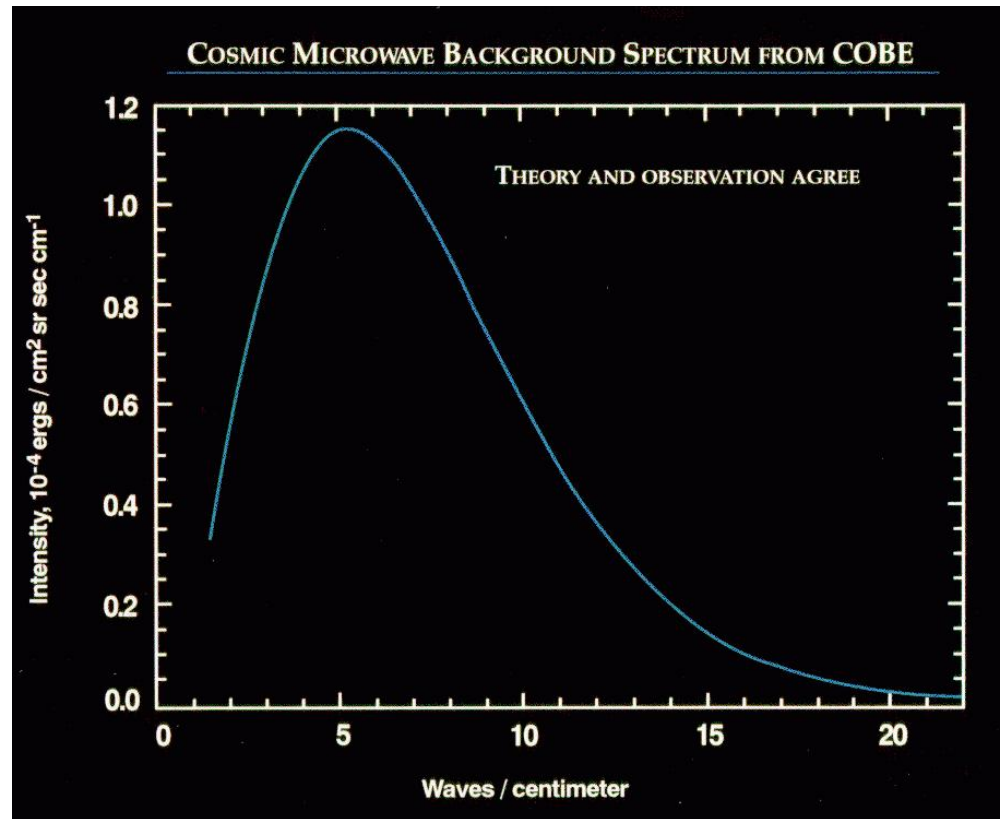
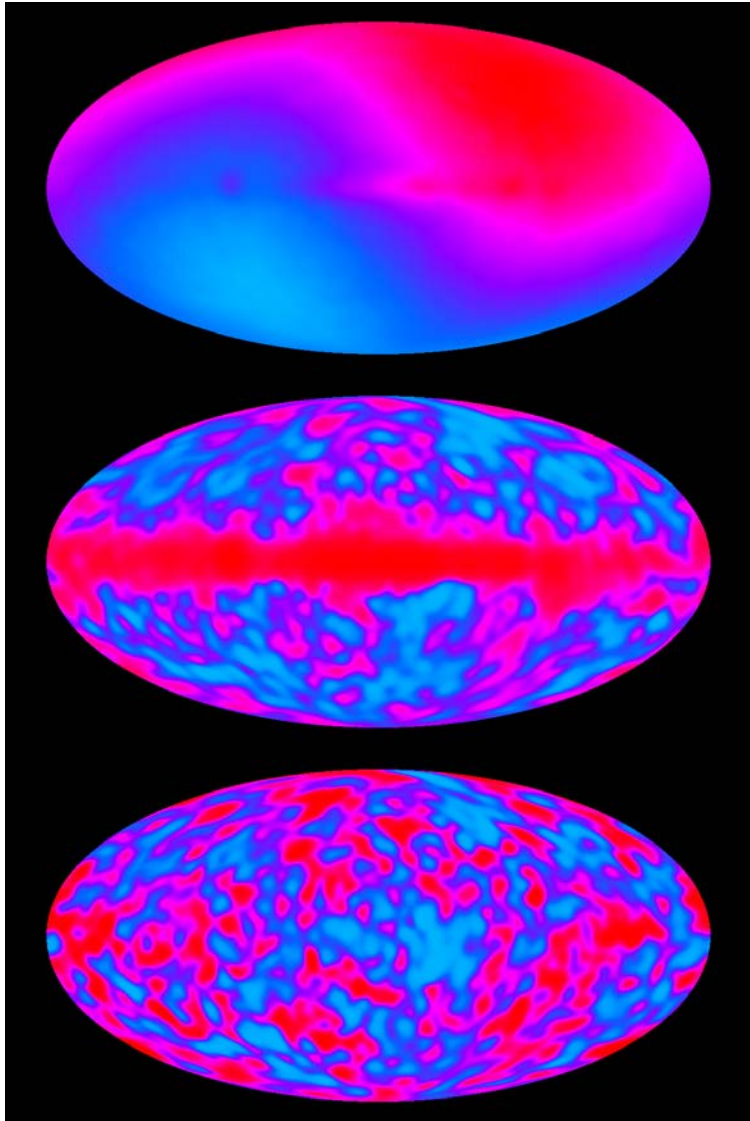
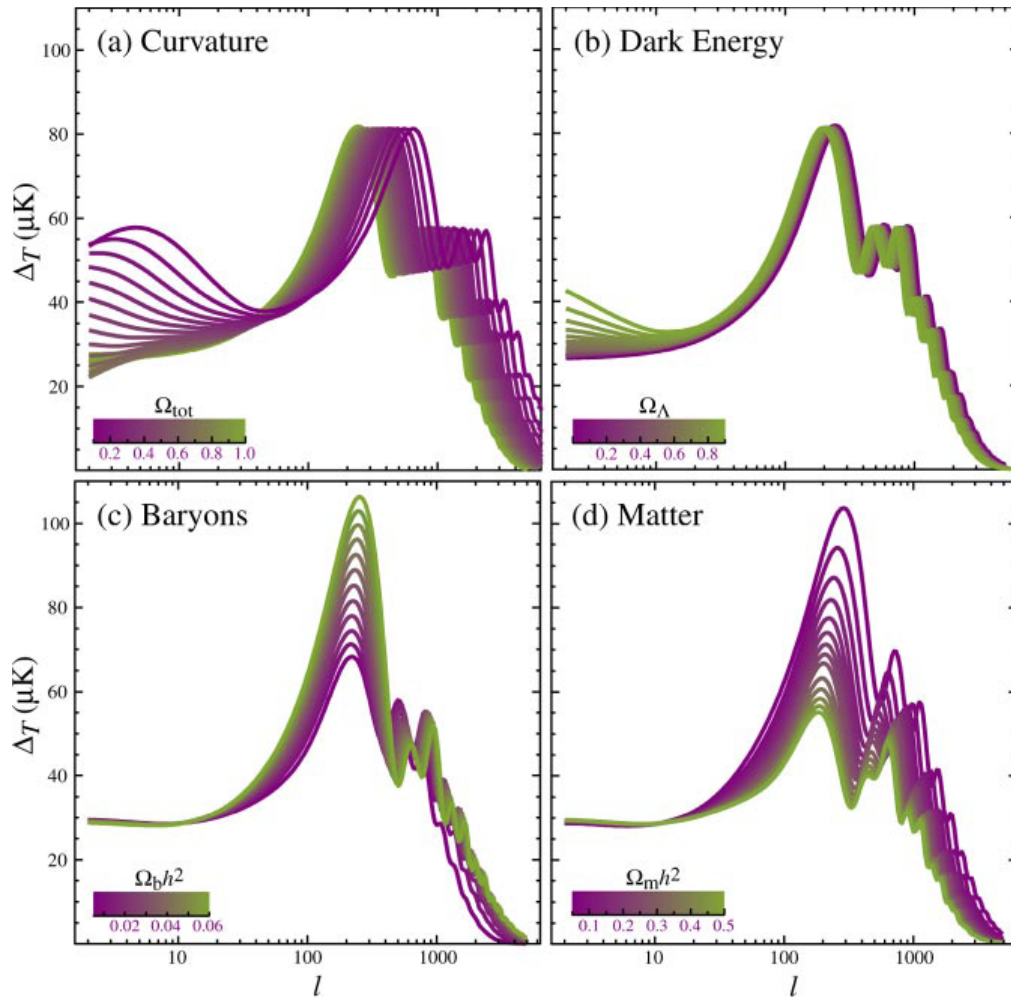
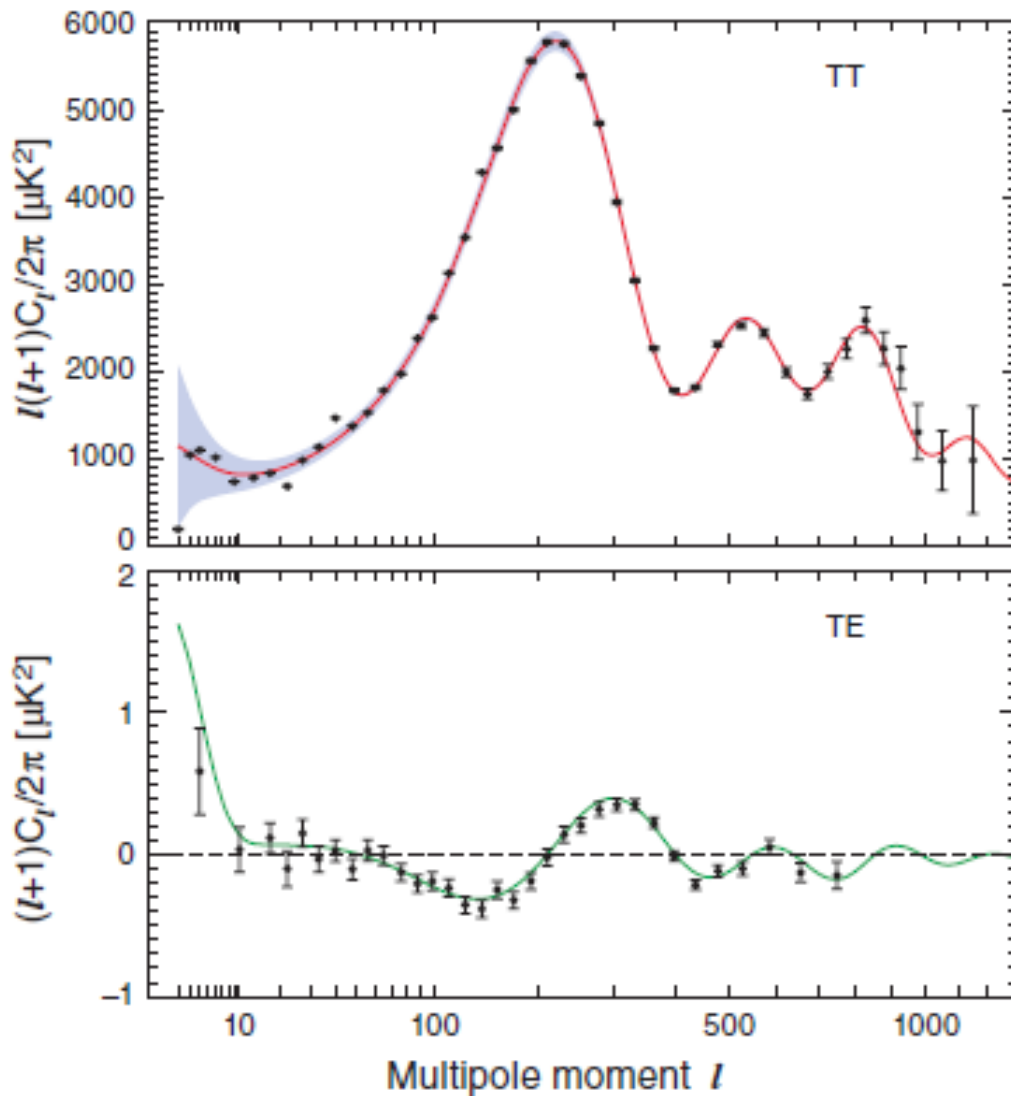


