

Tianlai Data Products

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Data Products

- Visibility

RFI flagged and calibrated visibilities, shape=(ntime, nfreq, npol, nbl), nfreq = 576, npol = 4

- 20160927/output_full_data/data/path/to/vis.hdf5 ~11TB
- 20180322/output_full_data/data/path/to/vis.hdf5 ~13TB

- Map

- /home/sharedir/zuoshifan/20160927_products/map_full.hdf5 nfreq = 144, nside=512, 4.5GB
- /home/sharedir/zuoshifan/20180322_products/map_full.hdf5 nfreq = 144, nside=512, 4.5GB
- /home/sharedir/zuoshifan/20160927_20180322_synthesis_products/map_full.hdf5 nfreq = 144, nside=512, 4.5GB
- /home/sharedir/zuoshifan/20180322_576freqs_products/map_full.hdf5 nfreq = 576, nside=512, all baselines, 18GB
- /home/sharedir/zuoshifan/20180322_576freqs_xcyl_products/map_full.hdf5 nfreq = 576, nside=512, cross-cyliner baselines only, 18GB

- Multi-frequency Angular Power Spectrum $C_\ell(\nu, \nu')$

- /home/sharedir/zuoshifan/20160927_products/cl.hdf5 and cl_from_map_full.hdf5 nfreq = 144, nl = 718
- /home/sharedir/zuoshifan/20180322_products/cl.hdf5 and cl_from_map_full.hdf5 nfreq = 144, nl = 718
- /home/sharedir/zuoshifan/20160927_20180322_synthesis_products/cl.hdf5 and cl_from_map_full.hdf5 nfreq = 144, nl = 718
- /home/sharedir/zuoshifan/20180322_576freqs_products/cl.hdf5 and cl_from_map_full.hdf5 nfreq = 576, nl = 718

- Power Spectrum P(k)

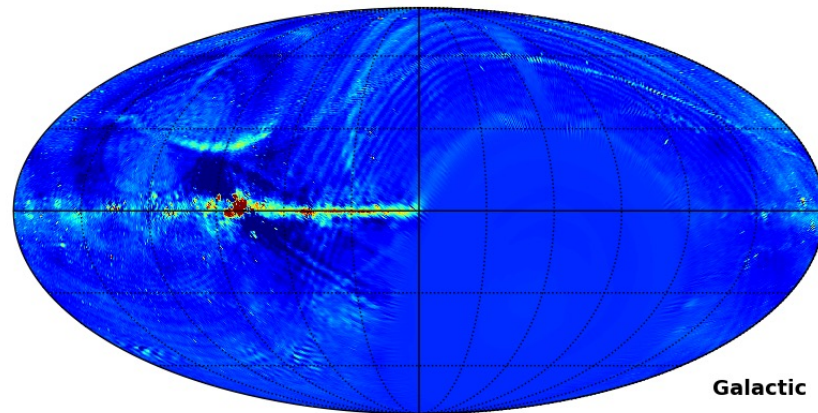
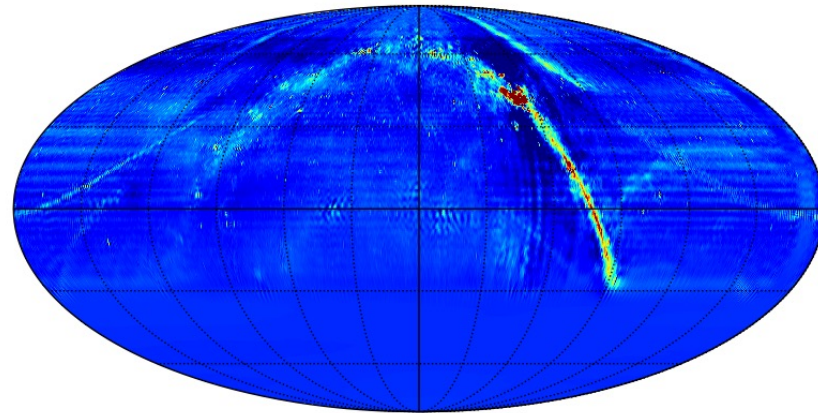
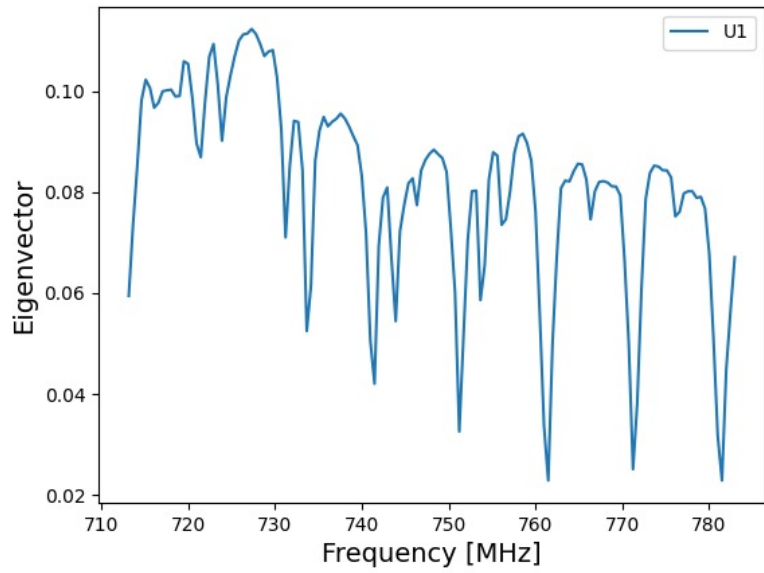
- /home/sharedir/zuoshifan/20160927_20180322_synthesis_products/fisher.hdf5 and ps_full.hdf5

