Monthly Notes of the Alternative Cosmology Group – May 2014

The ACG Webmaster who distributes this newsletter to subscribers would prefer not to receive related correspondence.

Please address all correspondence to MNACG Editor, Hilton Ratcliffe: mnacg_editor@cosmology.info**.**

The ACG newsletter is distributed gratis to subscribers. Get onto our mailing list without obligation at **www.cosmology.info/newsletter**. The current newsletter is a review of selected papers published on arXiv under astro-ph and gen-phys for the months of January to May, 2014. We now include papers archived elsewhere, provided access is full and open. The Alternative Cosmology Group draws its mandate from the open letter published in *New Scientist*, 2004 (**www.cosmologystatement.org**), and these monthly notes seek to publicise recently published empirical results that are aligned with that ethos. In other words, what observations seem anomalous in terms of the Standard Model of Cosmology? We prefer observational results and tend to avoid complete cosmologies and purely theoretical work. Discussion of method is welcome. If you would like to suggest recently published or archived papers for inclusion, please send the arXiv, viXra or other direct reference and a brief exposition to Hilton Ratcliffe (**hilton@hiltonratcliffe.com**). Note that our spam filter rejects slash and colon in the text, so please write web addresses commencing "www".

I. Editorial comment

I thought I had retired gracefully from MNACG editorship, but fate dictates otherwise! Attempts to find a new editor have not yet borne fruit, so I shall have to step into the gap, at least in the short term. If anyone out there aligned with the ethos of the ACG and the editorial policy of MNACG would like to serve mankind in this capacity, please contact me. The pay's not good but the fringe benefits are spectacular! Meanwhile, prompted by the publication of Eric Lerner's paper on surface brightness, I shall put together a special edition to cover the gaping hole in continuity of the MNACG. My intention is to try to get the MNACG back onto its feet again in the near future.

This issue is devoted to material supplied by Eric Lerner et al, comprising a press release of the long overdue publication of their paper on galaxian luminosities (supporting a static Universe) and a cogent summary of remaining significant problems in the Big Bang model.

II. Breaking News

1. Press release:

May 1, 2014

Observations of distant galaxies provide stunning new evidence

that the Universe is not expanding

New challenge to the dominant Big Bang theory, which is suffering growing contradictions

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In a startling challenge to the widely-popular Big Bang theory, new evidence, to be published this week in the International Journal of Modern Physics, D, indicates that **the universe is not expanding** after all. The evidence, based on detailed measurements of the size and brightness of hundreds of galaxies, adds to a growing list of observations that contradict the predictions of the increasingly complex Big Bang model.

The new research tested one of the striking predictions of the Big Bang theory: that ordinary geometry does not work at great distances. In the space around us, on earth, in the solar system and the Milky Way, as similar objects get farther away, they look **fainter** and **smaller.** Their surface brightness, that is the brightness per unit area, remains constant. In contrast, the Big Bang theory tells us that in an expanding universe objects actually should appear fainter **but** bigger**.**

Thus in this theory, the surface brightness decreases with the distance. In addition, the light is stretched as the universe expanded, further dimming the light. So in an expanding universe the most distant galaxies should have hundreds of times dimmer surface brightness than similar nearby galaxies, making them actually undetectable with present-day telescopes.

But that is not what observations show, as demonstrated by this new investigation. The researchers—Eric J. Lerner (**LPPhysics, Inc.,USA**), Dr. Renato Falomo (INAF – Osservatorio Astronomico di Padova, Italy), and Dr. Riccardo Scarpa (Instituto de Astrofisica de Canarias, Spain)-- carefully compared the size and brightness of about a thousand nearby and extremely distant galaxies, using images from the GALEX satellite for nearby ones and from the Hubble Space Telescope for distant ones. They chose the most luminous spiral galaxies for comparisons, matching the average luminosity of the near and far samples. Contrary to the prediction of the Big Bang theory**, they found that the surface brightness of the near and far galaxies is identical.** (See Figure 1).

