

Reconstruction of the primordial power spectrum using multiple data sets

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The primordial power spectrum is important both for cosmological parameter estimation and for distinguishing between models of inflation. Many cosmological observables which probe inhomogeneities are related to the power spectrum by a convolution with a transfer function. We show how two different deconvolution techniques, Tikhonov regularisation and the Backus-Gilbert method, can be used to obtain high resolution reconstructions of the power spectrum with well-defined error estimates from multiple noisy data sets. We apply both methods to a number of data sets including the WMAP temperature and polarisation data and demonstrate they give consistent results. The recovered power spectrum exhibits interesting features on large scales.

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