- Other products

- gain
- mmodes
- beam transfer matrices

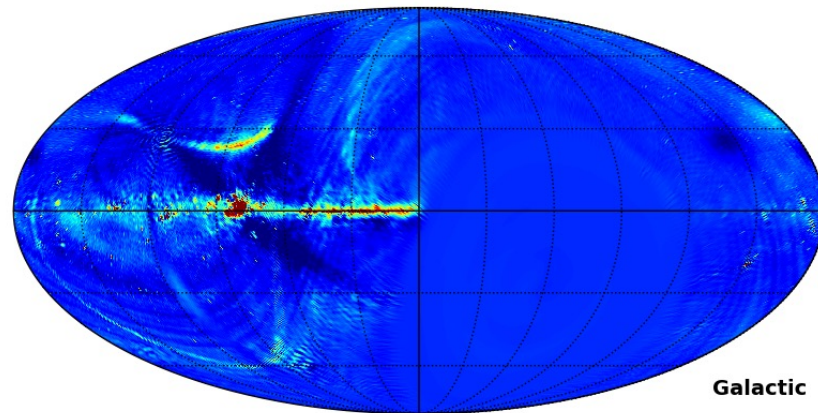
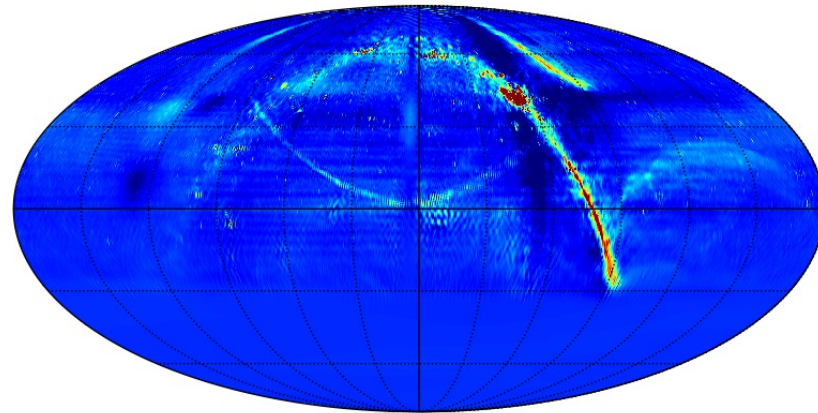
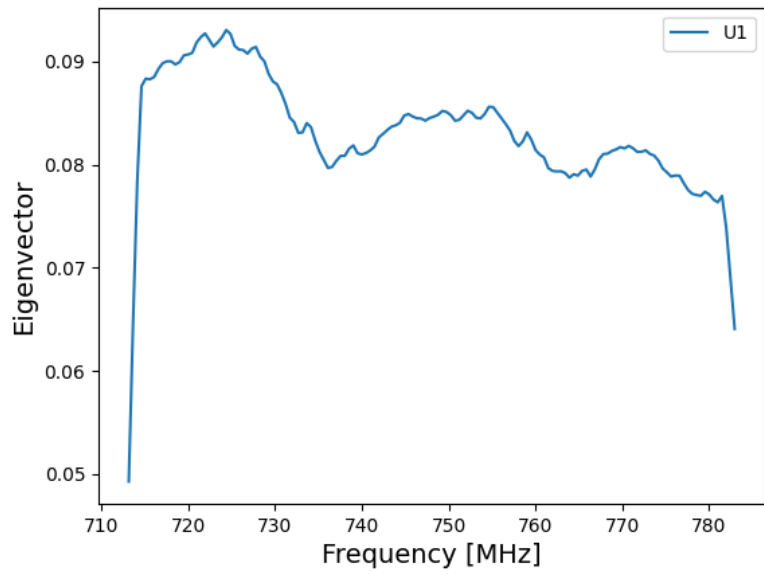
Maps

