



ALTERNATIVE COSMOLOGY GROUP

www.cosmology.info

The Alternative Cosmology Group Newsletter - September 2009

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 904 papers published under astro-ph, together with 408 under gen-phys on arXiv for the month of August, 2009. We now include papers archived elsewhere, provided access is full and open. If you would like to suggest papers for inclusion, please send the arXiv, viXra or other direct reference and a brief exposition to Hilton Ratcliffe (hilton@hiltonratcliffe.com).

We are pleased to acknowledge increasing participation by subscribers to the content this newsletter. So that we are all on the same page, here is part of our response to one such suggestion: *“The ACG newsletter functions as a notice board for the latest publications, and utilises the past calendar month to constrain source material. We would simply be swamped if we did not apply a boundary condition on what comprises ‘recent’.* In addition, as you may have noticed, we narrow the field even further by avoiding very theoretical material in favour of more empirical results that may be applied to test theory. There are exceptions of course, as for example the case of Black Holes. As a general rule we tend to shy away from complete cosmologies and concentrate on component parts which may be used to challenge the dominant paradigm.” We’d also prefer links directly to the paper being referenced, rather than links to web pages where our reader has to navigate to find the referred article. Note that our spam filter rejects slash and colon in the text, so please write web addresses commencing “www”.

What has emerged in recent newsletters is that our rather guileless scanning method quite fortuitously reveals a minor theme for the month. This is largely a function of coincidental threads in what is archived, and does not in any way exclude other interesting topics. This month it’s the theoretical underpinnings of Big Bang Theory.

The prevailing paradigm

Despite the great sophistication of modern mathematical modelling, sometimes observations simply cannot be explained in terms of the LCDM paradigm, and have to be stored away with the label “*anomaly*”. Balancing current observation with the requirements of postulated primordial conditions on one hand, with what is read into CMBR anisotropies on the other is proving increasingly difficult, sowing seeds of doubt into whether the two phenomena are indeed related as LCDMM

demands. One such problematic observation is the anomalously large bulk flows of galaxies at scales $> \approx 100 \text{ Mpc} h^{-1}$. The following group of investigators from the University of Heidelberg finds that, *“These coherent motions of galaxies challenge the standard Λ CDM concordance model as well as a large class of competitive models of dark energy and modified gravity. Recent observations of large-scale galaxy motions constitute one of the main challenges for the cosmological standard model. In a Gaussian window of diameter $100 h^{-1} \text{ Mpc}$, Watkins et al. find a coherent bulk motion of $407 \pm 81 \text{ km/s}$ in conflict with the expectation of $\approx 200 \text{ km/s}$ at the 2σ level. Other independent results confirm the presence of unexpectedly large bulk motions. Kashlinsky et al. investigate scales of $\approx 300 h^{-1} \text{ Mpc}$, where the expectation is even lower, obtaining the drastic result of $600\text{-}1000 \text{ km/s}$. Despite the large uncertainties still present today, such values have the potential of forming a highly significant anomaly for the Λ CDM model in the future.”*

The authors consider, and then reject, a solution that might be attained by drastically exaggerating the already fantastically high constraints of inflation: *“Finally, we briefly comment on the possibility of altering the primordial spectrum of perturbations in order to obtain the observed bulk flows without abandoning the standard dynamics. A significant shift of power on very large scales may in principle be motivated, e.g., by models of double inflation. Though an appealing idea at first sight, the CMB imposes stringent bounds. When the measured bulk flows are to be obtained without losing consistency with the CMB, extreme values have to be selected. Estimations suggest that one would have to go to scales far outside the horizon and to amplify the power spectrum by a large factor. Moreover, regarding the lack of large-scale power in the CMB maps, it would seem more natural to assume less primordial power on the largest scales.”*

[536] Title: Peculiar Velocity Anomaly from Forces Beyond Gravity?

