The Alternative Cosmology Group Newsletter - June 2009

The 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 930 papers published under astro-ph on arXiv for the month of May, 2009. If you would like to suggest papers you may have come across for inclusion, please send them to Hilton Ratcliffe or Eric Lerner.

WMAP catastrophe

This month, we've chosen to highlight a paper that is causing a stir in cosmology. Serious doubt is cast upon the validity of the entire body of WMAP analysis. Thanks to Eric Lerner for the following analysis:

An important new paper shows that there are serious errors in the WMAP team's analysis of the satellite's data. The new paper, *Observation number correlation in WMAP data* By Ti-Pei Li *et al*, which has been accepted by MNRAS, shows that a spurious apparent temperature is introduced into the map of the CMB by the WMAP team's analyses. As a result, the conclusions based on this analysis, including the widely-publicized supposed agreement with some predictions of the dominant LCDM cosmology, are thrown into doubt. Li et al's recent paper on WMAP observation number effects arXiv 0905.0075 is a follow-up to Liu and Li's earlier paper on the same subject, 0806.4493, which was reported in this newsletter, but whose significance was not fully recognized at the time.

WMAP mapped the tiny variations of anisotropies in the CMB by comparing the inputs of two receivers or horns placed 141 degrees apart, as the satellite spun and scanned the entire sky. Complex mathematical procures were used to transform these differences in inputs into a map of absolute temperature or intensity at every point in the sky. In outline the authors argue that:

1. The way temperature is calculated by the WMAP team based on the differential between the two WMAP horns is in error, as is best explained in the Li et al paper. When the number of observations of a given pixel by the "plus" horn (the number of times that point in the sky is scanned) is different than the number of observation by the "minus" horn, there is a spurious temperature added, dependent on transmission imbalances, which are different for different bands. (Esq. 5 and 6 of Li et al). These spurious temperatures, up to 10-20 micros K are clearly shown in figure 3, which shows the pixel-by-pixel correlation of the

difference in observation number and temperature. This spurious temperature, dependent on observation number, in turn produces a spurious fluctuation in temperature which is dependent on the number of observations. The number of observations in turn is a strong function of declination. See figure 2 of Liu and Li, which tells the story very well. Li explains procedures by which the raw data can be re-analysed to eliminate these artefacts.

2. The method by which WMAP temperatures are calculated also does not accurately correct for the fact that pixels 141 degrees way from hot spots are measured too cold. In Liu and Li, p.18, they show that pixels 141 degrees away from the 2000 hottest pixels in the map are on average 12-14 micro Kelvin cooler than average pixels, depending on the band. This is *several hundred* times above the expected random variation. Since each circle contains 15,000 pixels spread across a good section of the sky, the average temperature should be very close to the average of the whole sky. This is even truer for 2,000 such circles. But that is not what Liu and Li found.

So, from these papers, it seems that there are spurious temperature anisotropies that are comparable with the entire anisotropy found in the WMAP team's maps. *Therefore the entire analysis of cosmological parameters based on these maps is wrong.* Indeed it seems very puzzling that an analysis that is so contaminated with errors should come up with parameters anywhere near those expected by LCDM models. The fact that the Li et al paper was accepted by MNRAS is perhaps an indication that some of the leading journals are becoming more open to work that challenges conventional assumptions in cosmology.

13. **Title: Observation number correlation in WMAP data**

Authors: Ti-Pei Li, Hao Liu, Li-Ming Song, Shao-Lin Xiong, Jian-Yin Nie

arXiv:0905.0075

Another paper released on Arxiv this month, the WMAP uncelebrated time ordered data is a better fit to no anisotropies in the cosmic microwave background than with the anisotropies reported in the official analysis by Keith S Cover also raises serious questions about the WMAP team's work. Cover shows that the calibration technique, which uses the same data as is used for the mapping process, is flawed. *Indeed, if it assumed that there are no anisotropies at all, a calibration can be determined that fits the data better than the one in the WMAP teams' work.* The problems pointed out by Li et al could very well explain this result, by showing that the WMAP team's maps include the large spurious temperatures that are related to observation number.

