

Re: Is the Sun mostly dark matter ?

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- *From:* john <vegan16@xxxxxxxxxxxxxxxx>
 - *Date:* Sat, 22 Mar 2008 07:56:32 -0700 (PDT)
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On Mar 22, 8:43 am, john <vega...@xxxxxxxxxxxxxxxx> wrote:

On Mar 21, 11:41 pm, YKhan <yjk...@xxxxxxxxxx> wrote:

On Mar 20, 3:11 pm, carlip-nos...@xxxxxxxxxxxxxxxxxxxxxxxx wrote:

In the extremely early universe, dark matter was in thermal equilibrium with the rest of the universe. At thermal equilibrium, there is certainly a distribution of energies, but the distribution is determined by the temperature, and at the very high temperatures of the extremely early universe, "slow" speeds are scarce.

As the universe expanded, energies and densities decreased, and at some (still quite early) time, dark matter "decoupled" from ordinary matter. The details of this process depend on the exact nature of dark matter, which we don't know, but the basic ingredient is that the density became too low of particles and antiparticles of dark matter to "find" each other to annihilate, and the energy became too low for annihilation of ordinary matter and antimatter to produce dark matter.

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After decoupling, dark matter continued to cool, but (essentially) only because of the expansion of the universe. This means that the temperature, and therefore the velocity distribution, evolved in a simple, predictable way. This can be calculated, and we can predict how much dark matter is captured by various gravitational sources.

If DM is cooling only at the rate of expansion of the universe, so then that would mean that ordinary matter cooled at a much faster rate than the expansion rate of the universe. Which is as expected by the Laws of Thermodynamics. That would mean that ordinary matter lost a lot of energy to entropy, whereas DM must've lost no energy due to entropy. So DM doesn't follow the 2nd law of thermodynamics, somehow?

Also why doesn't DM congregate around intergalactic gas?

It does. You just have to calculate how much.

There is apparently enough of this gas around to create billions more galaxies, yet the Bullet Cluster collision clearly shows that DM doesn't get attracted to the gas, just to the galaxies. This despite the fact that the gas outweighs all of the galaxies by several fold in that collision.

No, that's not what the Bullet Cluster shows. The collision of gas in the Bullet Cluster drastically slowed the motion of the gas, while not affecting the dark matter, which kept moving. Eventually the gravitational interaction will pull some of the gas and dark matter back together, but this takes time

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— after all, if you throw a ball into the air, the Earth's gravity doesn't *instantaneously* stop it and pull it to the ground. (I don't know off hand whether the present relative velocity of the gas and dark matter is faster than the escape velocity; if it is, most of the gas and dark matter will continue to separate forever.)

(The stars in the galaxies are pretty much bystanders. As you say, their mass is small compared to that of the gas. The fact that they move with the dark matter doesn't have so much to do with gravity — they are just keeping their original velocities, and so is the dark matter.)

Yes, the gas collided and slowed down. And yes, the DM kept right on trucking along without being affected by the gas collision slowdown. Also the galaxies were unaffected by the gas collision. But the DM was just as unaffected by the gas collision as the galaxies were, meaning that the DM stayed in lock-step with the galaxies.

Doesn't this just prove that DM is nothing but an illusionary energy effect due to the concentration of matter in galaxies, rather than being an independent source of material cohabiting with the galaxies? Isn't it a bit of a leap to say that the DM and the galaxies are just moving along in the same direction and at the same speed because of a coincidence?

Yousuf Khan

Bit of a leap?
Bit of a leap?

Dark matter is the biggest
leap of all time.

Postulating a whole new never-before-seen form of gravitating but non-electrically-interacting matter because one's theory of gravity derived on earth

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doesn't match with what a galaxy does?

Bit of a f**king leap!!

(shaking head and muttering for rest of act)

John

Galaxy Model for the Atom

If, however, a black hole or AGN is a standing wave vortex whose spin is intense-enough to split virtual pairs and send one kind out one jet and the other kind out the other jet, then all these split pairs would exist along with every galaxy as a gravitationally-bound cloud. These clouds would be a big part of the mass of each galaxy.

John

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