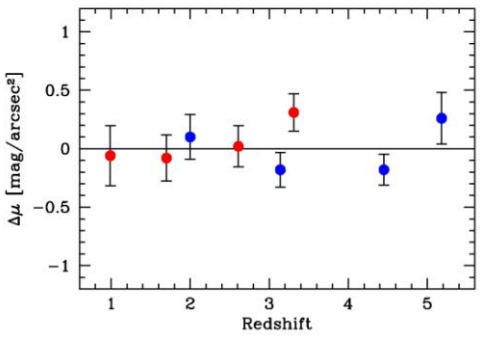


Figure 1. Difference in surface brightness between nearby galaxies observed with GALEX and distant ones observed with Hubble Space Telescope are plotted against the redshift of the Hubble galaxies. Vertical line show statistical error bars. The data are completely consistent with no difference in surface brightness, as predicted for a non-expanding universe.(Red dots are galaxies measured in the Near UV band and Blue dots those in the Far UV band.)

These results are fully consistent with what would be expected from ordinary geometry if the Universe was not expanding, and are in contradiction with the drastic dimming of surface brightness predicted by the expanding Universe hypothesis.

"Of course, you can hypothesize that galaxies were much smaller, and thus had hundreds of times intrinsic surface brightness in the past, and that, just by coincidence, the Big Bang dimming **exactly** cancels that greater brightness at all distances to produce the *illusion* of a constant brightness, but that would be a *very* big coincidence", comments Lerner.

That was not the only startling result of their research. In order to apply the surface brightness test, first proposed in 1930 by physicist Richard C. Tolman, the research team had to determine the actual luminosity of the galaxies, so as to match near and far galaxies.

To do that, they had to link the distance to the galaxies with their redshift-- the amount that their light had shifted to the red part of the spectrum. They hypothesized that the **distance is proportional to the redshift at all distances**, as is well verified to be the case in the nearby Universe. They checked this relation between redshift and distance with the data on supernova brightness that has been used to measure the hypothesized accelerated expansion of the Universe.

"It is amazing that the predictions of this simple formula are as good as the predictions of the expanding universe theory, which include complex corrections for hypothetical dark matter and dark energy. (See Figure 2). ", says Dr. Falomo. "Again you could take this to be merely coincidental, but it would be a second big coincidence," says Dr. Scarpa.

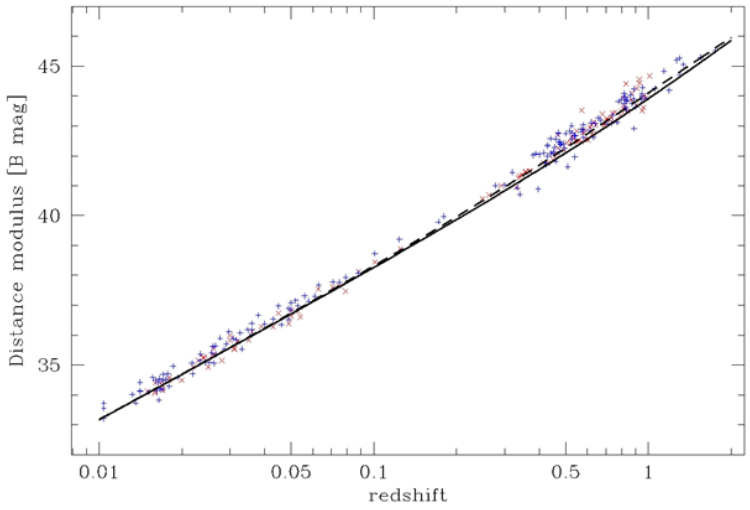


Figure 2. The apparent brightness of Type 1 a supernovae (x and plus signs) are plotted against redshift (the dimmer the star, the higher the distance modulus). The predictions of the non-expanding theory (solid line) hardly differ from that of the dark matter, dark energy Big Bang theory (dashed line).

Therefore if the universe is not expanding, the redshift of light with increasing distance must be caused by some other phenomena--something that happens to the light itself as it travels through space. "We are not speculating now as to

what could cause the redshift of light," explains Lerner. "However, such a redshift, which is not associated with expansion, could be observed with suitable spacecraft within our own solar system in the future".

The team spent years ensuring that no errors crept into the data, that all galaxies were measured in the same way, and that even galaxies too small to be measured were taken into account, as is detailed in the paper, "*UV surface brightness of galaxies from the local Universe to z ~ 5*", being published in IJMPD. The work also shows that earlier studies of the surface brightness test, when consistently analyzed, support the same conclusion.