# COBE: CMB



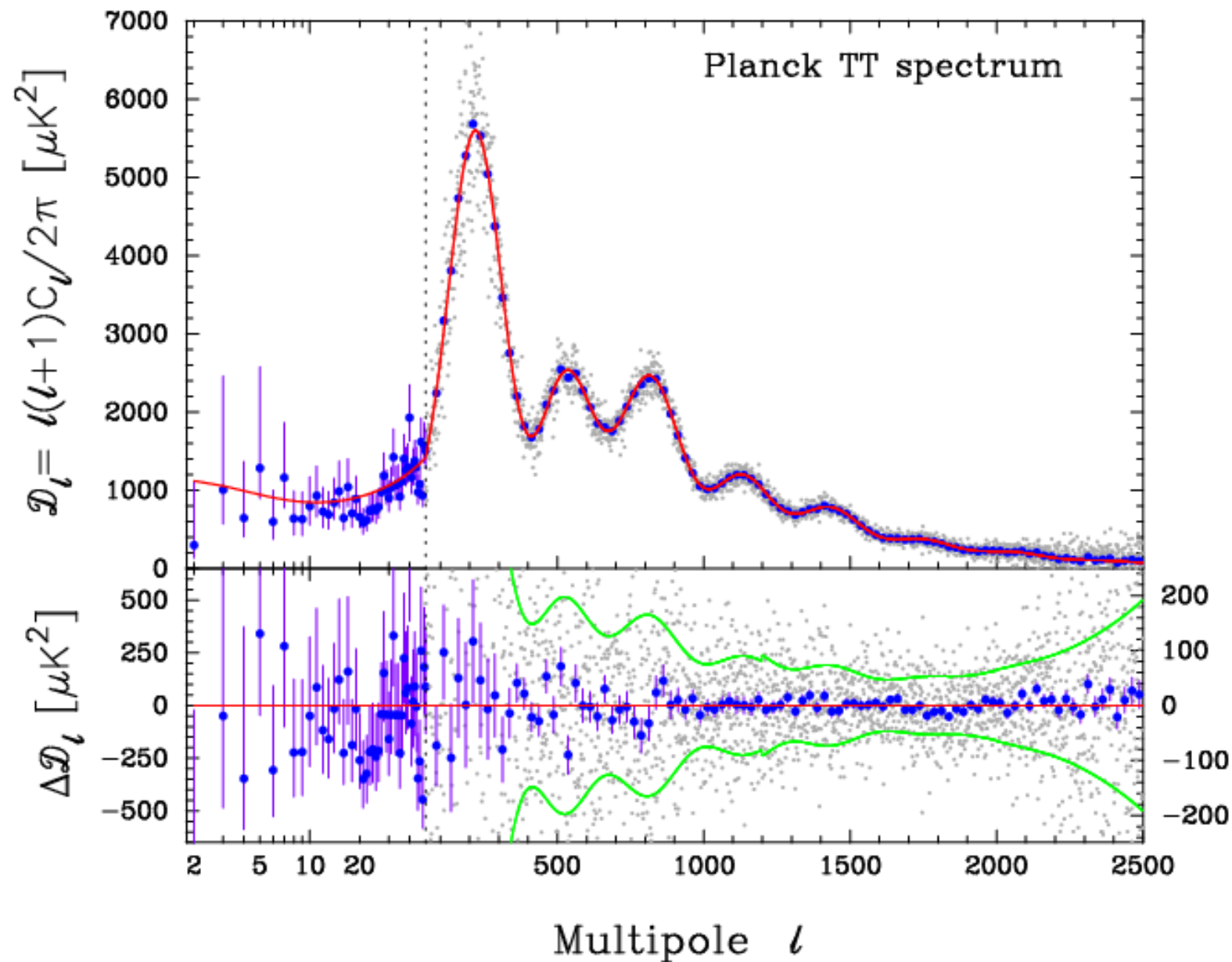


Sensitivity of the acoustic temperature spectrum to four fundamental cosmological parameters. (a) *The curvature*, (b) *The dark energy*, (c) *The physical baryon