

ALTERNATIVE COSMOLOGY GROUP

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Monthly Notes of the Alternative Cosmology Group – May 2010

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 1,007 papers published on arXiv under astro-ph, together with 545 under gen-phys, for the month of April, 2010. 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 this newsletter seeks to publicise recently published empirical results that are aligned with that ethos. 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”.

Visit to Greece

ACG founding member Eric Lerner will be visiting Greece in July, and would welcome the opportunity to meet up with ACG members while he is there. If you think you might be in a position to take up Eric’s invitation, please contact him directly by email at elerner@jgc.org.

CCC1 Proceedings

We have had some enquiries about availability of proceedings volumes for the *First Crisis in Cosmology Conference* (CCC1). Unfortunately, the ACG no longer has stock, but they are available at Amazon.com:

http://www.amazon.com/s/ref=nb_sb_noss?url=search-alias%3Dstripbooks&field-keywords=CCC1+proceedings&x=15&y=15

Books

Here are some suggested titles for our members’ book list. Thank you.

1. Author: [Avtar Singh](#) *The Hidden Factor: An Approach for Resolving Paradoxes of Science, Cosmology and Universal Reality* (AuthorHouse, 2003).

2. Author: Bernard R. Bligh *The Big Bang Exploded! Cosmology Corrected, A Commentary with Thermodynamics* (Self published).
3. Author: John Moffat *Redefining Gravity* (<http://www.amazon.com/dp/0061170887>)
4. Authors: J. Narlikar and G. Burbidge *Facts and Speculations in Cosmology* (Cambridge, 2008).

Expansion/Evolution/Nucleosynthesis

“As some of the first known objects to exist in the Universe, Lyman alpha emitting galaxies (LAEs) naturally draw a lot of interest. First discovered over a decade ago, they have allowed us to probe the early Universe, as their strong emission line compensates for their faint continuum light. While initially thought to be indicative of the first galaxies forming in the Universe, recent studies have shown them to be increasingly complex, as some fraction appear evolved, and many LAEs appear to be dusty, which one would not expect from primordial galaxies.”

[1] [arXiv:1004.0001](https://arxiv.org/abs/1004.0001)

Title: Searching for the First Galaxies

Authors: [Steven L. Finkelstein](#)

[118] [arXiv:1004.0754](https://arxiv.org/abs/1004.0754)

Title: Some caveats about the evolution of the N/O abundance and the star formation history

Authors: [M.Molla](#), [M.Gavilan](#)

Black Holes

“Black holes emit blackbody radiation (Hawking[8] evaporation), and this is what is observed in the CMBR. Millimetre size black holes emit blackbody radiation at a temperature of $2.7\{\deg\}$ Kelvin, and this is the resulting CMBR . Partial evaporation of $\sim 10^{30}$ m.b.h. gives the observed background field of photons being emitted and absorbed at the same rate by the m.b.h. The number of photons is constant, as observed. Their temperature decreases with time because the mass of the m.b.h. (and therefore its size) increases with time (the mass-boom effect [9]). The total mass of the m.b.h. is the dark matter. Hence dark matter is not so "dark" after all. Two important cosmological items are here identified by only one source: millimetre black holes.”

[138] gen-phys [arXiv:1004.2251](https://arxiv.org/abs/1004.2251)

Title: Sources of cosmic microwave radiation and dark matter identified: millimetre black holes (m.b.h.)

Authors: [Antonio Alfonso-Faus](#), [Marius Josep Fullana i Alfonso](#)

“The fundamental role played by black holes in our study of microquasars, gamma ray bursts, and the outflows from active galactic nuclei requires an appreciation for, and at times some in-depth analysis of, curved spacetime. We highlight misconceptions surrounding the notion of coordinate transformation in general relativity as applied to metrics for rotating black holes that are beginning to increasingly appear in the literature. We emphasize that there is no coordinate transformation that can turn the metric of a rotating spacetime into that for a Schwarzschild spacetime, or more generally,

that no coordinate transformation exists that can diagonalize the metric for a rotating spacetime. We caution against the notion of "local" coordinate transformation, which is often incorrectly associated with a global analysis of the spacetime."

[260] [arXiv:1004.1600](#) [pdf, ps, other]

Title: Misconceptions About General Relativity in Theoretical Black Hole Astrophysics

Authors: [David Garofalo](#), [David L. Meier](#)

Aether

"From the customary view the Michelson-Morley experiment is used to expose the failure of the aether theory. The key point in this experiment is the $\backslash\emph{fringe shift}$ of the interference pattern. Regularly, the fringe shift calculations are only presented from the perspective of the inertial frame where the one-way speed of light is anisotropic. We believe that this is biased and misleading. In a spirit of revision of these facts, we have meticulously analyzed the physics behind them ... From these two points at least three theories follow: (1) the special theory of relativity (SR) based on the Lorentz transformations, (2) a new aether theory (NET) based on the Tangherlini transformations and (3) emission theories based on Ritz' modification of electrodynamics ... This analysis reveals that the first postulate of SR violates HP. Founded on these arguments, we claim that there are no strong reasons to refuse the aether which conceived as a material medium, still stands up as a physical reality and could be physically associated with dark matter, the cosmic background radiation and the vacuum condensates of particle physics."

