Pico

Commander updates 02.09.2021

Ragnhild Aurlien and the Oslo group

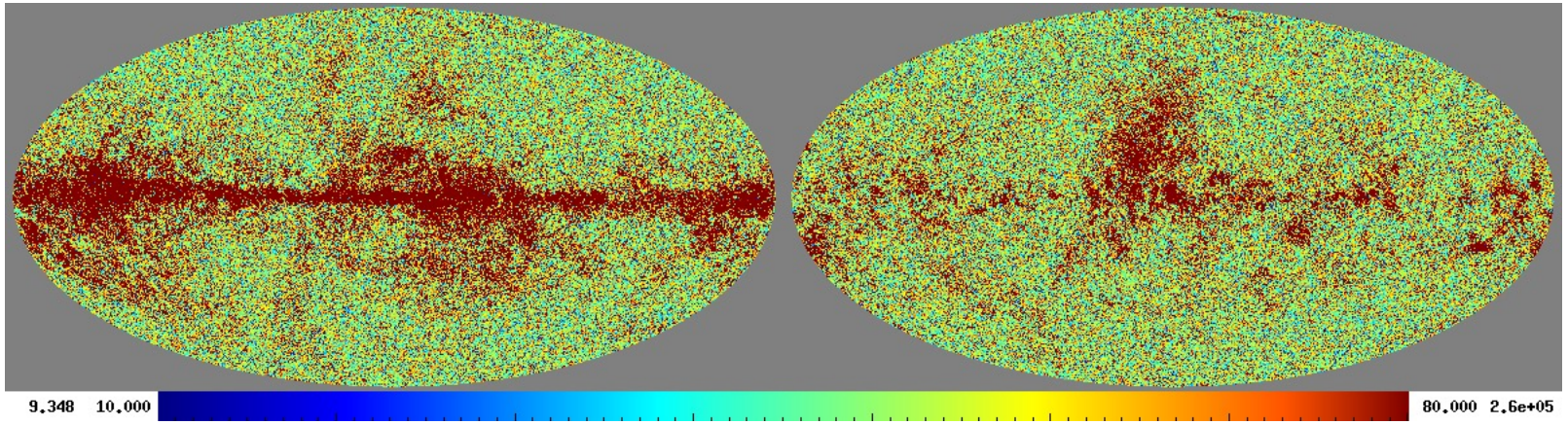
Results from 91.91 simulations

- Fitting the same mathematical model in Commander3 as is used to produce the simulations
- Fitting 3 parameters – only amplitudes
  - CMB (A_{cmb})
  - One dust model (A_{dust})
  - Synchrotron model (A_{sync})
  - Keeping spectral indexes fixed to PYSM input ($T_{dust}, \beta_{dust}, \beta_{synch}$)
- Fitting all parameters will make the results worse