Density*, (d) *The physical matter density*. All are varied around a fiducial model of  $n=1$ ,  $k=0$ ,  $\Lambda=0.65$ ,  $\Omega_b h^2=0.02$ ,  $\Omega_m h^2=0.15$ . [Hu & Dodelson 2002, ARA&A 40, 171]

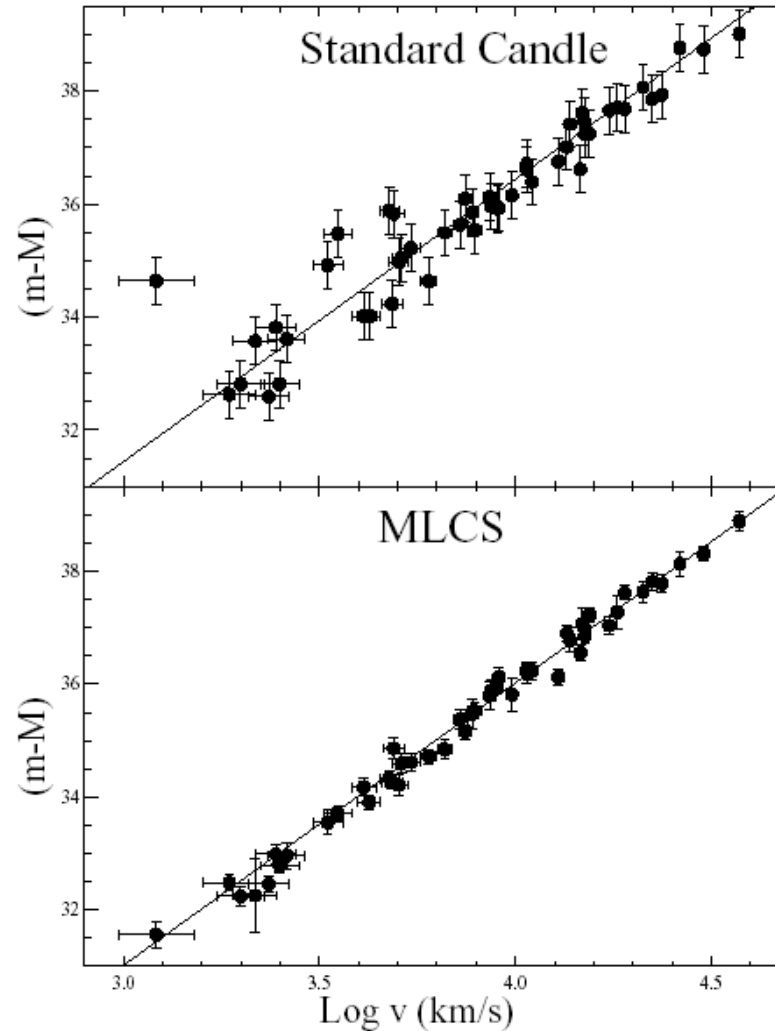


# CMB: WMAP 7yr

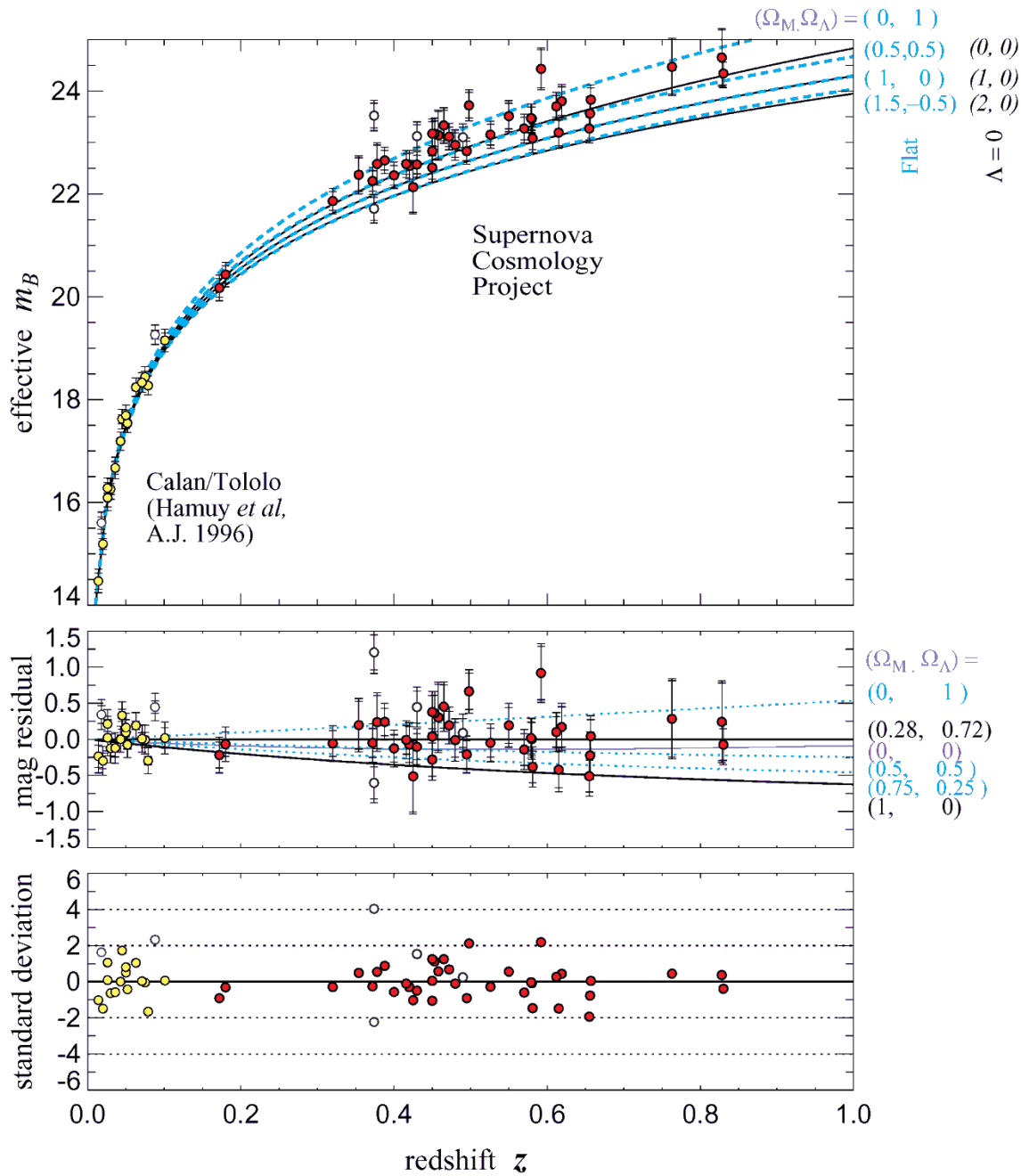
**Figure 9.** Temperature (TT) and temperature–polarization (TE) power spectra for the