[910] **Title: The WMAP uncalibrated time ordered data is a better fit to no anisotropies in the cosmic microwave background than with the anisotropies reported in the official analysis**

Authors: Keith S Cover

arXiv:0905.3971

This paper reveals more problems with the WMAP picture. *"We investigate the abundance of large-scale hot and cold spots in the WMAP-5 temperature maps and find considerable discrepancies compared to Gaussian simulations based on the LCDM best-fit model. Too few spots are present in the reliably observed CMB region, i.e. outside the foreground-contaminated parts excluded by the KQ75 mask. This can only partially be explained by the well-known quadrupole anomaly. Even simulated maps created from the original WMAP-5 estimated multipoles contain more spots than visible in the measured CMB maps."*

[564] **Title: Too few spots in the Cosmic Microwave Background**
Authors: Youness Ayaita, Maik Weber, Christof Wetterich

arXiv:0905.3324

Expansion

Alan Sandage is an icon in astronomy and cosmology, and any new publication by him is required reading by anyone in the field. His latest, cited below, appears from the claim of its title to be the first application we have seen of the Tolman Surface Brightness test which finds in favour of universal expansion, as opposed to two which have concluded against expansion (Andrews 2006, and Lerner 2006). Indeed, that would in our opinion make it one of the most important publications of the decade. The paper is comprehensive and detailed, over 50 pages long, and includes the following statements:

"In one of the outstanding ironies in the history of observational cosmology, Hubble, even in his last years, expressed doubts about the reality of the expansion…Although in a minority, there are still astronomers who offer alternate explanations of these latter tests in their questioning of the standard model of a hot early universe; yet the time scale agreement remains the decisive test (Sandage 1968) on which there is now such a large literature as to deny an adequate summary here. Nevertheless, a true expansion where the redshifts are cosmological, not due to 'some unknown law of nature' as favored by Hubble, is itself such a remarkable proposition that decisive proofs are still of interest, ***even if only as academic curiosities now****…The fit of HST data to the standard curve is excellent. The hSBi difference between the zero-redshift standard (upper curves) and the observed points is the effect we are seeking. It is the Tolman signal as modified by the luminosity change in the remote 1324 + 3011 cluster due to evolution in the look-back time…We have not calculated the effect on R using a finite value of Λ, taken from the current 'concordance world model', with assigned values of Λ and q_0 because the uncertainties here are at the level just stated for the range of q_0 from 0 to 1, and are bracketed by them. This amounts to a systematic error over which we have no control unless we know the correct world model, which we do not. We ignore this systematic uncertainty in what follows, giving only the statistical errors for the $q_0 = 1/2$ case…The solution of the Tolman test given by LS01c and differently here has not been quite as easily done as I set out at the planning meeting for the LST in 1974. It has required many developments not yet made at the time. However, the test seems*

to have been successful. The Tolman prediction is verified. The expansion would seem to be real. The two conclusions are that the universe expands, and that there is luminosity evolution in the look-back time."

There is plenty of grist for our mill in there, and we should look at it carefully. Immediately obvious is the omission of the Malmquist Bias, and the assumption of certain LCDMM axioms. Perhaps Eric Lerner could formulate a rebuttal?

[548] **Title: The Tolman Surface Brightness Test for the Reality of the Expansion. V. Provenance of the Test and a New Representation of the Data for Three Remote HST Galaxy Clusters**

Authors: Allan Sandage

arXiv:0905.3199

Galaxy collisions play an extremely important role in astrophysics, and could seriously impact on standard cosmology. This study concludes that while only ~8% of large galaxies at $z < 1$ show signs of mergers, at $1 < z < 1.5$, the figure rises to 21%. This is onerous for the LCDMM. Given that theory dictates that expansion is exclusively non-local, and therefore that we should expect to find galaxies spreading out at higher redshifts, the conclusion that nearly a quarter of higher-redshift galaxies are travelling or have travelled *towards* each other is a serious anomaly.

[466] **Title: The Galaxy Major Merger Fraction to z ~ 1**

Authors: C. López-Sanjuan *et al*

arXiv:0905.2765

The Cosmological Principle

The Cosmological Principle, a critical parameter of Big Bang cosmology, requires that the expanding universe should be homogeneous and isotropic. Dominik Schwarz admits in this paper that this requirement is not met in the observed universe, but instead of modifying the model, suggests changes to the Cosmological Principle itself to contrive a fit.