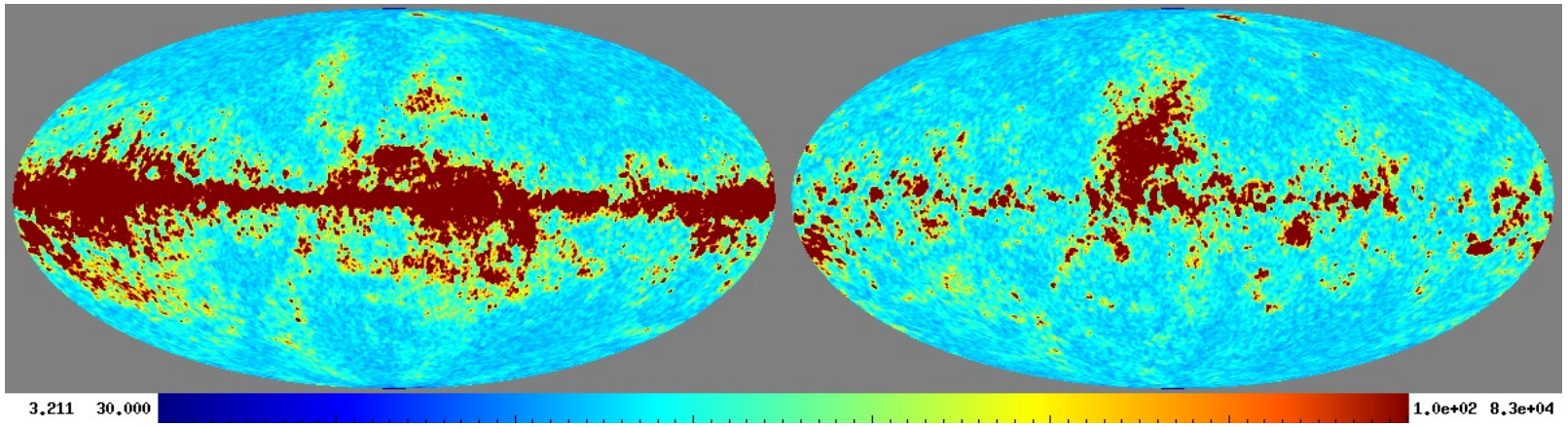
Chisquare from 91.91 simulations

Q U

χ^2

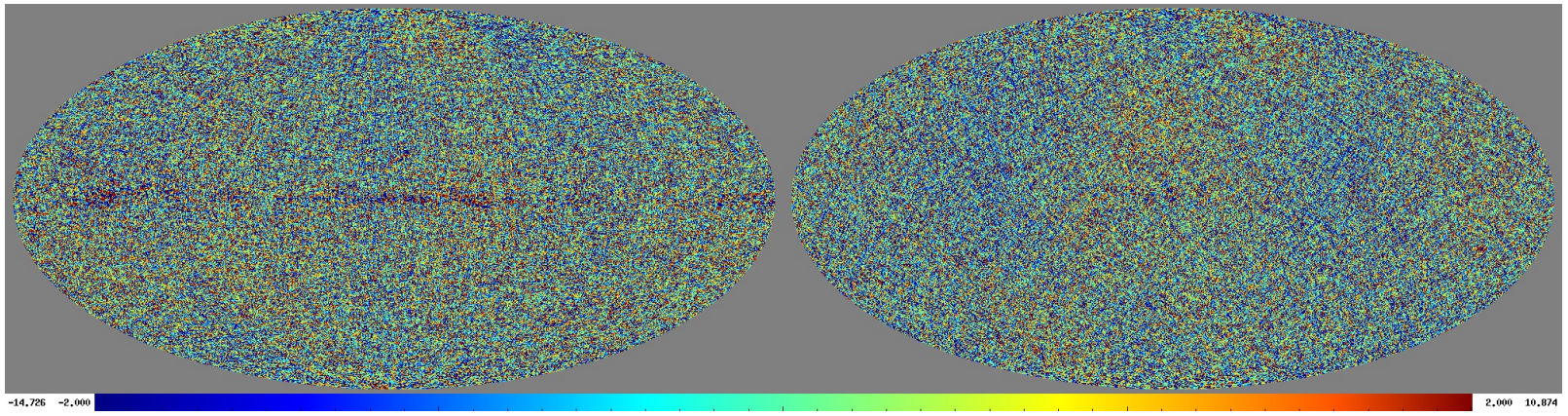


Smoothed to a
1 degree beam

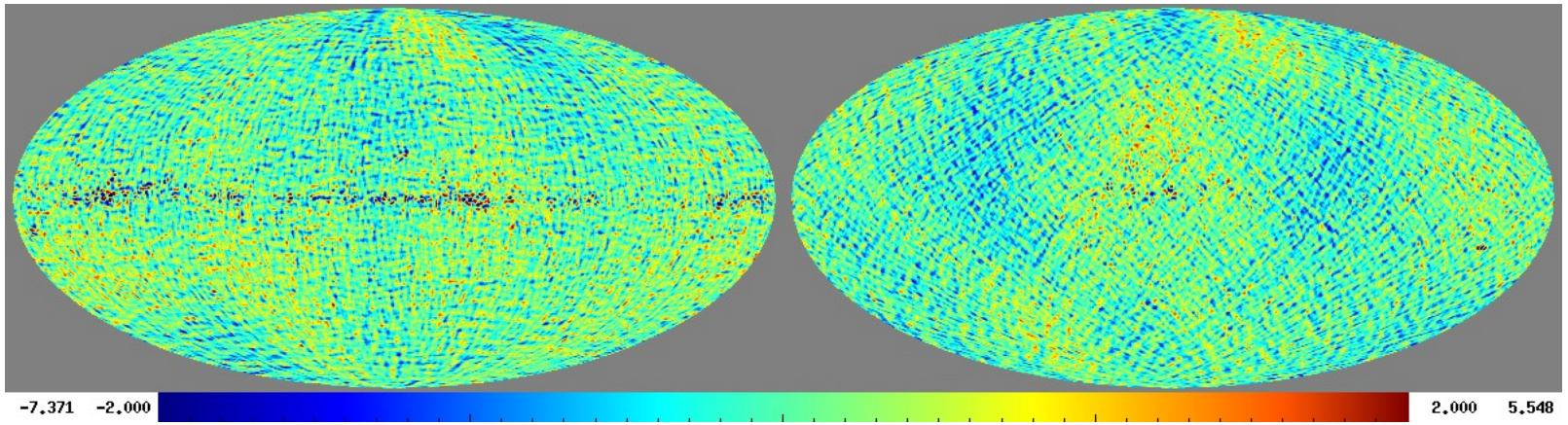


Resulting CMB map 91.91