seven-year *WMAP* data set. The solid lines show the predicted spectrum for the best-fit flat  $\Lambda$ CDM model. The error bars on the data points represent measurement errors, while the shaded region indicates the uncertainty in the model spectrum arising from cosmic variance. The model parameters are  $\Omega_b h^2 = 0.02260 \pm 0.00053$ ,  $\Omega_c h^2 = 0.1123 \pm 0.0035$ ,  $\Omega_\Lambda = 0.728^{+0.015}_{-0.016}$ ,  $n_s = 0.963 \pm 0.012$ ,  $\tau = 0.087 \pm 0.014$ , and  $\sigma_8 = 0.809 \pm 0.024$ .



# SNIa Hubble diagram

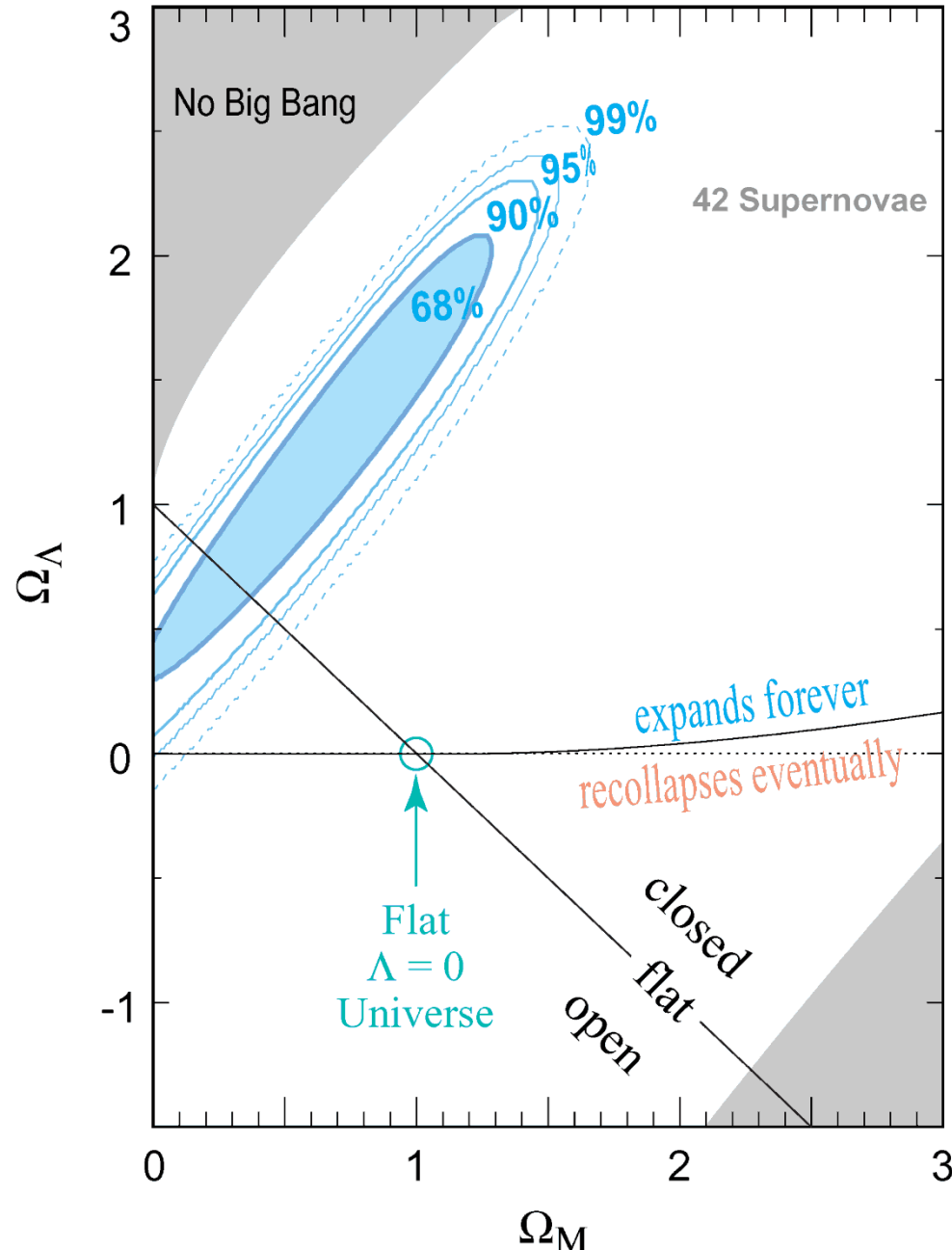


