

The other direction

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- *From:* "ajiko" <ajiko2004@xxxxxxxx>
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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).
- 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. 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. 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?

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. To me, it seems the energy-matter content of the universe must continue on quite a long way beyond that farthest visible galaxy. We don't see the galaxies out there because they are not yet lit up – not quite separated out into galaxies.

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.

Ned Phipps

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