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CMB Power Spectrum Results for the Complete ACBAR Data Set

The Arcminute Cosmology Bolometer Array Receiver (ACBAR) is a multi-frequency 16-element bolometer array which observed from the 2m Viper telescope at the South Pole during the 2001, 2002, 2004 and 2005 Austral winters. ACBAR's small (5') beams allow it to probe the damping tail of the cosmic microwave background (CMB) power spectrum, making it highly complementary to experiments at larger angular scales such as WMAP and Boomerang. I will present recent results from the complete set of ACBAR's CMB temperature anisotropy observations. We include new data from the final 2005 observing season, expanding the number of detector-hours by 210% and the sky coverage by 490% over the data set used in the previous ACBAR release. As a result, the band-power uncertainties have been reduced by more than a factor of two on angular scales encompassing the third to fifth acoustic peaks as well as the damping tail of the CMB power spectrum. The calibration uncertainty has been reduced from 6% to 2.1% in temperature through a direct comparison of the CMB anisotropy measured by ACBAR with that of the dipole-calibrated WMAP5 experiment. The measured power spectrum is consistent with a spatially flat, LambdaCDM cosmological model. We include the effects of weak lensing in the power spectrum model computations and find that this significantly improves the fits of the models to the combined ACBAR+WMAP5 power spectrum. When marginalized over other cosmic parameters, the preferred strength of the lensing is found to be consistent with theoretical expectations. On fine angular scales, there is weak evidence (1.1 sigma) for excess power above the level expected from primary anisotropies. We expect this excess power to be dominated by the combination of emission from dusty protogalaxies and the Sunyaev-Zel'dovich effect. However, the excess observed by ACBAR is significantly smaller than the excess power at ell >2000 reported by the CBI experiment operating at 30 GHz. Therefore, while it is unlikely that the CBI excess has a primordial origin; the combined ACBAR and CBI results are consistent with the source of the CBI excess being either the Sunyaev-Zel'dovich effect or radio source contamination.

Mercredi 19 novembre 2008 à 11 heures

Salle André Berthelot, bât. 141

Le café sera servi 15 minutes avant

NB : *La présentation d'une carte d'identité ou d'un passeport est exigée à l'entrée du centre. Tous les auditeurs extérieurs sont priés de prévenir à l'avance de leur visite Emilie Chancrin, tél. 01 69 08 23 50 (U.E. : délai de 24 h, hors U.E. : délai de 4 jours).*