[50] [arXiv:1004.0716](#)

Title: The Physics Surrounding the Michelson-Morley Experiment and a New Æther Theory

Authors: [Israel Perez](#)

"Einstein's theory of general relativity describes gravity as the interaction of particles with space-time geometry, as opposed to interacting with a physical fluid, as in the old gravitational aether theories. Moreover, any theoretical physicist would tell you that, despite its counter-intuitive structure, general relativity is one of the simplest, most beautiful, and successful theories in physics, that has withstood a diverse battery of precision tests over the past century. So, is there any motivation to relax its fundamental principle, and re-introduce a gravitational aether? Here, I give a short and non-technical account of why quantum gravity and cosmological constant problems provide this motivation."

[183] [arXiv:1004.2901](#)

Title: Reviving Gravity's Aether in Einstein's Universe

Authors: [Niayesh Afshordi](#)

Dark Matter/Dark Energy

The discovery of hitherto unseen baryonic mass in the Galaxy lends weight to the proposals initially by Verschuur (Inter Stellar Medium), and later by Gallo and Feng, that galactic rotational anomalies result not from unaccounted-for Dark Matter halos, but from normal, baryonic matter lying undetected in the galactic disk. This study reports the finding of 130 previously unknown star clusters in the thin disk of the Milky Way, with obvious implications for the rotation curve.

“It is textbook knowledge that open clusters are conspicuous members of the thin disk of our Galaxy, but their role as contributors to the stellar population of the disk was regarded as minor. Starting from a homogenous stellar sky survey, the ASCC-2.5, we revisited the population of open clusters in the solar neighbourhood from scratch. In the course of this enterprise we detected 130 formerly unknown open clusters, constructed volume- and magnitude-limited samples of clusters, re-determined distances, motions, sizes, ages, luminosities and masses of 650 open clusters. We derived the present-day luminosity and mass functions of open clusters (not the stellar mass function in open clusters), the cluster initial mass function CIMF and the formation rate of open clusters. We find that open clusters contributed around 40 percent to the stellar content of the disk during the history of our Galaxy. Hence, open clusters are important building blocks of the Galactic disk.”

[418] [arXiv:1004.2494](https://arxiv.org/abs/1004.2494)

Title: Open clusters and the galactic disk

Authors: [Siegfried Roeser](#) et al.

“We study the predictions of various annihilating Dark Matter (DM) models in order to interpret the origin of non-thermal phenomena in galaxy clusters ... We conclude that the possibility of interpreting the origin of non-thermal phenomena in galaxy clusters with DM annihilation models requires a low neutralino mass and a cored DM density profile. If we then consider the multimessenger constraints to the neutralino annihilation cross-section, it turns out that such scenario would also be excluded unless we introduce a substantial boost factor due to the presence of DM substructures.”

[arXiv:1004.1286](https://arxiv.org/abs/1004.1286)

Title: On the DM interpretation of the origin of non-thermal phenomena in galaxy clusters

Authors: [S. Colafrancesco](#), [R. Lieu](#), [P. Marchegiani](#), [M. Pato](#), [L. Pieri](#)

“The extraction of a 'haze' from the WMAP microwave skymaps is based on subtraction of known foregrounds, viz. free-free (bremsstrahlung), thermal dust and synchrotron, each traced by other skymaps. While the 408 MHz Effelsberg survey is used for the synchrotron template, the WMAP bands are at tens of GHz where the spatial distribution of the radiating cosmic ray electrons ought to be quite different because of the energy-dependence of their diffusion in the Galaxy. The systematic uncertainty this introduces in the residual skymap is comparable to the claimed haze and can, for certain source distributions, even have a similar morphology and spectrum. Hence caution must be exercised in interpreting the haze as a signature of dark matter annihilation in the Galactic centre.”

[512] [arXiv:1004.3056](https://arxiv.org/abs/1004.3056) [[pdf](#), [other](#)]

Title: Systematic effects in the extraction of the 'WMAP haze'

Authors: [Philipp Mertsch](#), [Subir Sarkar](#)

Redshift

“In this paper we set out to measure time dilation in quasar light curves. In order to detect the effects of time dilation, sets of light curves from two monitoring programmes are used to construct Fourier power spectra covering timescales from 50 days

to 28 years. Data from high and low redshift samples are compared to look for the changes expected from time dilation. **The main result of the paper is that quasar light curves do not show the effects of time dilation.** Several explanations are discussed, including the possibility that time dilation effects are exactly offset by an increase in timescale of variation associated with black hole growth, or that the variations are caused by microlensing in which case time dilation would not be expected.”

