Abstract Submitted
for the APR13 Meeting of
The American Physical Society

The physical origin of constraints on cosmological parameters from cosmic microwave background measurements ZHEN HOU, University of California - Davis, PLANCK COLLABORATION, SPT COLLABORATION — The angular power spectrum of the cosmic microwave background (CMB) has been precisely measured on different scales recently by WMAP, SPT and ACT, and will be greatly improved by the Planck satellite by the time of the meeting. The CMB power spectrum is crucial to the constraints on cosmological parameters, but in a very indirect and model-dependent way. It is important to understand the physics of how the cosmological parameters are constrained given these new CMB datasets instead of treating the modern Boltzmann codes as a black box. I will present how the LCDM parameters are constrained, as well as various parameters in extensions to the LCDM model, including curvature (Ω_k), the primordial helium abundance (Y_p), the effective number of relativistic neutrino species ($N_{\rm eff}$) and the mass of the neutrinos ($\sum m_\nu$). I will show that the constraints on these extensions are from different physical processes at different epochs of the evolution of the Universe.

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Date submitted: 11 Jan 2013 Electronic form version 1.4