

## Re: Has anyone tested MOND?

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- *From:* Sam Wormley <[swormley1@xxxxxxxxxx](mailto:swormley1@xxxxxxxxxx)>
  - *Date:* Wed, 25 Jun 2008 20:31:07 GMT
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Yousuf Khan wrote:

fred.zakity@xxxxxxxxxx wrote:

If  $F=ma$  breaks down at very low accelerations as claimed by MOND, has any experiment been done to test its validity?

It seems to me that it would not be a very difficult experiment to conduct.

It may not be possible to do inside Earth's gravity, since the acceleration of Earth's gravity is much larger than MOND's  $a_0$ , and it would inundate the experimental results.

Yousuf Khan

MOND is Dead? ...most likely

<http://www.astro.ucla.edu/~wright/density.html#MOND>  
[http://www.astro.ucla.edu/~wright/old\\_new\\_cosmo.html](http://www.astro.ucla.edu/~wright/old_new_cosmo.html)

22 Oct 2002 – The Chandra X-ray Observatory presented evidence against the Modification of Newtonian Dynamics (MOND) alternative to dark matter theories. The August 2002 Scientific American has a long article about MOND. The hot X-ray emitting gas around the galaxy NGC 720 forms an ellipsoidal cloud, which requires an ellipsoidal gravitational potential well. While an ellipsoidal cloud of dark matter could provide such a well, MOND would necessarily give a spherical potential well. In general MOND works well on the scale of individual galaxies, but not for clusters of galaxies. So why is MOND only maybe dead? Its supporters like Milgrom are persistent and clever, and they may come up with a MONDian explanation for NGC 720.

More on Dark Matter

<http://www.astro.ucla.edu/~wright/cosmolog.htm#News>

## Re: Has anyone tested MOND?

21 Aug 2006 – NASA announced updated information about the "bullet cluster" 1E0657–56 today. Two clusters of galaxies have recently collided in this X–ray source. This cluster is filled with hot gas so X–ray observations by the Chandra X–ray Observatory show where the ordinary matter is located. 90% of the ordinary matter (the "baryonic" matter) is hot gas.

The new results [Clowe et al., Bradac et al.] use gravitational lensing of background galaxies to show where the sources of gravity are located. The sources of gravity in the cluster are not located where the ordinary matter is located, so this cluster is a counter–example to MOND. All of this was known in 2003 but with less precision. Sean Carroll has a nice post about this at Cosmic Variance.

The Matter of the Bullet Cluster

<http://antwarp.gsfc.nasa.gov/apod/ap060824.html>

Explanation: The matter in galaxy cluster 1E 0657–56, fondly known as the "bullet cluster", is shown in this composite image. A mere 3.4 billion light–years away, the bullet cluster's individual galaxies are seen in the optical image data, but their total mass adds up to far less than the mass of the cluster's two clouds of hot x–ray emitting gas shown in red. Representing even more mass than the optical galaxies and x–ray gas combined, the blue hues show the distribution of dark matter in the cluster. Otherwise invisible to telescopic views, the dark matter was mapped by observations of gravitational lensing of background galaxies.

In a text book example of a shock front, the bullet–shaped cloud of gas at the right was distorted during the titanic collision between two galaxy clusters that created the larger bullet cluster itself. But the dark matter present has not interacted with the cluster gas except by gravity. The clear separation of dark matter and gas clouds is considered direct evidence that dark matter exists.

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