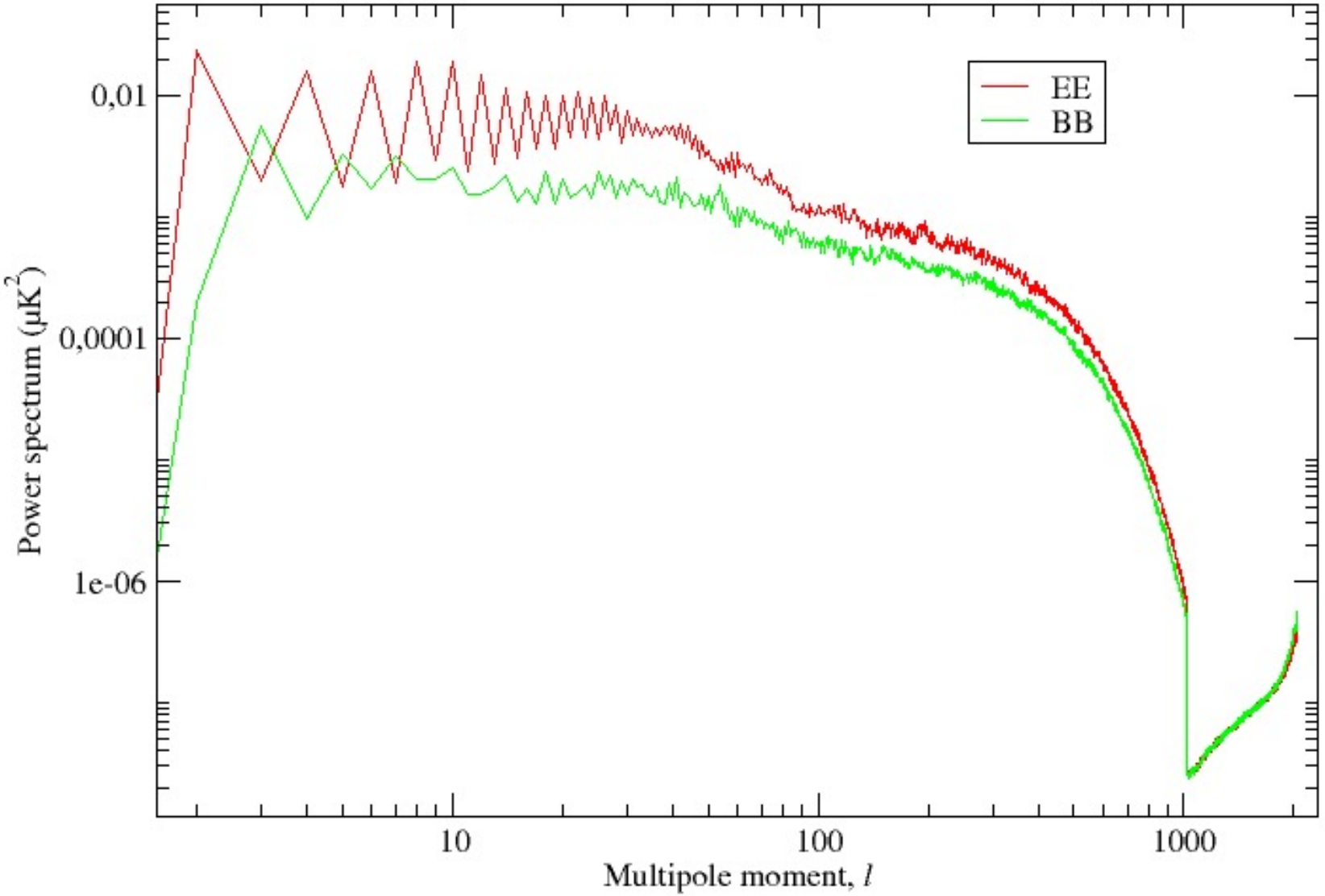
Q U



Smoothed to a
1 degree beam



Power spectrum from Clems simulations



Only has power up to 2Nside

Not instrumental noise dominated at lmax, but dominated by Healpix grid errors