[289] [arXiv:1004.1824](https://arxiv.org/abs/1004.1824)

Title: On time dilation in quasar light curves

Authors: [M. R. S. Hawkins](#)

The so-called “Doppler-factor crisis” is in fact simply a redshift crisis, not necessarily involving Doppler shift.

“Magnetically-driven non-stationary acceleration of jets in AGNs results in the leading parts of the flow been accelerated to much higher Lorentz factors than in the case of steady state acceleration with the same parameters. The higher Doppler-boosted parts of the flow may dominate the high energy emission of blazar jets. We suggest that highly variable GeV and TeV emission in blazars is produced by the faster moving leading edges of highly magnetized non-stationary ejection blobs, while the radio data trace the slower-moving bulk flow. Model predictions compare favorably with the latest Fermi gamma-ray and MOJAVE radio VLBI results.”

[403] [arXiv:1004.2430](https://arxiv.org/abs/1004.2430)

Title: Resolving Doppler-factor crisis in AGNs: non-steady magnetized outflows

Authors: [Maxim Lyutikov](#) , [Matthew Lister](#)

CMBR anomalies

The Standard Model originally predicted a circumextant radiation field with three primary properties: Isotropy; homogeneity; and Gaussian distribution. Observations recorded by COBE and WMAP show anisotropy, heterogeneity, and non-Gaussianity for the Cosmic Microwave Background Radiation. The Standard Model accommodates these discordant results by simply changing the predictions. We would like to remind our readers of the paper *Absence of significant cross-correlation between WMAP and SDSS* published in January by [M. Lopez-Corredoira](#), [F. Sylos Labini](#), and [J. Betancort-Rijo](#) ([arXiv:1001.4000](https://arxiv.org/abs/1001.4000)), in which they find, *“The ratio of signal to re-sampling errors is larger than unity in a way that strongly depends on the selected sky region. We therefore conclude that there is no evidence yet of a significant detection of the integrated Sachs-Wolfe (ISW) effect. Hence, the value of $\Omega_{\Lambda} \sim 0.8$ obtained by the authors who **assumed they were observing the ISW effect would appear to have originated from noise analysis.**”*

Here are several papers published in the month under review concerning CMBR anomalies:

“A detection or nondetection of primordial non-Gaussianity in the CMB data is essential not only to test alternative models of the physics of the early universe but also to discriminate among classes of inflationary models. Given this far reaching consequences of such a non-Gaussianity detection for our understanding of the physics of the early universe, it is important to employ alternative indicators in order to have further information about the Gaussianity features of CMB that may be helpful for identifying their origins ...”

[155] [arXiv:1004.0974](https://arxiv.org/abs/1004.0974)

Title: Non-Gaussianity in the HILC foreground-reduced three-year WMAP CMB map

Authors: [A. Bernui](#), [M.J. Reboucas](#)

“We present an analytical derivation of the Sachs Wolfe effect sourced by a primordial magnetic field. In order to consistently specify the initial conditions, we assume that the magnetic field is generated by a causal process, namely a first order phase transition in the early universe ... We find that the relevant contribution to the magnetic Sachs Wolfe effect comes from the metric perturbations at next-to-leading order in the large scale limit.”

[226] [arXiv:1004.1405](https://arxiv.org/abs/1004.1405)

Title: CMB temperature anisotropy at large scales induced by a causal primordial magnetic field

Authors: [Camille Bonvin](#), [Chiara Caprini](#)

“About 70-80% of the previously estimated WMAP CMB quadrupole signal would be an artefact of incorrect Doppler dipole subtraction if the hypothesis of a small timing interpolation error were correct. Observations of bright foreground objects constitute part of the time-ordered-data (TOD) ... The requirement that the correct choice of timing offset must maximize image sharpness implies that the hypothesis of a timing error in the WMAP collaboration's compilation of the WMAP calibrated, filtered TOD is rejected at high statistical significance in each of the Q, V and W wavebands. However, the hypothesis that a timing error was applied during calibration of the raw TOD, inducing a dipole difference signal, is not excluded by this method.”

[726] [arXiv:1004.4506](https://arxiv.org/abs/1004.4506) [[pdf](#), [ps](#), [other](#)]

Title: On the suspected timing error in WMAP map-making

Authors: [Boudewijn F. Roukema](#)

“We review the recently found large-scale anomalies in the maps of temperature anisotropies in the cosmic microwave background. These include alignments of the largest modes of CMB anisotropy with each other and with geometry and direction of motion of the Solar System, and the unusually low power at these largest scales. We discuss these findings in relation to expectation from standard inflationary cosmology, their statistical significance, the tools to study them, and the various attempts to explain them.”