Authors: [Youness Ayaita, Maik Weber, Christof Wetterich arXiv:0908.2903](#)

Big Bang Theory is a consequence of GRT, which itself flows logically from SRT. *“The empirical evidences in favor of the hypothesis that the speed of light decreases by a few centimetres per second each year are examined. Lunar laser ranging data are found to be consistent with this hypothesis, which also provides a straightforward explanation for the so-called Pioneer anomaly, that is, a time-dependent blue-shift observed when analyzing radio tracking data from distant spacecrafts, as well as an alternative explanation for both the apparent time-dilation of remote events and the apparent acceleration of the Universe. The main argument against this hypothesis, namely, the constancy of fine-structure and Rydberg constants, is discussed.”*

[19] gen-phys Title: Empirical evidences in favor of a varying-speed-of-light

Authors: [Yves-Henri Sanejouand arXiv:0908.0249](#)

Antonio Alfonso-Faus takes the supposed constants a step further, and concludes for a static Universe: *“Then the constancy of R_y , the Rydberg expression, implies that the momentum mc is also a true constant. This is just the second law of Newton. The Compton wavelength, \hbar/mc , is then a true constant and there is no expansion at the quantum mechanical level. General relativity then predicts that the universe is not expanding. It is the only solution for cosmology. The time variation of the*

speed of light explains the observed red shift ... The red shift from distant galaxies is better interpreted as a result of the decrease of the speed of light. An increase of mass with cosmological time is also the immediate consequence. The stability of a non-expanding universe may be achieved by the equilibrium between expanding electrical forces and contracting gravitational ones."

[104] gen-phys Title: The case for a non-expanding universe

Authors: [Antonio Alfonso-Faus arXiv:0908.1539](#)

The following paper relates the historical context of Einstein's crucial abandoning of the aether concept and entrenchment of constant light speed. Although he frequently denied knowledge of the Michelson-Morley experiment at the time of writing up SRT, the latest evidence suggests that Dr Einstein's recollection may have been blurred.

[107] gen-phys Title: On the role of the Michelson-Morley experiment: Einstein in Chicago

Authors: [Jeroen van Dongen arXiv:0908.1545](#)

Then everything turns on its head again. Mei shows here the Robertson-Walker metric necessarily implies Galileo's added-velocities, with serious consequences for SRT, and also more importantly, for Friedmann's solutions.

[161] Title: Cosmology Needs the Metric of Relativity

Authors: [Mei Xiaochun arXiv:0908.2334](#)

Redshift

This paper has just been published in the Journal of Astrophysics and Astronomy. Dave Russell, a regular contributor to this newsletter whose exemplary work with the Tully-Fisher Relation (correlating rotation and luminosity in spiral galaxies) is widely admired, sent the following news: *"I would like to point you to my recently published paper in the Journal of Astrophysics and Astronomy. In this article I find $H_0 = 84$ which creates either an age crisis or a conflict with the matter density of the universe. It is very difficult to reconcile $H_0 = 84$ with lambda-CDM cosmology. I also discuss potential flaws with the Hubble Key Project final value of $H_0=72$."*

Title: The Ks-band Tully–Fisher Relation – A Determination of the Hubble Parameter from 218 Scl Galaxies and 16 Galaxy Clusters

Author: [David G. Russell](#) (J. Astrophys. Astr. (2009) **30**, 93–118) [arXiv:0812.1288](#)

"There is still much debate on whether the cosmological redshift can be interpreted as a Doppler effect (in the sense of Special Relativity) due to the recessional motion of galaxies, as originally envisaged by Hubble, or whether this interpretation is incorrect. The cosmological redshift factor is a straightforward prediction of standard cosmology, but its interpretation seems to be still controversial, judging from the number of articles debating it... Our implementation of Harrison's example

should shed some light here. According to Harrison the cosmological redshift cannot be interpreted as a Doppler shift because both source and observer are at rest when the signal is emitted or received... It is arguable whether an interpretation of the redshift formula derived in such a clear way in textbooks is really necessary but, if one opts for choosing an interpretation, this should be tied to the physically preferred comoving observers. For the latter, the redshift is definitely gravitational and not due to an ill-defined recessional motion of galaxies.”

