Re: Cosmic structure explained without dark matter?

Source: http://sci.tech−archive.net/Archive/sci.physics/2006−12/msg03143.html

- *From*: Sam Wormley <swormley1@xxxxxxxxx>
- *Date*: Fri, 29 Dec 2006 01:12:30 GMT

G=EMC^2 Glazier wrote:

> Sam Posted that dark matter an transparent matter are relative.

No, Herb, what I posted was:

The scientists making the observations, are convinced they have definitive evidence for the existence of dark matter. Next up will be the discovery of what is consists of.

Dark Matter Exposed?
http://sciencenow.sciencemag.org/cgi/content/full/2006/821/1

By Tom Siegfried
ScienceNOW Daily News
21 August 2006

A smoking bullet clinches the case for dark matter in galactic clusters, NASA announced today. The cluster of galaxies designated 1E0657−56, known as the "bullet cluster" for its picturesque bullet−shaped cloud of superhot gas, has provided astronomers with the best evidence yet that intergalactic space is filled with the same stuff that provides the gravity needed to hold the galaxies together.

Normal matter in galactic clusters consists mostly of stars and very hot gas−− the gas between the galaxies, in fact, outweighs all the stars. But the gas and stars together appear to be vastly outweighed themselves by some mysterious form of unseen matter, composed of an as yet unidentified species of particle (ScienceNOW, 7 February) Previously, dark matter's existence had been inferred from its gravitational effects on the motions of galaxies. But some scientists suspected that odd galactic motions could be explained without the need for dark matter if gravity's strength was merely altered on galactic scales.

But such "modified" theories of gravity can't explain away the new

observations, report astronomer Douglas Clowe of the University of Arizona in Tucson and colleagues. Images from NASA's Chandra X−ray satellite indicate that the bullet cloud was formed by an explosive collision between galactic clusters, with the shock wave dragging the hot gas between the galaxies into its peculiar shape. The shock wave would not have affected dark matter, which interacts only via gravity, so the collision effectively separated the dark matter from the gas. Images from the Hubble Space Telescope and other telescopes show that the strength of the cluster's gravity no longer matches up with the hot gas, indicating that a stronger gravitational source−−the dark matter−−exists in the cluster. Those images show how the cluster's gravity bends light and distorts the images of distant background galaxies.

"For the first time, we're actually able to see dark and ordinary matter separated in space. And this proves in a simple and direct way that dark matter exists," said astrophysicist Maxim Markevitch, of the Harvard−Smithsonian Center for Astrophysics, in Cambridge, Massachusetts, at a NASA briefing. Markevitch is a member of the team led by Clowe that will present its findings in an upcoming issue of Astrophysical Journal Letters.

The data make the case "beyond a reasonable doubt" that galactic clusters are held together by dark matter rather than a modified gravity, says University of Chicago cosmologist Sean Carroll. "Evidence [for dark matter] has been accumulating for a long time," Carroll says, "and the great thing about this particular result is there are pictures."
.