20160927, nfreq = 144, nside=512



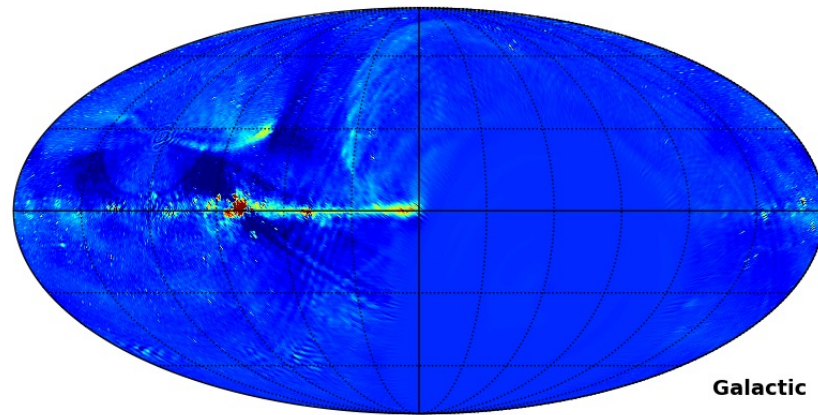
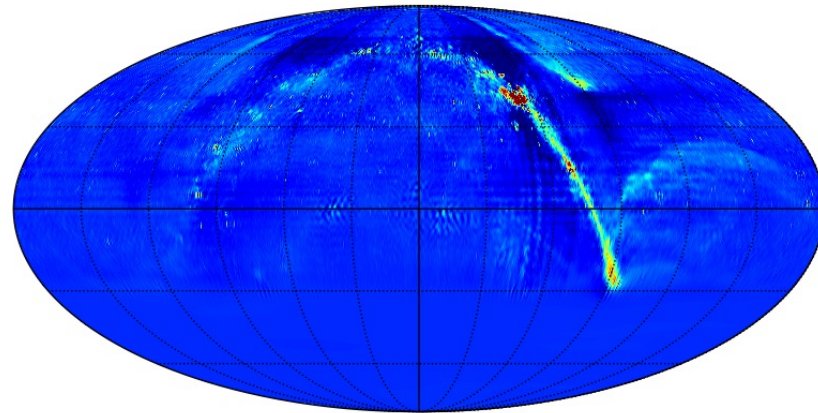
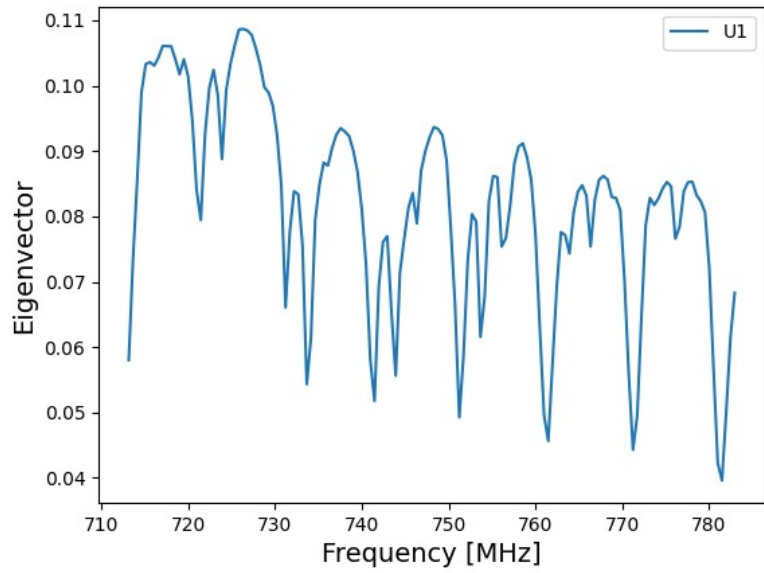
Maps

