

Astro 448: Problem Set 1
Due October 10

1 Problem 1: CMBfast

- (a) Goto <http://www.physics.nyu.edu/matiasz/CMBFAST/cmbfast.html> and download the compressed tar file to your computer. Unpack the files.
- (b) Run `configure`. Run `make`. Run `ujlgen` and `jlgen`. The former is needed since you will also be running models with curvature.
- (c) Run `cmb` for $\Omega_v = 0$ and $\Omega_{\text{tot}} = \Omega_b + \Omega_c = 0.5, \dots, 1.5$ in steps of 0.1. These are open and closed models with no cosmological constant. For the other parameters, hold $\Omega_b h^2 = 0.02$ and $\Omega_c h^2 = 0.23$ fixed by adjusting H_0 appropriately. You may set the other parameters to their default values indicated in parentheses.
- (d) Plot your results for $\ell(\ell + 1)C_\ell/2\pi \equiv (\delta T/T)^2$.
- (e) Tabulate the positions of the first three peaks and plot their multipole number against Ω_{tot} .