Need to see a smooth transition from signal domination to noise domination for Commander data model to make sense

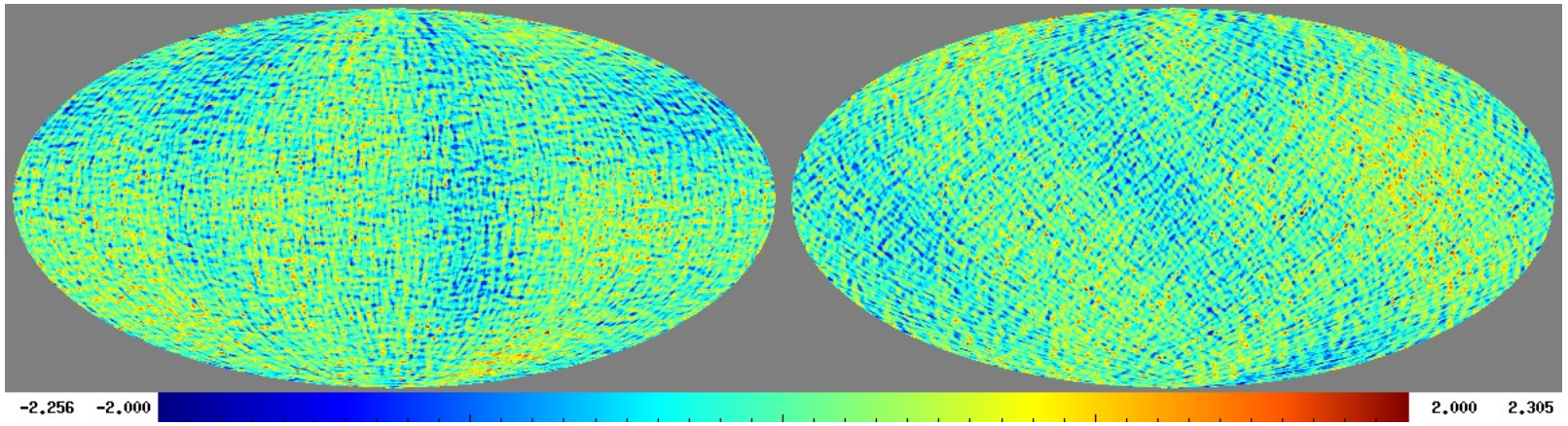
Analysis of Unnis simulations from March