20180322 , nfreq = 144, nside=512



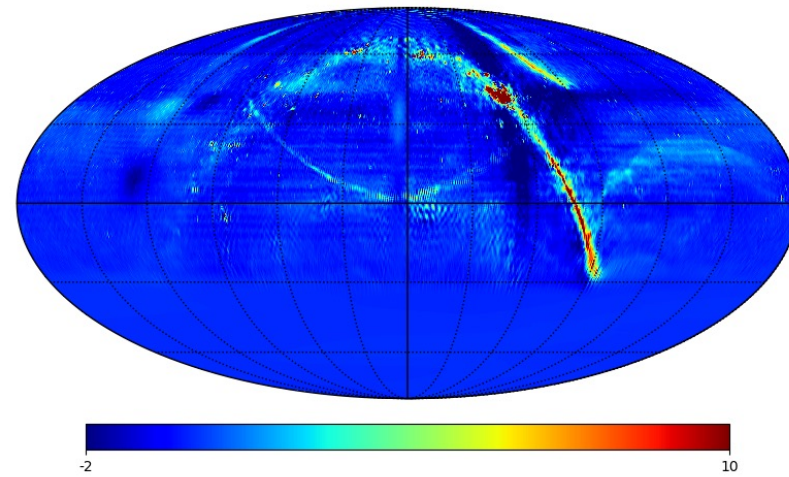
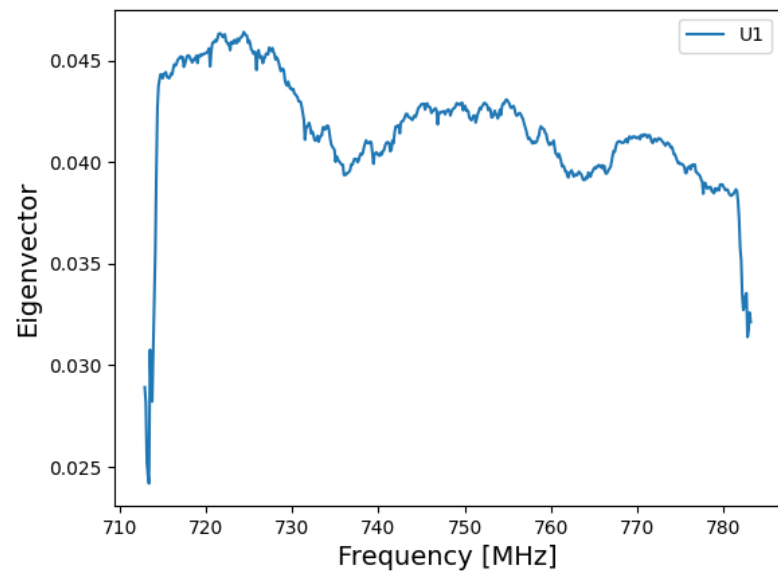
Maps