This new evidence is by no means the only recent result that challenges the Big Bang theory, a theory that after all rests on the existence of dark matter, dark energy, and inflation, three hypothetical entities whose reality is far from being proved. See background on "The Growing Case against the Big Bang Theory"**.**

"Questions and Answers on The Science of Surface Brightness" gives more technical details on this study. Also available are **biographical sketches** of the research team members, background on the **connection between Eric J. Lerner's research of fusion energy and on cosmology**.

2. The Growing Case Against the Big Bang - A Summary from LPPhysics, Inc.

The **new evidence on surface brightness** is by no means the only recent research that contradicts the Big Bang theory. Despite the continuing popularity of the theory, essentially every prediction of the theory has been increasingly contradicted by better and better data, as shown by many teams of researchers. The observations are, on the other hand, consistent with a non-expanding universe with no Big Bang.

Key contradicted predictions:

1) Lithium

Prediction: Any superhot explosion throughout the universe, like the Big Bang, would have generated a certain small amount of the light element lithium.

Evidence: Yet as astronomers have observed older and older stars, the amount of lithium observed has gotten less and less, and, in the oldest stars is **less than one tenth of the predicted level.** This, however, accords with non-Big-Bang predictions that explain the production of light elements by stars and cosmic rays within the galaxies themselves.

2) Dark Matter

Prediction: The Big Bang theory requires the existence of **dark matter**—mysterious particles that have never been observed in the laboratory, despite huge experiments to find them.

Evidence: Multiple lines of evidence, especially observations of the motions of galaxies, show that this dark matter does not exist.

3) Too Large Structures

Prediction: In the Big Bang theory, the universe is supposed to start off completely smooth and homogenous.

Evidence: But as telescopes have peered farther into space, huger and huger structures of galaxies have been discovered, which are too large to have been formed in the time since the Big Bang.

4) Cosmic Background Radiation (CBR) Asymmetries

Prediction: The inflation that was supposed to have occurred during the Big Bang should have smoothed out any large-scale asymmetries in the universe. The CBR should show be perfectly symmetrical.
Evidence: The CBR in fact shows **strong evidence of asymmetries** from one side of the sky to the other that, although small, could not have been produced by the ultra-symmetric "inflation" that hypothetically occurred in the Big Bang.

The response of most cosmologists to this growing body of evidence has, unfortunately, not been to decide the Big Bang theory has been falsified, but to add new "parameters" and hypotheses, like dark energy. The theory is now far more complex and speculative than the Ptolemaic epicycles that were destroyed by the Scientific Revolution. Each contradiction with observation is taken as a mere "anomaly" that does not undermine the theory as a whole. Strong peer pressure is applied against many of those who question the theory.

"It's as if researchers are saying 'I can see the Emperor's elbow through his New Clothes', 'I can see the Emperor's knee though his New Clothes' and so on, " says Lerner. "It is time to say: 'The Emperor is not wearing any clothes'. This theory has no correct predictions."

To replace the Big Bang, other researchers have elaborated, in peer-reviewed publications, alternative explanations of the generation of light elements and of the energy in the CBR by ordinary stars, and of the development of large-scale structures through the interaction of gravity and electromagnetic processes. "No one would claim that all the problems in cosmology have been resolved, "agrees Lerner," but *the evidence is consistent with an evolving, but non-expanding universe, which had no beginning in time and no Big Bang."*

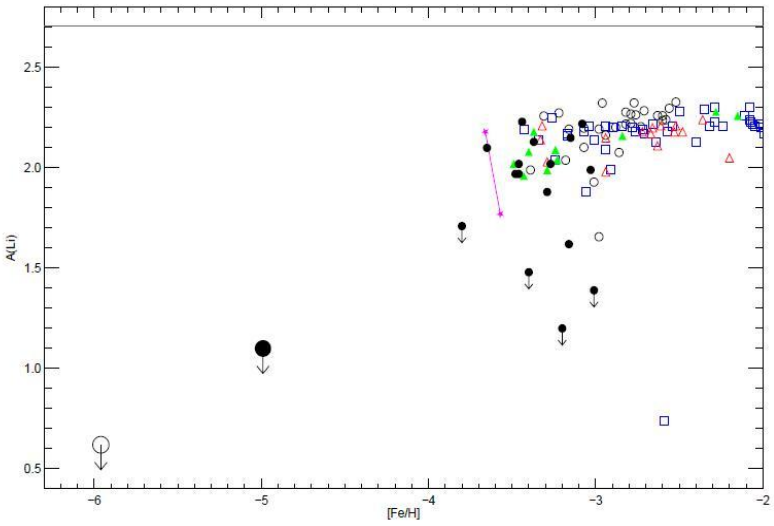
More detailed descriptions of the evidence against the Big Bang theory:

