Alternative Cosmology Group Newsletter - June 2008

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Light element problems, historical perspective

Lithium abundances in old stars are far less than Big Bang nucleosynthesis predicts. Now, measurements on the lowest metallicity star yet discovered have worsened this problem. No lithium was detected, and new upper limits on the lithium abundance put it at least a factor of ten below that of other old stars, which in turn are a factor of four below BBN predictions.

G. Burbidge provides an historical overview of the origins of the modern theory of stellar nucleosynthesis and the possibilities for explaining the current abundance of He4. He lists as possibilities the Big Bang, production at current rates but for long periods of time—several hundred billion years—or production in active galactic nuclei. Your editor notes that Burbidge overlooks one other possibility—production of He4 in a first generation of intermediate mass stars in the early formation of individual galaxies.

HE 1327-2326, an uninvolved star with [Fe/H] <-5.0. II. New 3D-1D corrected abundances from a VLT/UVES spectrum
Authors: Anna Frebel, Kjell Eriksson, Remo Collet, Norbert Christlieb, Wako Aoki
http://arxiv.org/abs/0805.3341v1

B2FH, the Cosmic Microwave Background and Cosmoloy
Authors: G. Burbidge
http://arxiv.org/abs/0806.1065v1

Time dilation again claimed with new SN data

Previous claims that the decay curves of light from supernovae prove that the universe is expanding have been disputed. Critics have argued that since brighter supernovae are know to have longer decay curves, and brighter ones are more likely to be observed at greater distance and higher redshifts, the claimed correlation between redshift and decay time is spurious. However, Blondin et al claim that they can avoid this bias by measuring the change in spectra with time of the SN, a change that they argue is independent of SN brightness. Here, too they claim the same correlation of decay time with redshift that is predicted if the universe is expanding and the time signals from distant objects are stretched. It will be interesting to see the critical analysis of this work in the future.

Time Dilation in Type Ia Supernova Spectra at High Redshift
Authors: S. Blondin, T. M. Davis, K. Krisciunas, B. P. Schmidt, J. Sollerman, W. M. Wood-Vasey, A. C. Becker, P. Challis, A. Clocchiatti, G. Damke, A. V. Filippenko, R. J. Foley, P. M. Garnavich, S. W. Jha, R. P. Kirshner, B. Leibundgut, W. Li, T. Matheson, G. Miknaitis, G. Narayan, G. Pignata, A. Rest, A. G. Riess, J. M. Silverman, R. C. Smith, J. Spyromilio, M. Stritzinger, C. W. Stubbs, N. B. Suntzeff, J. L. Tonry, B. E. Tucker, A. Zenteno
http://arxiv.org/abs/0804.3595v1

Dark matter gets darker, alternatives brighter

Yet another laboratory experiment has failed to detect dark-matter particles. This has not yet had a noticeable effect on the enthusiasm for dark matter. However, alternatives continue to develop. Stacy McGaugh has analyzed data for rotation velocities in our own galaxy and shows, that, as for many other galaxies, the pattern closely follows the predictions of Modified Newtonian Dynamics, MOND, rather than those of dark matter theories. J.W. Moffat and V.T. Tooth work out the implications of MOND for the bending of light by massive bodies, and R.H. Sanders gives a review of evidence for MOND, concluding that dark matter theories of galaxy rotation curves are clearly falsified.

David Tsiklauri examines another alternative—that rotation curves are influenced by galactic magnetic fields, a possibly that has been looked at by others since the 1970's. He concluded that the Milky Way's rotation curve can also be explained by magnetic fields. It would be useful if comparisons are done between MOND and this alternative.

Limits on spin-dependent WIMP-nucleon cross-sections from the XENON10 experiment
Authors: J. Angle, E. Aprile, F. Arneodo, L. Baudis, A. Bernstein, A. Bolozdynya, P. Brusov, L.C.C. Coelho, C.E. Dahl, L. DeViveiros, A.D. Ferella, L.M.P. Fernandes, S. Fiorucci, R.J. Gaitskell, K.L. Giboni, R. Gomez, R. Hasty, L. Kastens, J. Kwong, J.A.M. Lopes, N. Madden, A. Manalaysay, A. Manzur, D.N. McKinsey, M.E. Monzani, K. Ni, U. Oberlack, J. Orboeck, G. Plante, R. Santorelli, J.M.F. dos Santos, P. Shagin, T. Shutt, P. Sorensen, S. Schulte, C. Winant, M. Yamashita, for the XENON10 Collaboration
http://arxiv.org/abs/0805.2939v1

Milky Way Mass Models and MOND
Authors: Stacy McGaugh (University of Maryland)
http://arxiv.org/abs/0804.1314v1

The bending of light and lensing in modified gravity
Authors: J. W. Moffat, V. T. Toth
http://arxiv.org/abs/0805.4774v2

From dark matter to MOND
Authors: R.H. Sanders
http://arxiv.org/abs/0806.2585v1

Galaxy rotation curves without non-baryonic dark matter and modifications to gravity: effect of the Ampere force
Authors: David Tsiklauri (University of Salford)
http://arxiv.org/abs/0806.1513v1