[883] [arXiv:1004.5602](https://arxiv.org/abs/1004.5602)

Title: Large angle anomalies in the CMB

Authors: [Craig J. Copi](#), [Dragan Huterer](#), [Dominik J. Schwarz](#), [Glenn D. Starkman](#)

Pontzen and Peiris go so far as to suggest that anisotropies in the CMB are *not* anomalous, if treated to enough careful mathematical massaging.

[454] [arXiv:1004.2706](https://arxiv.org/abs/1004.2706) [[pdf](#), [other](#)]

Title: The cut-sky cosmic microwave background is not anomalous

Authors: [Andrew Pontzen](#), [Hiranya V. Peiris](#)

Method

“We have re-analyzed the stability of pulse arrival times from pulsars and white dwarfs using several analysis tools for measuring the noise characteristics of sampled time and frequency data. We show that the best terrestrial artificial clocks substantially exceed the performance of astronomical sources as time-keepers in terms of accuracy (as defined by caesium primary frequency standards) and stability ... The use of natural clocks as tests of physics under the most extreme conditions is entirely appropriate; however, the contention that these natural clocks, particularly white dwarfs, can compete as timekeepers against devices constructed by mankind is shown to be doubtful.”

[18] [arXiv:1004.0115](#)

Title: A Comparison of Astrophysical and Terrestrial Frequency Standards: Which are the best clocks?

Authors: [John G. Hartnett](#), [Andre Luiten](#)

[287] [arXiv:1004.1801](#) [[pdf](#)]

Title: Method of analysis of the spatial galaxy distribution at gigaparsec scales. I. Initial principles

Authors: [Nikita Nabokov](#), [Yuri Baryshev](#)

[arXiv:1004.1800](#) [[pdf](#)]

Title: Method for analyzing the spatial distribution of galaxies on gigaparsec scales. II. application to a grid of the HUDF-FDF-COSMOS-HDF surveys

Authors: [Nikita Nabokov](#), [Yuri Baryshev](#)

“By relaxing the conventional assumption of a purely gravitational interaction between dark energy and dark matter, substantial alterations to the growth of cosmological structure can occur. In this work we focus on the homogeneous transfer of energy from a decaying form of dark energy. We present simple analytic solutions to the modified growth rates of matter fluctuations in these models, and demonstrate that neglecting physics within the dark sector may induce a significant bias in the inferred growth rate, potentially offering a false signature of modified gravity.”

[309] [arXiv:1004.1920](#)

Title: Unmodified Gravity

Authors: [Fergus Simpson](#), [Brendan M. Jackson](#), [John A. Peacock](#)

Standard Candles

The classification of type 1a SNe as standard candles is increasingly challenged by observation, with greater emphasis now being placed on progenitor stars' varying properties leading to non-standard light curves. Of course, distance used to derive absolute magnitude is taken from redshift.

“SN 2007if was the third over-luminous SN Ia detected after 2003fg and 2006gz. We present the photometric and spectroscopic observations of the supernova and its host by ROTSE-III, HET and Keck. From the H_{alpha} line identified in the host spectra, we determine a redshift of 0.0736. At this distance, the supernova reached an absolute magnitude of -20.4, brighter than any other SNe Ia ever observed.”

[554] [arXiv:1004.3329](https://arxiv.org/abs/1004.3329)

Title: The Exceptionally Luminous Type Ia Supernova 2007if

Authors: [F. Yuan](#) et al

Titles of the month

Now, what astronomical observations were those?

"The recent astronomical observations indicate that the expanding universe is homogeneous, isotropic and asymptotically flat. The Euclidean geometry of the universe enables to determine the total gravitational and kinetic energy of the universe by Newtonian gravity in a flat space ... The relativistic calculations for total kinetic energy have been made and the dark energy has been excluded from calculations. The total mechanical energy of the universe has been found close to zero, which is a remarkable result. This result supports the conjecture that the gravitational energy of the universe is approximately balanced with its kinetic energy of the expansion."

[70] [arXiv:1004.1035](https://arxiv.org/abs/1004.1035) [[pdf](#), [ps](#), [other](#)]

Title: Estimations of total mass and energy of the universe

Authors: [Dimitar Valev](#)

[3] [arXiv:1004.0060](https://arxiv.org/abs/1004.0060) [[pdf](#), [other](#)]

Title: Got the Flu (or Mumps)? Check the Eigenvalue!

Authors: [B. Aditya Prakash](#), [Deepayan Chakrabarti](#), [Michalis Faloutsos](#), [Nicholas Valler](#), [Christos Faloutsos](#)