Abstract

(based on Phys. Rev. D 75, 123502 (2007) and arXiv:0709.1944)

We implement an improved (error sensitive) Richardson-Lucy deconvolution algorithm on the measured angular power spectrum from the WMAP 3 year data to determine the primordial power spectrum assuming different points in the cosmological parameter space for a flat LCDM cosmological model. The recovered spectrum for most of the points in the cosmological parameter space has a likelihood far better than a 'best fit' power law spectrum up to $\Delta\chi^2_{eff} \approx -27$. We use Discrete Wavelet Transform (DWT) for smoothing the raw recovered spectrum from the binned data. The results obtained here reconfirm and sharpen the conclusion drawn from our previous analysis of the WMAP 1st year data. A sharp cut off around the horizon scale and a bump after the horizon scale seems to be a common feature for all of these reconstructed primordial spectra. We have shown that although the WMAP 3 year data prefers a lower value of matter density for a power law form of the primordial spectrum, for a free form of the spectrum, we can get a very good likelihood to the data for higher values of matter density. We have also shown that even a flat CDM model allowing a free form of the primordial spectrum, can give a very high likelihood fit to the data. Theoretical interpretation of the results are open to the cosmology community.