20160927 + 20180322 , nfreq = 144, nside=512



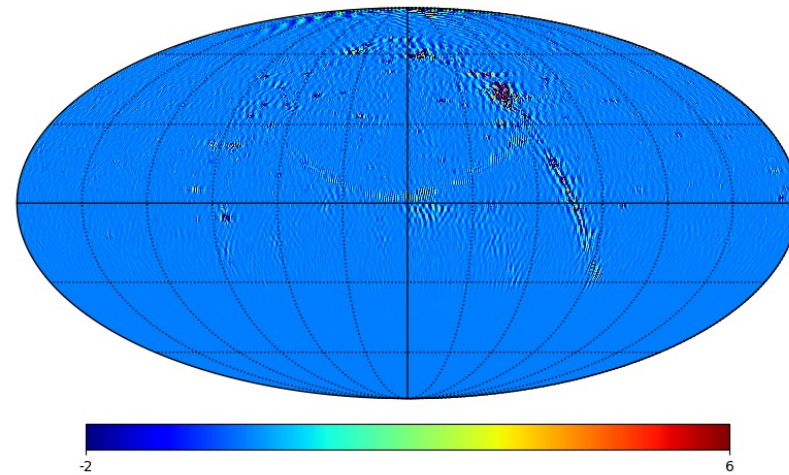
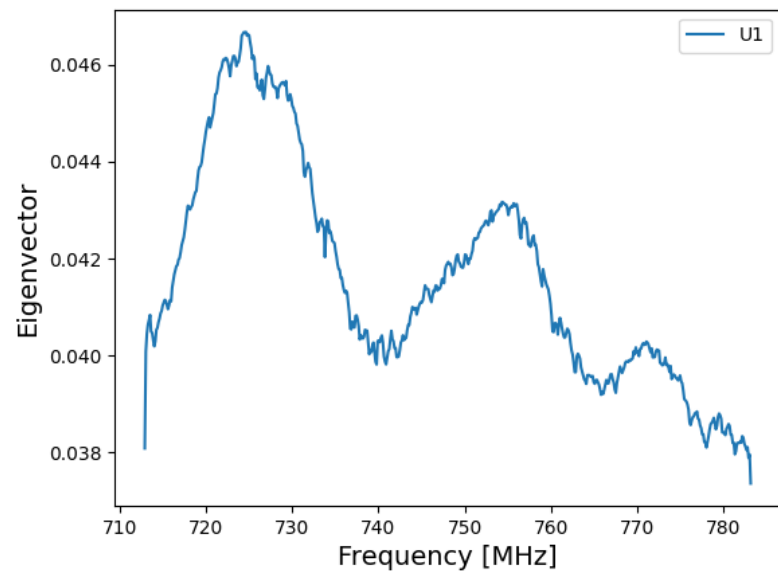
Maps