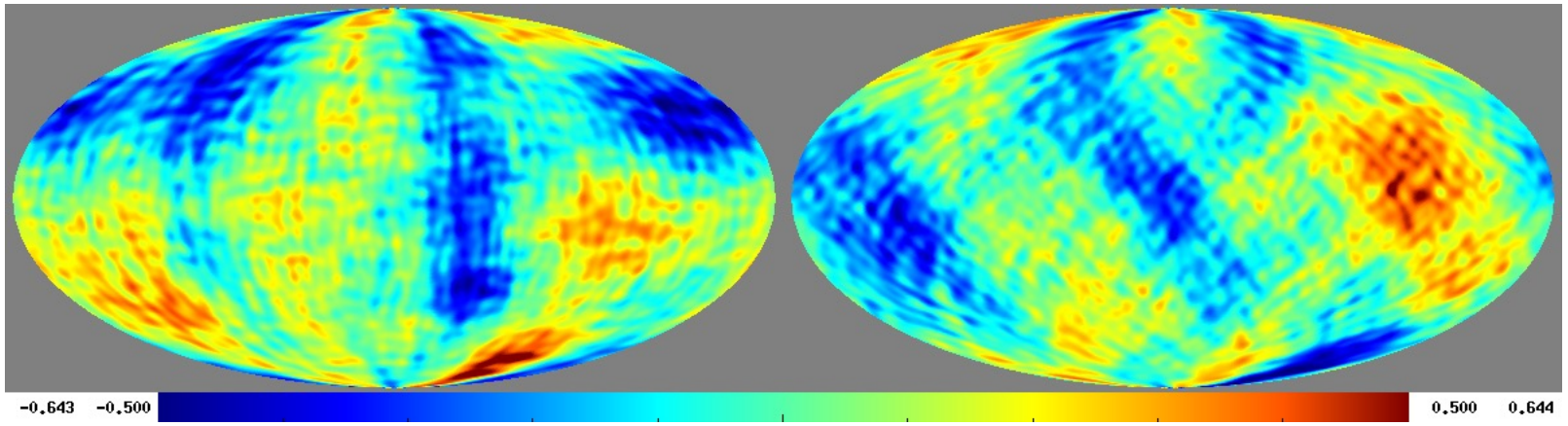
Simulations generated by Unni Fuskeland

- All frequency maps are smoothed with a 1 degree beam and downgraded to nside 256 before white noise is added
- Foreground model PySM d1s1 (model 90.91)
- 10 different CMB and white noise realisations
  - With both $r = 0$ and $r = 0.003$
- Run Commander1 fitting 6 parameters
  - CMB (A_{cmb})
  - One dust model ($A_{dust}, T_{dust}, \beta_{dust}$)
  - Synchrotron model ($\mathrm{A}_{sync}, \beta_{synch}$)