[881] Title: Harrison's interpretation of the cosmological redshift revisited

Authors: [Valerio Faraoni arXiv:0908.3431](#)

Imerito *et al* investigate the redshift distribution of GRBs, and find several selection effects (including Malmquist bias) colouring the data.

[73] Title: Are GRB optical afterglows relatively brighter at high z?

Authors: [A. Imerito, D.M. Coward, R.R. Burman, D.G. Blair arXiv:0908.0410](#)

Gravitational lensing

As always, the Natural Philosophy Alliance fielded a wide range of interesting papers at their annual Storrs conference. Thank s to David de Hilster of the NPA for pointing us towards this contribution on the interaction (or lack thereof) between EMR and gravitation, with specific reference to the viability of gravitational lensing.

Title: Profound Fundamentals of Mathematical Physics found to be Seriously Misapplied to Gravitational Lensing

Authors: Edward Dowdye www.worldnpa.org/php2/index.php?tab0=Scientists&tab1=Display&id=435

Large Scale Structure

Much of the effort in space science is directed towards understanding phenomenology in a vacuum, yet the vacuum has never been found. Furthermore, the treatment of material distribution in space is further confounded by assuming ideal gases and perfect fluids, although it would appear such things are merely benchmarks rather than physically realised media. *“In the standard approach to relativistic cosmology it is usual to assume that the cosmological principle implies that the Universe is permeated by a set of continuous perfect fluids. Examples of these are photons, baryons, dark matter and dark energy. Yet when we observe the Universe, there is clear evidence for discreteness. Matter is accumulated in stars and galaxies which arrange themselves in clusters, filaments and walls. These structures occupy a small volume of space, the rest of which is almost completely devoid of electromagnetically interacting matter. It is therefore reasonable to ask if the fluid approximation is a good representation of the real Universe, and, if not, what are the corrections due to the discretization we observe ... In summary, we find that the fluid approximation in cosmology, while appearing innocuous, can introduce considerable errors in interpreting cosmological data. Using a simple model of the Universe, with discrete masses arranged on a regular lattice, we have shown that even if the average dynamics of the Universe are unchanged, the error introduced in*

the estimation of Ω_Λ due to different optical properties can be of the order of 10%. Such effects will need to be understood and accounted for if we are to attempt precision cosmology.”

[802] Title: Errors in Estimating Omega Lambda due to the Fluid Approximation

Authors: [Timothy Clifton, Pedro G. Ferreira arXiv:0908.4488](#)

MOND

Mordehai Milgrom presents a review of Modified Newtonian Dynamics 25 years after its inception. It includes some interesting predictions using the MOND parameter a_0 .

[685] Title: MOND: time for a change of mind?

Authors: [Mordehai Milgrom arXiv:0908.3842](#)

“Recent models and simulations demonstrate that MOND phenomenology is able to reproduce observations of galaxy dynamics, and solve the problems of CDM at galaxy scales. The bar frequency is compatible with what is observed, and the number of mergers/starbursts is degenerate. Dynamical friction is much smaller than in the CDM model, and this could explain the frequency of compact groups. However, MOND encounters remaining missing mass problems at cluster scale, which are not yet resolved, although neutrinos or dark baryons have been invoked.”

[593] Title: MOND and the Galaxies

Authors: [F. Combes, O. Turet arXiv:0908.3289](#)

This contribution from Iran makes an intriguing proposal: The peculiar rotation curves of galaxies can be explained mechanically by exposing MOND to Mach’s principle (that inertia is the result universally connected gravitating objects).

“According to Mach, in any two-body interaction the influence of all other matter inside their causal sphere should be taken into account. For instance, in the process of gravitational interaction of close objects one can replace the distant universe by a spherical shell of the effective mass M and the effective radius R . This shell may act as a gravitational Faraday cage inside of which a constant gravitational potential exists...”

[769] Title: A Machian interpretation of MOND

Authors: [F. Darabi arXiv:0908.4239](#)

CMBR & WMAP

The standard model of cosmology requires that there should be no preferred direction in a cosmological radiation background. However, numerous studies have found that it is embedded in the WMAP and COBE pictures, and named “Axis of Evil” by Imperial College theorist Joao Magueijo. This study by Frommert and Ensslin suggests that it may be the result of polarisation.