20180322 , nfreq = 576, nside=512, with all baselines



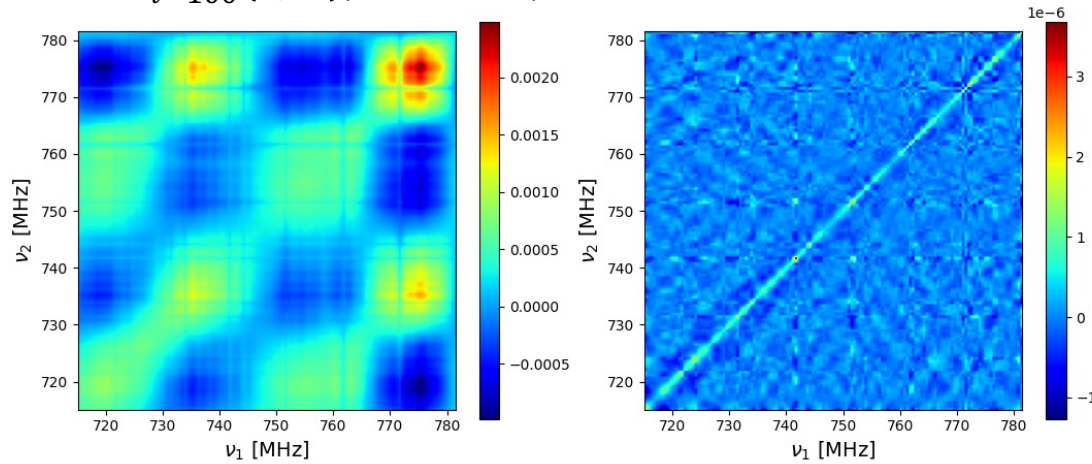
Maps

20180322 , nfreq = 576, nside=512, with only cross-cylinder baselines

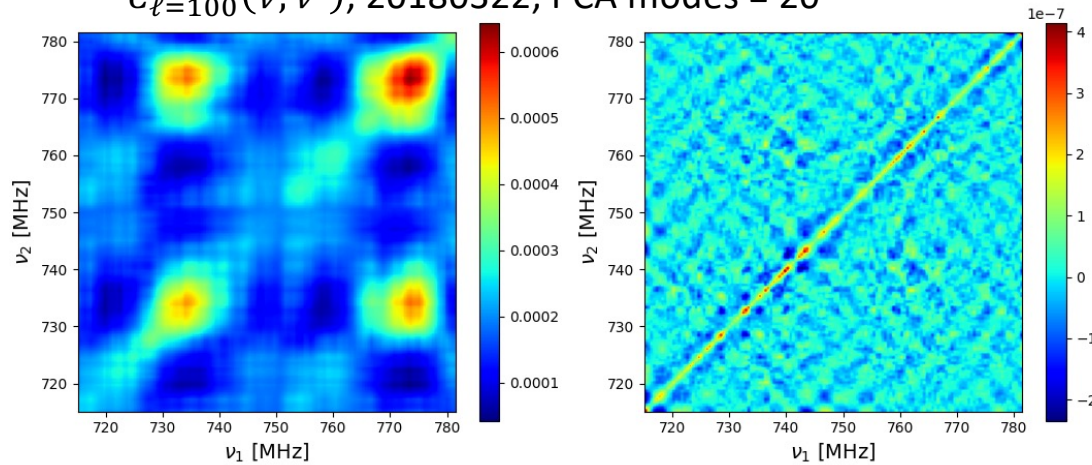


Multi-frequency Angular Power Spectrum $C_\ell(\nu, \nu')$

$C_{\ell=100}(\nu, \nu')$, 20160927, PCA modes = 20



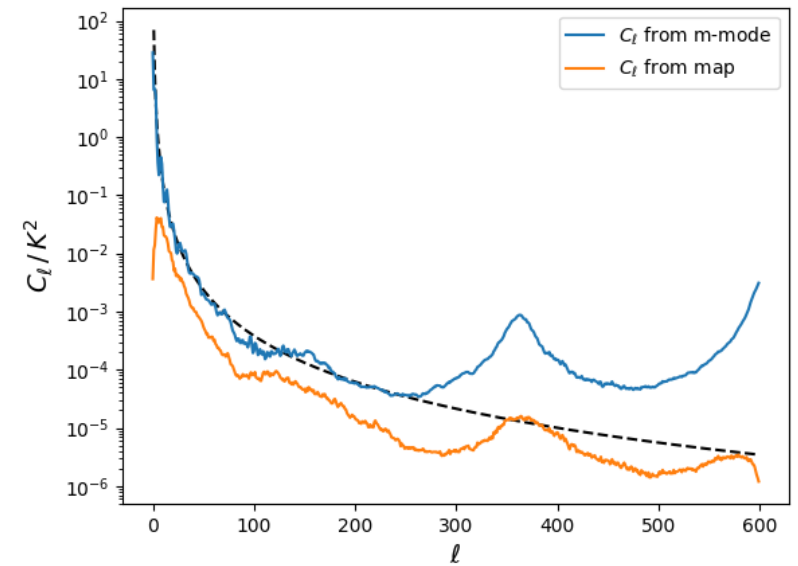
$C_{\ell=100}(\nu, \nu')$, 20180322, PCA modes = 20



$$C_\ell(\nu) = A \left(\frac{\ell}{\ell_0}\right)^{-\alpha} \left(\frac{\nu}{\nu_0}\right)^{-2\beta}$$