Resulting CMB map using Unnis simulations

Q U

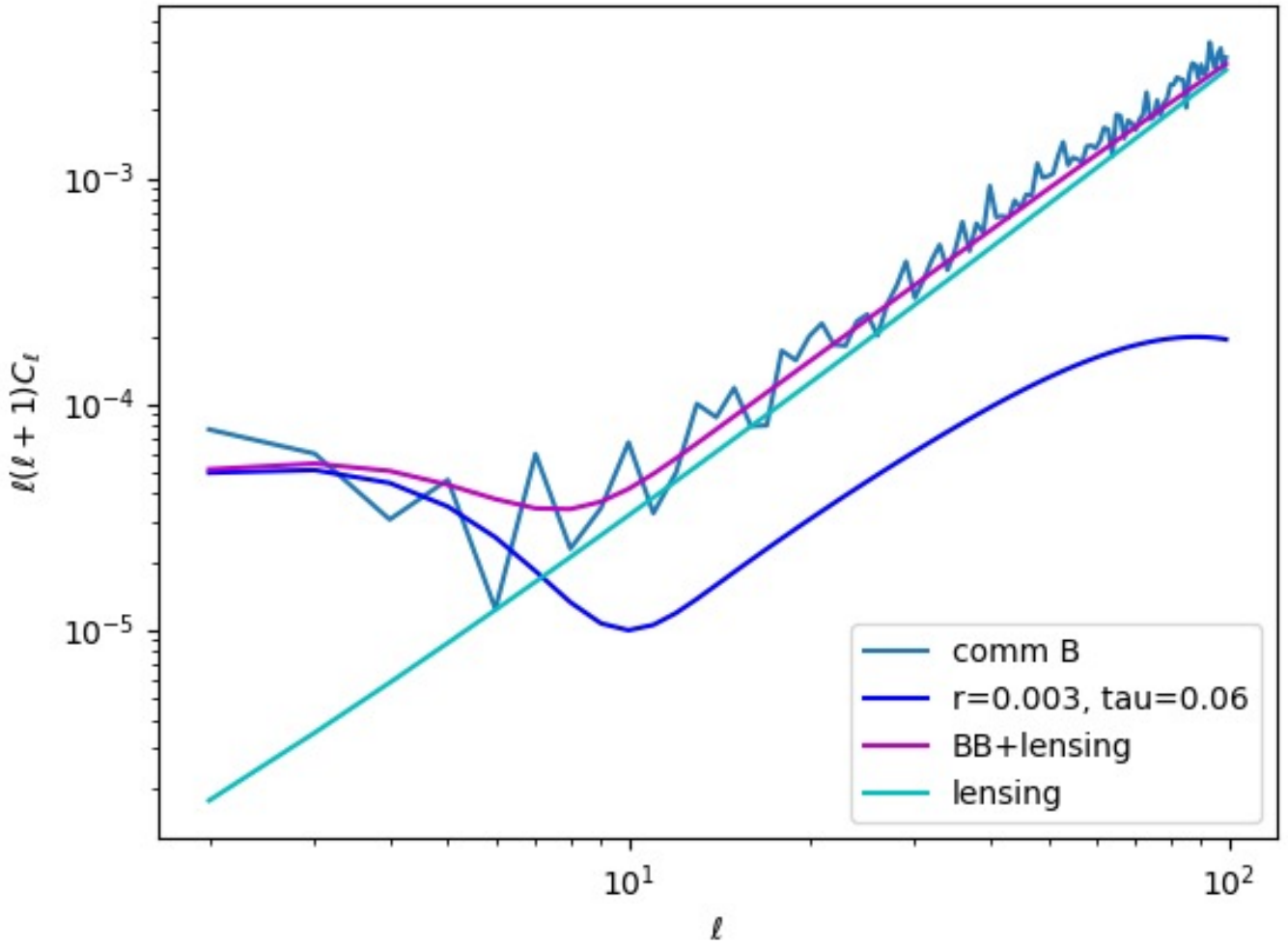




Smoothed to a
5 degree beam

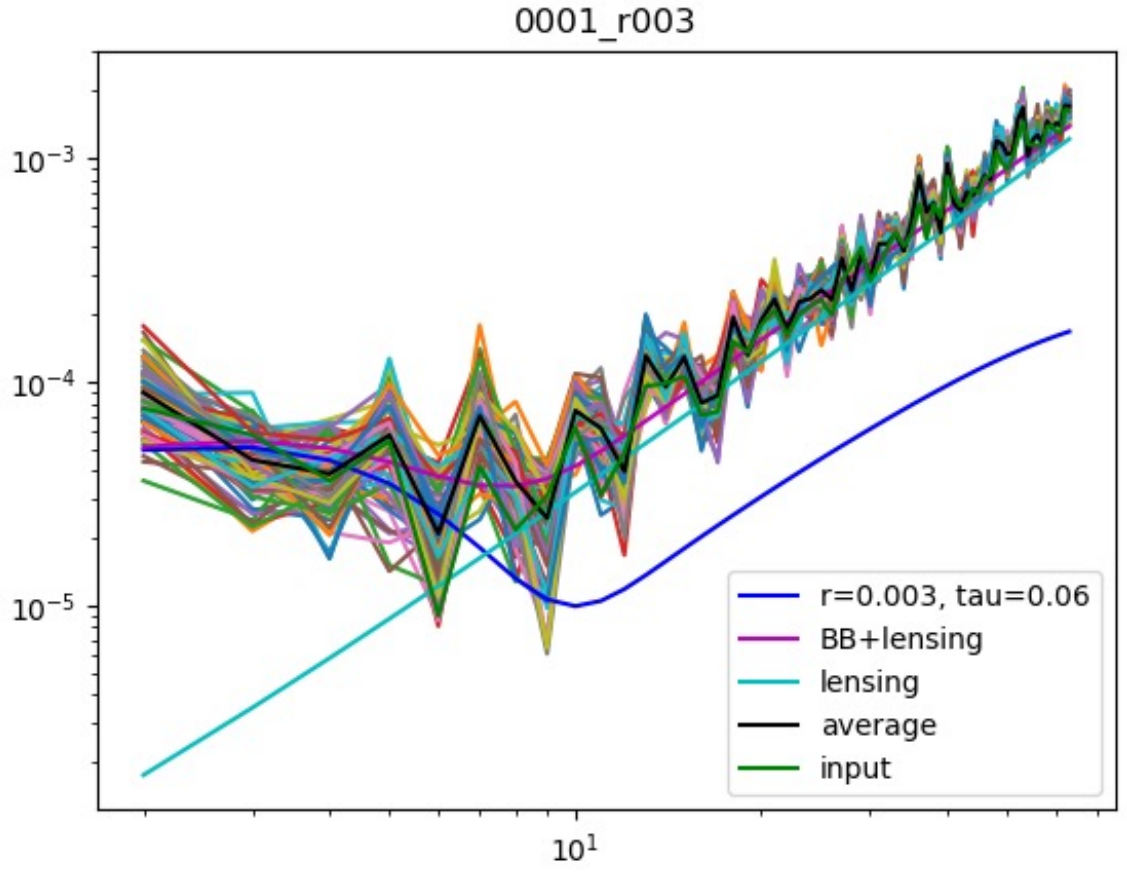
CMB powerspectrum

- Run with $\mathrm{r} = 0.003$
- Power spectrum from output CMB map from Commander1
- Unmasked CMB map (fullsky)



