of the 'shape' of the
I> universe, and in doing so have been reading about the expansion of
I> space according to the standard model. I will list the following
I> concepts as assertions for simplicity, but actually each is a
I> question, asking if the statement is true, false, or unknown. Any
I> further explanation with responses would be much appreciated.

I> 1. In the standard model, space is expanding continuously, and is
I> doing so homogeneously and isotropically throughout the
I> universe. This statement is equivalent to saying that 'space' is
I> being continuously created throughout the universe.

Actually, in the standard model, the distances between galaxies is expanding with time. The standard model is based on general relativity, which doesn't know anything about "space." General relativity describes how to measure the distance between objects and how objects change the distances between them.

Various popular descriptions of the standard model invoke this mysterious "space" stuff, which leads to some of the questions that you've posed. Basing things on distances, as GR does, obviates that problem.

I> 2. If this is true, then in and of itself, the continuous creation
I> of space is no more or less 'reasonable' than the continuous
I> creation of matter, as in the now generally discredited
I> steady−state theory. [...]

If true, correct. Actually, both the Big Bang and the Steady State models invoke "creation of matter" at some level. The SS model requires a continuous creation, while the BB requires an initial creation. (No, not in the religious sense.)

I> 3. Space cannot be quanticized, since if it were, the creation of
I> space could not be continuous.

General relativity applies on large scales, sufficiently large that quantum mechanics is not important. Your question supposes that GR and quantum mechanics are reconciled, which they haven't been to any good degree.

I> 4. Since the expansion of space is occuring everywhere, it is
I> occuring locally. [...]

Another problem with the popular description of expanding "space." The equations describing the expansion of the Universe are derived assuming a homogeneous and isotropic distribution of matter. That assumption is violated on small scales (like the scale of your computer). On small scales the Universe does not expand. ("Small" in this case corresponds to scales smaller than about 40 Mpc.)

[...]
I> 8. Because of the expansion of space, the Hubble Length (cz)
I> measures the maximum distance in any direction we can receive data
I> from, since any data beyond that is further away than can reach us
I> at speed c.

Actually, the horizon would be approximately c/H, where H is Hubble's constant. The quantity 1/H is approximately the age of the Universe. Other than that, yes, the finite speed of light indicates that there is a finite distance to which we can see.

I> 9. The greatest two−dimensional length of the universe from which
I> we can receive data is twice the Hubble length, namely a line from
I> our observation point in any direction, plus the line in the
I> opposite direction.

Not quite. Remember that in the time it takes light to travel from the distant reaches of the Universe to here, the Universe has expanded. Therefore, the distance is larger.

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