



Monthly Notes of the Alternative Cosmology Group – January 2011

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 1040 papers published on arXiv under astro-ph, together with 612 under gen-phys, for the month of December, 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 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. CMBR anomalies

1. Title: A search for concentric circles in the 7-year WMAP temperature sky maps

Authors: [I. K. Wehus](#), [H. K. Eriksen](#)

[arXiv:1012.1268](http://arxiv.org/abs/1012.1268)

Quote: *“In a recent analysis of the 7-year WMAP temperature sky maps, Gurzadyan and Penrose claim to find evidence for violent pre-Big Bang activity in the form of concentric low-variance circles at high statistical significance. In this paper, we perform an independent search for such concentric low-variance circles, employing both χ^2 statistics and matched filters, and compare the results obtained from the 7-year WMAP temperature sky maps with those obtained from LCDM simulations. Our main findings are the following: We do reproduce the claimed ring structures observed in the WMAP data as presented by Gurzadyan and Penrose, thereby verifying their computational procedures. However, the results from our simulations do not agree with those presented by Gurzadyan and Penrose. On the contrary we obtain a substantially larger variance in our simulations, to the extent that the observed WMAP sky maps are fully consistent with the LCDM model as measured by these statistics.”*

2. Title: No evidence for anomalously low variance circles on the sky

Authors: [Adam Moss](#), [Douglas Scott](#), [James P. Zibin](#)

[arXiv:1012.1305](https://arxiv.org/abs/1012.1305)

Quote: "In a recent paper, Gurzadyan & Penrose claim to have found directions on the sky centred on which are circles of anomalously low variance in the cosmic microwave background (CMB). These features are presented as evidence for a particular picture of the very early Universe. We attempted to repeat the analysis of these authors, and we can indeed confirm that such variations do exist in the temperature variance for annuli around points in the data. However, we find that this variation is entirely expected in a sky which contains the usual CMB anisotropies. In other words, properly simulated Gaussian CMB data contain just the sorts of variations claimed. Gurzadyan & Penrose have not found evidence for pre-Big Bang phenomena, but **have simply re-discovered that the CMB contains structure.**"

3. **Title: More on the low variance circles in CMB sky**

Authors: V.G.Gurzadyan, R.Penrose

arXiv:1012.1486

Quote: "Two groups [3,4] have confirmed the results of our paper concerning the actual existence of low variance circles in the cosmic microwave background (CMB) sky. They also point out that the effect does not contradict the LCDM model - a matter which is not in dispute. We point out two discrepancies between their treatment and ours, however, one technical, the other having to do with the very understanding of what constitutes a Gaussian random signal. Both groups simulate maps using the CMB power spectrum for LCDM, while we simulate a pure Gaussian sky plus the WMAP's noise, which points out the contradiction with a common statement [3] that "CMB signal is random noise of Gaussian nature". For as it was shown in [5], the random component is a minor one in the CMB signal, namely, about 0.2. Accordingly, the circles we saw are a real structure of the CMB sky and they are not of a random Gaussian nature. Although the structures studied certainly cannot contradict the power spectrum, which is well fitted by LCDM model, we particularly emphasize that the low variance circles occur in concentric families, and this key fact cannot be explained as a purely random effect. **It is, however a clear prediction of conformal cyclic cosmology.**"

4. **Title: Fractal Structure of Isothermal Lines and Loops on the Cosmic Microwave Background**

Authors: Naoki Kobayashi, Yoshihiro Yamazaki, Hiroto Kuninaka, Makoto Katori, Mitsugu Matsushita, Satoki Matsushita, Lung-Yih Chiang

arXiv:1012.1701

Quote: "The statistics of isothermal lines and loops of the Cosmic Microwave Background (CMB) radiation on the sky map is studied and **the fractal structure is confirmed** in the radiation temperature fluctuation. We estimate the fractal exponents, such as, the fractal dimension D_e of the entire pattern of isothermal lines, the fractal dimension D_c of a single isothermal line, the exponent α in Korčak's law for the size distribution of isothermal loops, the two kind of Hurst exponents, H_e for the profile of the CMB radiation temperature, and H_c for a single isothermal line. We perform the fractal analysis also on the two artificial sky maps simulated by the standard model in physical cosmology, the WMAP best-fit Lambda Cold Dark Matter (LCDM) model, and by the Gaussian free model of rough surfaces. **The temperature fluctuations of the real CMB radiation and of the simulation by the LCDM model are non-Gaussian**, in the sense that the displacement of isothermal lines and loops has antipersistent property indicated by $H_e \approx 0.25 < 1/2$."

5. **Title: Reconciling the local void with the CMB**

Authors: Seshadri Nadathur, Subir Sarkar

arXiv:1012.3460

Quote: "In the standard cosmological model, the dimming of distant Type Ia supernovae is explained by invoking the existence of repulsive 'dark energy' which is causing the Hubble expansion to accelerate. However this may be an artifact of interpreting the data in an (oversimplified) homogeneous model universe. In the simplest inhomogeneous model which fits the SNe Ia Hubble diagram without dark energy, we are located close to the centre of a void modelled by a Lemaitre-Tolman-Bondi metric. It has been claimed that such models cannot fit the CMB and other cosmological data. This is however based on the assumption of a scale-free spectrum for the primordial density perturbation. An alternative physically motivated form for the spectrum enables a good fit to both SNe Ia (Constitution/Union2) and CMB (WMAP 7-yr) data, and to the locally measured Hubble parameter. Constraints from baryon acoustic oscillations and primordial nucleosynthesis are also satisfied."

II. Stellar Evolution and Large-Scale Structure

1. Title: The complex universe: recent observations and theoretical challenges

Authors: Francesco Sylos Labini, Luciano Pietronero

arXiv:1012.5624

Quote: "The observed density inhomogeneities pose a fundamental challenge to the standard picture of cosmology but it also represents an important opportunity which points to new directions with respect to many cosmological puzzles. Indeed, the fact that matter distribution is not uniform, in the limited range of scales sampled by observations, raises the question of understanding how inhomogeneities affect the large-scale dynamics of the universe. We discuss several attempts which try to model inhomogeneities in cosmology, considering their effects with respect to the role and abundance of dark energy and dark matter."

III. Method

1. Title: The True Bottleneck of Modern Scientific Computing in Astronomy

Authors: Igor Chilingarian, Ivan Zolotukhin

arXiv:1012.4119

Quote: "We discuss what hampers the rate of scientific progress in our exponentially growing world. The rapid increase in technologies leaves the growth of research result metrics far behind. The reason for this lies in the education of astronomers lacking basic computer science aspects crucially important in the data intensive science era."

IV. Titles of the month

Title: Indecent Exposure in Seyfert 2 Galaxies: A Close Look

Authors: Hien D. Tran, James E. Lyke, Jeff A. Mader

arXiv:1012.1865