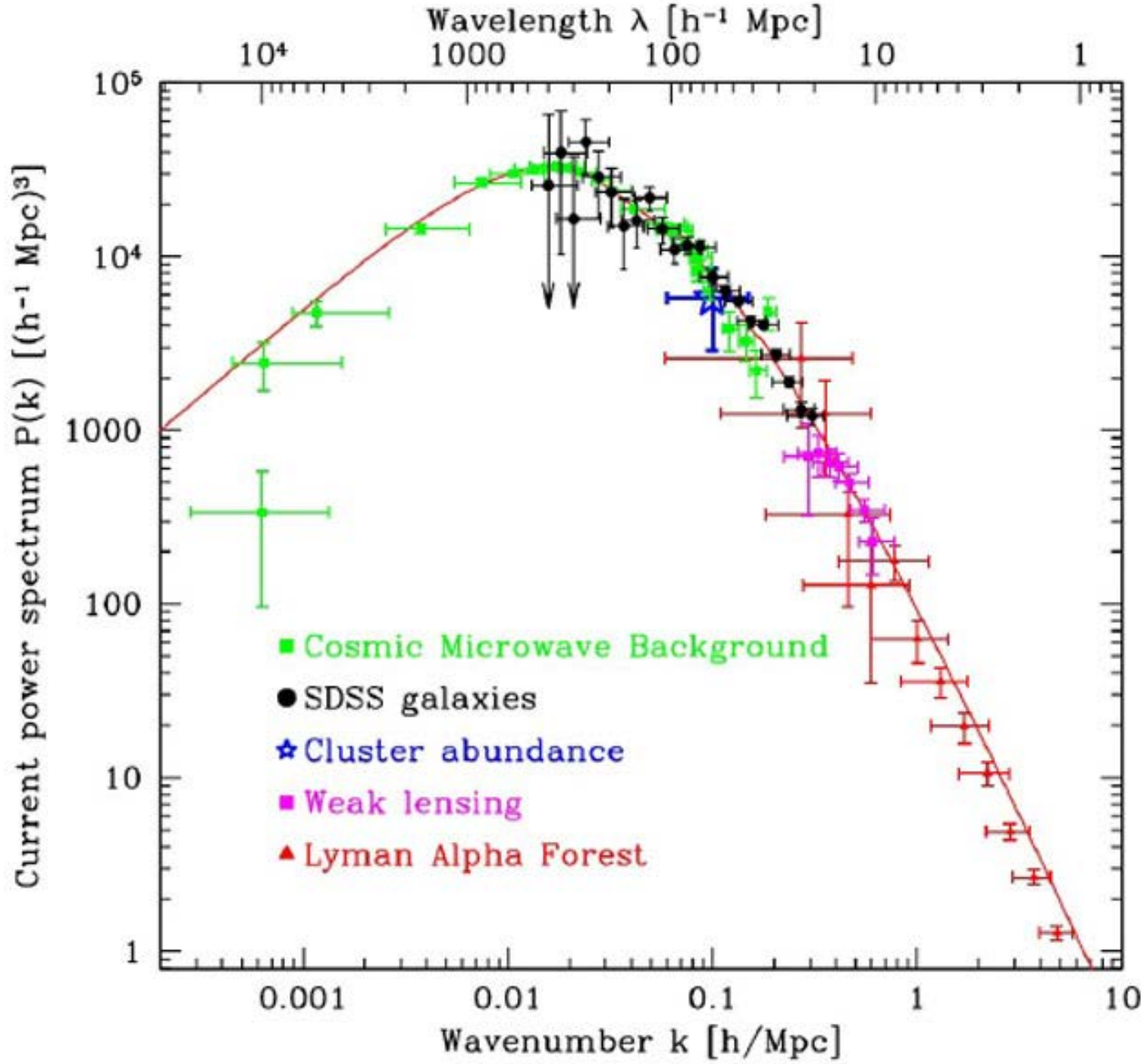
# SN Ia



Perlmutter, *et al.* (1998)

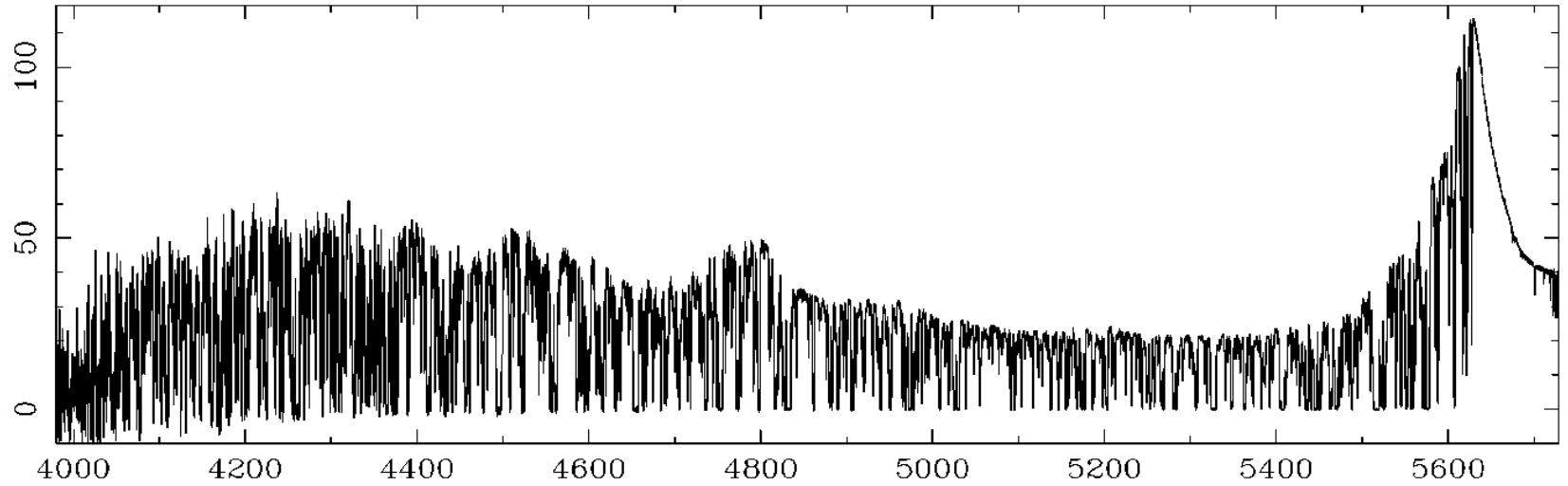
# SN Ia + CMB







# Ly- $\alpha$ Forest



# (Re)ionization?