[84] Title: The axis of evil - a polarization perspective

Authors: [Mona Frommert, Torsten A. Ensslin arXiv:0908.0453](#)

Taburet *et al* highlight the prevalence of model bias in applying the S-Z effect to CMBR analysis. *“The estimation of cosmological parameters from the CMB would ideally require a pure primary signal. However the measured CMB data will contain additional contributions, of which the TSZ dominates. The TSZ characteristic frequency signature allows us in principle to remove the secondary contribution of the detected galaxy clusters from the CMB in multi-frequency experiments. However, on the one hand the residual SZ signal, if not taken into account in the analysis, biases the cosmological parameters, and on the other hand taking it into account requires a good knowledge of the selection function...However, we point out that our incomplete understanding of the intra-cluster gas distribution and properties can result in errors in the calculation of the SZ angular power spectrum and is likely to bias the cosmological parameter estimation up to 2 sigmas for Ω_m and H_0 and even more for σ_8 . This reinforces the need for better constraints on the description of the galaxy cluster gas properties.”*

[323] Title: Sunyaev-Zel'dovich contribution in CMB analysis

Authors: [N. Taburet, M. Douspis, N. Aghanim](#)] [arXiv:0908.1653](#)

The S-Z effect is proving problematic in CMBR analysis, asking more questions than it answers. *“We consider superclusters similar to the Corona Borealis Supercluster (CrB-SC). This paper is motivated by the detection at 33GHz of a strong temperature decrement in the CMB towards the core of this supercluster. Multifrequency observations with VSA and MITO suggest the existence of a thermal SZ effect component in the spectrum of this cold spot, which would account for roughly 25% of the total observed decrement ... Our results show that WHIM produces a thermal SZ effect much smaller than the observed value. Neither can summing the contribution of small clusters and galaxy groups in the region explain the amplitude of the SZ signal. When we take into account the actual posterior distribution from the observations, the probability that WHIM can cause a thermal SZ signal like the one observed is <1%, rising up to a 3.2% when the contribution of small clusters and galaxy groups is included. If the simulations provide a suitable description of the gas physics, then we conclude that the thermal SZ component of the CrB spot most probably arises from an unknown galaxy cluster along the line of sight. The simulations also show that the kinetic SZ signal associated with the supercluster cannot provide an explanation for the remaining 75% of the observed cold spot in CrB.”*

[504] Title: The Sunyaev-Zeldovich effect in superclusters of galaxies using gasdynamical simulations: the case of Corona Borealis

Authors: [I. Flores-Cacho](#) et al [arXiv:0908.2726](#)

“Black Hole” candidates

A principal objection to the invocation of Black Holes in astrophysics is that they require supernatural physics. Signatures ascribed to BHs are ambiguous and can with less stress on physics be produced by ultra-dense baryonic objects. Whilst quark stars are themselves at the far reaches of astrophysical theory, they are nevertheless still a proposed formulation of baryonic structure, and, as in the following study, may illustrate the principle that extreme normal objects can equally well explain signals that are being generally and exclusively attributed to extreme paranormal objects. *“A possibility of distinguishing CFL quark stars from stellar mass black holes could be through the study of thin accretion disks around rapidly rotating quark stars and Kerr type black holes, respectively. Furthermore, we show that the radiation properties of accretion disks around black holes and CFL quark stars are also very similar. However, strange stars exhibit a low luminosity, but high temperature bremsstrahlung spectrum, which, in combination with the emission properties of the accretion disk, may be the key signature to differentiate massive strange stars from black hole.”*

[494] Title: Can stellar mass black holes be quark stars?

Authors: [Z. Kovacs, K. S. Cheng, T. Harko](#) [arXiv:0908.2672](#)

Titles of the Month

[1] Title: Life originated during accelerating expansion in the multiverse

Authors: [Pedro F. Gonzalez-Diaz](#)

[2] Title: Can ghost condensate decrease entropy?

Authors: [Shinji Mukohyama](#)