Lithium Evidence

The Big Bang theory unequivocally predicts certain amounts of light element, including lithium, helium and deuterium, must be produced in the explosion that is hypothesized to have started the universe. For lithium, the prediction is 400 lithium atoms for every trillion hydrogen atoms.

However, astronomers have measured the abundances of lithium in old stars in our galaxy and they have not found the Big Bang predictions to be correct. They know the stars were formed very early in the history of our galaxy, because they have very tiny amounts of iron and other heavy elements that are produced by previously-existing stars. In most of these stars, the lithium abundance is only 160 lithium atoms per trillion atoms, far below the Big Bang predictions.

In addition, as more data became available over the last few years (as described by many researchers, including, for example, **Sbordone, Bonifacio and Caffau**) it became clear that the older the stars, the less the lithium. By now, eight stars have been discovered with less than one tenth the amount of lithium predicted by the Big Bang, and all are of the type of star that would not have destroyed any lithium. The star with the least iron of these, born in the very early days of the Milky Way galaxy, has less than 3% of the lithium predicted.



The abundance of lithium is plotted logarithmically here against the abundance of iron, a measure of how old the star is: the less iron the earlier the star formed. The horizontal line near the top is the Big bang prediction of lithium abundance. Arrows mark upper limits on lithium abundance of individual stars. From ***Sbordone, Bonifacio and Caffau****.*

While these data flatly contradict the predictions of the Big Bang, they were predicted and simply explained by theories of galactic evolution that assumed there was no Big Bang, including a **paper published in 1989 by Lerner**. Lithium, as is well known, is produced by cosmic rays, emitted by early stars, crashing into carbon and oxygen nuclei, as well as by stars in their giant phase. The same stellar processes, Lerner showed, could produce the observed abundance of helium –from thermonuclear reactions in early intermediate-mass stars—and deuterium (again from cosmic rays), while producing the observed amounts of heavier elements like carbon and oxygen.

Evidence Against Dark Matter

The Big Bang theory , in its current form, predicts that most matter in the universe is dark matter, unlike any that has been found on earth.

Increasingly sensitive experiments on earth have failed to turn up any evidence of the dark matter particles that are firmly predicted by the Big Bang theory. But in addition, astronomical evidence as well has ruled out dark

matter. The simplest evidence is in the relatively low velocities of galaxies in the universe. (These can be measured for galaxies for which there are independent, non-redshift-based measurements of their distance. The redshifts can then be used to measure velocities of galaxies relative to one another.) The large amounts of dark matter predicted by the Big Bang would generate gravitational forces that will whip the galaxies around at hundreds of km per second. But the observed average velocities of 50 km/sec rules out the large amounts of dark matter required by the Big Bang, as **Baryshev, Sylos- Labini ,Montuori, Pietronero and Teerikourpi** have pointed out. Nor would a super-smooth distribution of dark matter needed to avoid high velocities be compatible with the lumpiness—inhomogeneity-- of matter that is observed on all scales.

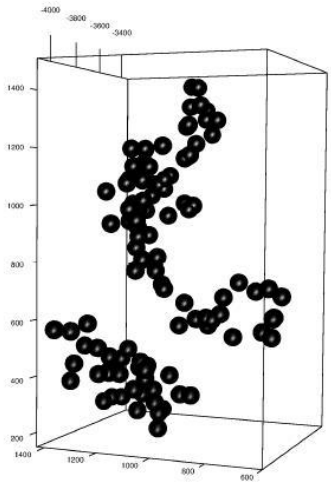
In addition, the satellite galaxies of both the Milky Way and the nearby Andromeda galaxy are in a disk configuration, just as expected if the gravitating mass is ordinary matter. If the gravitating mass were dark matter, the satellites would have to be in a random sphere. This evidence completely contradicts the dark matter hypothesis, as **Pavel Kroupa**, among many other researchers, has pointed out.