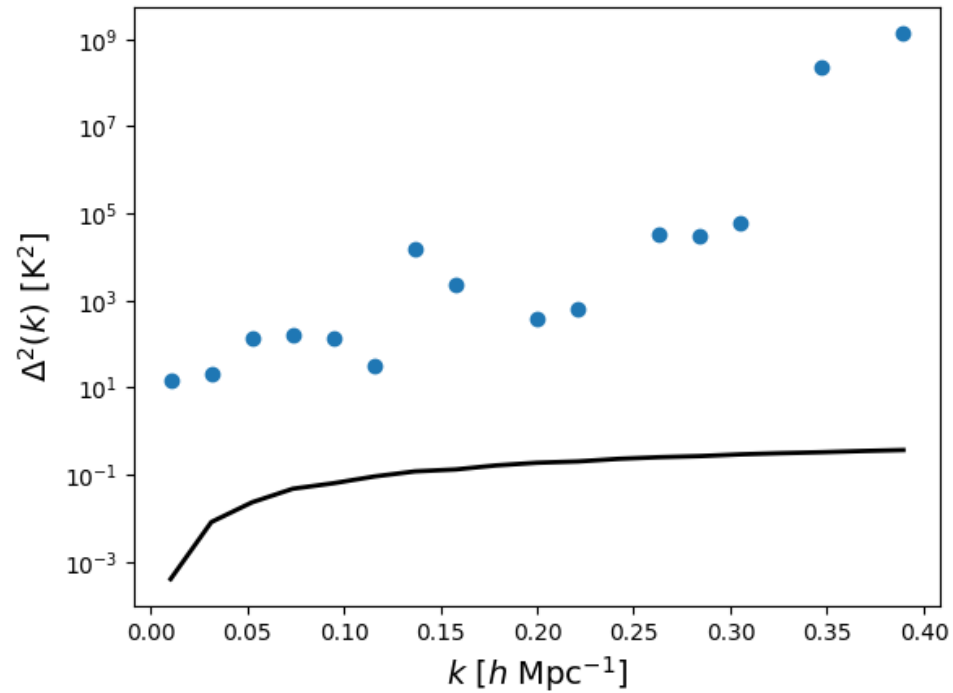
$C_\ell(\nu, \nu)$ with $\nu = 750$ MHz

Best fit: $0.000383(\ell/100)^{-2.628900}$



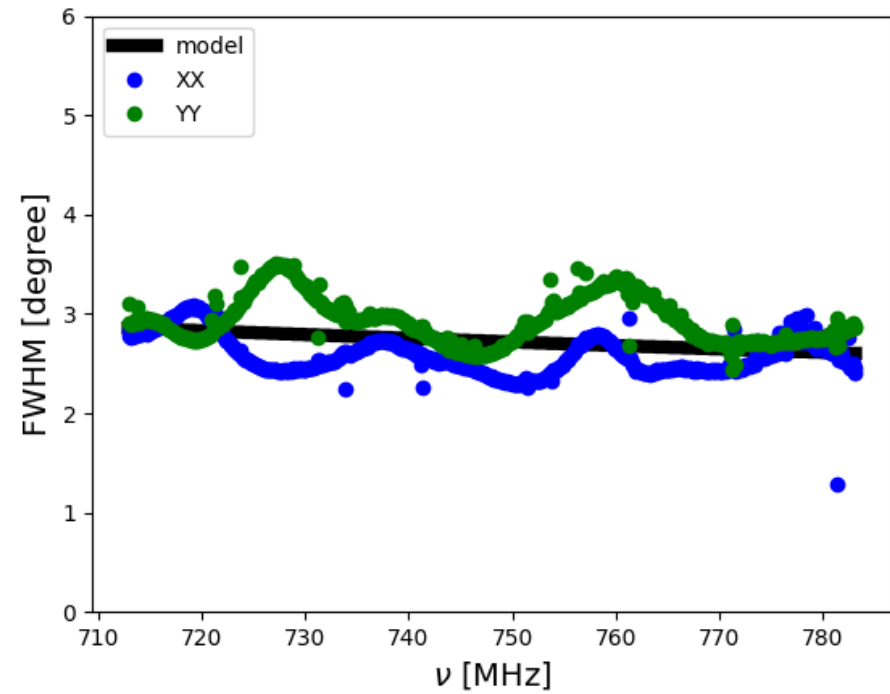
