

The Dark Fantasy

by Manjil Saikia - Thursday, January 19, 2012

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There seems to be a HALO of mysterious invisible material engulfing galaxies, which is commonly referred to as **Dark matter**. Scientists infer the existence of dark (=invisible!!!) matter from the observation of its gravitational pull, which causes the stars in the outer regions of a galaxy to orbit faster than they would if there was only visible matter present....real fast! Another indication is that we see galaxies in our own local cluster moving towards each other.

The Andromeda galaxy -about 2.2 million light years away from the Milky Way- is speeding toward us at 200,000 miles per hour. This motion can only be explained by gravitational attraction, even though the mass we observe is not nearly great enough to exert that kind of pull. So there must be a large amount of UNSEEN mass causing the gravitational pull, lying between the two galaxies.

Astronomers have no idea what the dark matter is that supposedly makes up 23% of all matter in our universe. Black holes and massive neutrinos are two possible explanations. Dark matter must have played an important role in galaxy formation during the evolution of the cosmos. But, even taking into account all known and suspected black holes, there seems to be much more matter out there than we can presently see or , which further takes us to the fact that the existence of black holes is not yet firmly established, and as we all know what they are actually, it may be a good idea to stay away from black holes, rather than being stretched out like “noodles” , should they actually exist.

Dark energy is perhaps even more mysterious than dark matter. The discovery of dark energy goes back to 1998 when a 10-year study of supernovae took an astonishing turn. A group of scientists had recorded several dozen supernovae, including some so distant that their light had started to travel towards Earth when the universe was only a fraction of its present age. The group's goal was to measure small changes in the expansion rate of the universe, which in turn would yield clues to the origin, structure, and fate of the cosmos. Contrary to their expectation, the scientists found that the expansion of the universe is not slowing, but accelerating. The acceleration is supposedly due to the anti-gravitational properties of the so-called dark energy.

Scientists agree that dark energy is the dominant constituent of our universe, which means that it is larger than the sum of visible and dark matter. It was discovered by Hubble that the universe is expanding, & at the beginning of the 21st century it seems that anti-gravity is coming back with vengeance. A possible explanation is that the energy content of a vacuum is non-zero with a negative pressure. This negative pressure of the vacuum would grow in strength as the universe expands and it would cause the expansion to accelerate. If the acceleration does not stop, this will lead to the Big Rip scenario suggested by Caldwell, in which the universe will be literally torn apart by the anti-gravitational force in several billion years. After all it always isn't necessary for a *fantasy* to be always be good.

[This article was contributed by Sunit Manjil Hazarika, a 2nd semester Integrated Masters student of the Department of Physics, Tezpur University, India.]

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