Again, there are other, simpler, non-Big Bang ways of explaining the data. Over 30 years ago, **Peratt and Green** showed that electromagnetic forces would produce the constant velocity of rotation in spiral galaxies that has long been used as a key evidence of dark matter. These velocities are measurements of the velocity of radio-emitting plasma within a galaxy, which is as much influenced by magnetic forces as by gravitational forces. Many researchers, **including Dr. Scarpa**, have demonstrated evidence that a small modification of gravitational forces, **termed MOND**, could also explain the data.

Structures Too Large to Form in the Time Since the Hypothesized Big Bang

The Big Bang theory hypothesizes that the universe came into existence with an almost perfectly homogenous – even--distribution of matter, and that structures built up gradually from stars to galaxies to cluster to superclusters.

But larger and larger structures have been uncovered at earlier and earlier times. To cite just one recent example of many, last year a team of observers, Roger Clowes, *et al*, discovered **a huge collection of quasars over 3 billion light years in extent**, existing billions of years ago. This was, in their view, too large to have been created within the hypotheses of conventional cosmology.



The huge agglomerations of quasars discovered by Roger Clowes et al. Tick marks are separated by 600 million light years. These objects are far too large to have been generated in the time since the Big Bang.

Indeed, Lerner has pointed out that, when the existing low velocities of galaxies are taken into account, the large structures of conglomerations of galaxies that we observe would take hundreds of billions of year to form. In **pioneering work in 1986 Lerner** used plasma physics to predict a fractal structure of the universe, including structures up to billions of light years across, structures that were later discovered. In Lerner's theory, these structures could only have formed in a universe whose history stretches far back before 14 billion years ago.

The Cosmic Background Radiation and the Problem of Large-Scale, Non-Random, Asymmetries

The Cosmic Background Radiation (CBR) is frequently cited as the key evidence for the Big Bang, and more recently for inflation, the super-expansion during the Big Bang that is a critical element of the theory. One of the few concrete predictions of inflation is that the universe is isotropic, the same in all directions. The inflation theory predicts that any asymmetries in the universe existing before inflation would be wiped out by the vast expansion during inflation. "The most decisive observational evidence against inflation would be provided by evidence that the Universe possesses large-scale rotation," wrote Barrow and Liddle in a 1997 paper**.**

But in fact the CBR evidence, combined with evidence from observations of galaxies, flatly contradicts this prediction.

The latest results from the Planck satellite confirmed what had been known for years, that there are **non-random alignments** on the sky of the small fluctuations in the intensity of the CBR. (These are only the most prominent contradictions of inflation predictions by Planck data).

In addition, a **study of the handedness of spiral galaxies** in 2012 showed a non-random alignment of the galaxy spins on a very large scale. Such spin alignments indicate precisely the large scale rotation that contradicts inflation.

On the other hand, plasmas-based theories of structure that scale up the well-know formation of filaments in plasma to cosmological scales predicted such evidence of rotation. Vortex filaments, which have been observed for decades from the laboratory to extremely large astrophysical scales, must rotate, so this is no surprise. Of course, such ultra-large vortices would, again, have taken hundreds of billions of years to form.

It has also been known for decades that the energy needed to account for the microwave background is equal to the energy that would have been released by the production by ordinary stars of the known amount of helium. **Plasma effects** can also, in part, account for the isotropy and blackbody spectrum of the CBR, although this 20–year old work needs to be updated to take into account new data as well as the surface brightness results.

Conclusion

Each of these sets of problems could be, and in fact often are, dismissed as mere “anomalies” in an otherwise well-supported theory. But taken collectively they contradict all the predictions of the theory, leaving no support at all. The response of supporters of the Big Bang theory has been to continually add “parameters” to the theory to account for new discordant data. As a result, as Michael Disney **has demonstrated**, the theory, now with over 20 parameters to be adjusted, has never had any power to predict new results. So it lacks the basic hallmark of a sound scientific theory. Indeed, the recent, well-publicized results from the BiCEPS instrument has led many researchers to add yet more parameters to the theory to explain apparent contradictions between BiCEPS and Planck results.

In contrast, the data that contradicts the Big Bang theory can be explained far more simply with hypotheses that are consistent with a universe that had no beginning in time and no Big Bang.