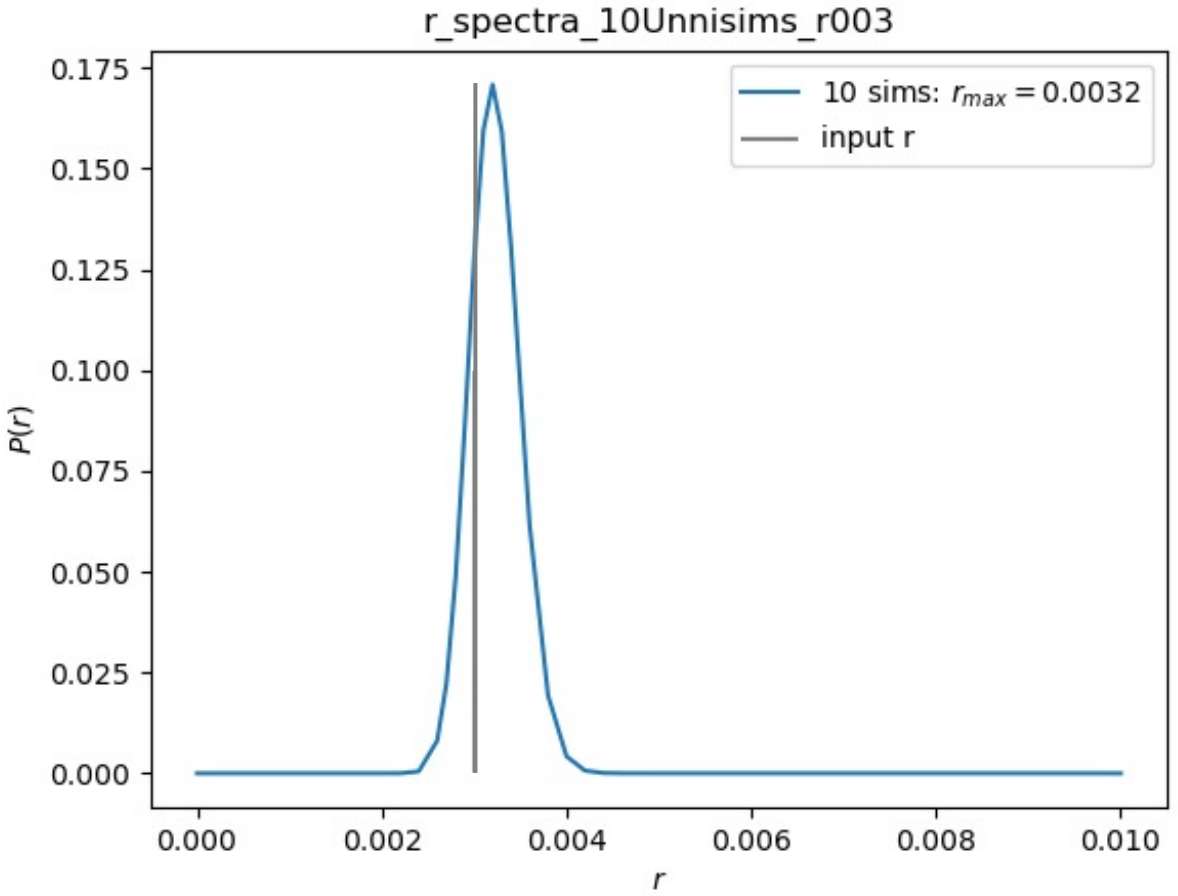
Powerspectrum after infilling

- CMB realization with $r = 0.003$
- CMB map from Commander masked with a 15% mask based on the dust amplitude map
- 80 different inpainted (Wiener filtering) realizations
  - After 20 iterations for burn in
- Average and input spectra also plotted



r-estimation

- Estimated using Blackwell Rao estimation based on the 80 inpainted CMB realizations for each of the 10 sets of simulations
- Estimated based on l from 2 to 12



Next step

- Finish analysis for $r = 0$
- Make 90.92 simulations and run these as well
- Paper writing while commander1 runs