[54] **Title: Thoughts on the cosmological principle**

Authors: Dominik J. Schwarz

arXiv:0905.0384

Mathematical analysis

We include the following paper as an example of the complexities of pure mathematical analysis. An entirely spurious and misleading conclusion can be reached, simply by choice of priors. These constraint equations very significantly limit the set of possible correlation functions. "For one particular example of a fiducial cosmic shear survey, we show that the Gaussian likelihood ellipsoid has a significant spill-over into the forbidden region of

correlation functions, rendering the resulting best-fitting model parameters and their error region questionable…" Although the authors suggest improved constraints and an improved analyisis, the fact remains that all prior studies of this nature (especially CMBR) have produced questionable results.

[93] **Title: Constrained correlation functions**

Authors: Peter Schneider, Jan Hartlap

arXiv:0905.0577

Evolution

The Standard Model suggests an evolutionary paradigm that is shaky at best, and it is constantly having to revise the process to try to accommodate new observations. The process of reionisation in the early universe is called into question by this study, which suggests that *"Applying these models to the small sample of z~6 galaxies, we find that this effect may lead to a typical downward revision of their stellar ages by a factor ~3. In consequence their average formation redshift may drastically be reduced, and these objects may not have contributed to cosmic reionisation at z>6."*

[150] **Title: The impact of nebular emission on the ages of z~6 galaxies**

Authors: Daniel Schaerer, Stephane de Barros

arXiv:0905.0866

Yang and Zhang show that the age of the universe given by the Standard Model cannot confidently embrace old quasars. *"The Lambda-CDM model accommodates the total age (14 Gyr for z=0) of the Universe estimated from old globular clusters, but cannot accommodate this old quasar at high confidence level constrained from SNIa, CMB, and BAO observations"*

[456] **Title: Age crisis in Lambda-CDM model?**

Authors: Rong-Jia Yang, Shuang Nan Zhang

arXiv:0905.2683

Despite my recent blacklisting by arXiv moderators and subsequent spat with Cornell, it appears they will still accept submissions for which I am not lead author. This paper is an invited chapter for a book (in press) on supernova research, and shows our conclusion that the Solar System emerged from a local SN ~5GYA.

[845] **Title: Fingerprints of a Local Supernova**

Authors: Oliver Manuel, Hilton Ratcliffe

arXiv:0905.0684

Black Holes

Wolfgang Kundt, respected author of the non-aligned alternative text *Astrophysics – A New Approach*, has made a useful summary of his scepticism about Black Holes in the second part of this paper.

[178] **Title: Juergen Ehlers - and the Fate of the Black-Hole Spacetimes**

Authors: Wolfgang Kundt

arXiv:0905.1028

Background Radiation

Backgound radiation comes in all waveband of light, and most is considered to be ambient starlight of one kind or another. The single exception appears to be the CMBR, which is held by consensus to be a unique picture of the primordial fireball, coming from behind all observed astrophysical structure. This study stops just short of the microwave band in declaring that, *"The extragalactic background light (EBL) from the far infrared through the visible and extending into the ultraviolet is thought to be dominated by starlight, either through direct emission or through absorption and reradiation by dust."* Why should microwaves be excluded?

[195] **Title: Modeling the Extragalactic Background Light from Stars and Dust**

Authors: Justin D. Finke, Soebur Razzaque, Charles D. Dermer

arXiv:0905.1115

This paper suggests that CMB anisotropies may well come from local structure: *"A non-cosmological origin for the CMB quadrupole moment is suggested in this paper. Geometric distortions to an otherwise isotropic CMB could be imprinted on the CMB radiation as it propagates through the asymmetric termination shock formed at the boundary of the solar wind and the local interstellar medium. In addition to this boundary distortion, the Voyager spacecraft observed abrupt changes in plasma properties and rapidly fluctuating magnetic and electric fields as they recently crossed the termination shock and entered the heliosheath. Several mechanisms are discussed which could potentially imprint the termination shock distortion on the CMB. Temporal variations of this distortion due to solar wind pressure wind changes could manifest in the multipole moments of the CMB. Speculations are presented for the effect of heliosheath radiative and dynamical processes on the observed small-scale angular power spectrum of the CMB."*

[500] **Title: A Heliosheath Model for the Origin of the CMB Quadrupole Moment**

Authors: H.N. Sharpe

arXiv:0905.2978