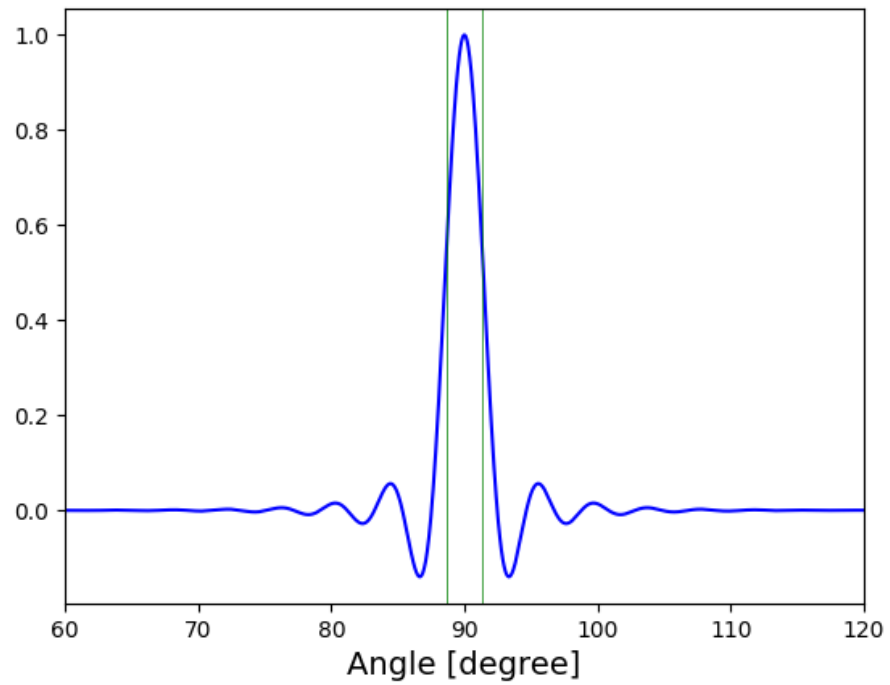
Power Spectrum

$$\Delta^2(k) = k^3 P(k) / 2\pi^2 \text{ from 20160927 + 20180322}$$



Beam

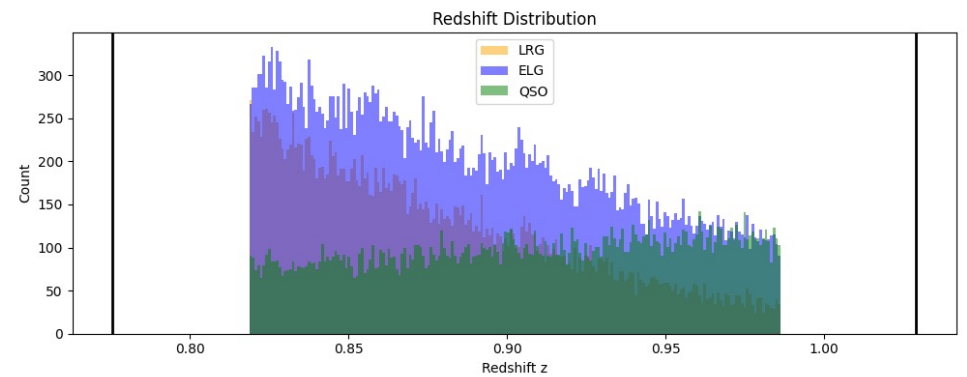
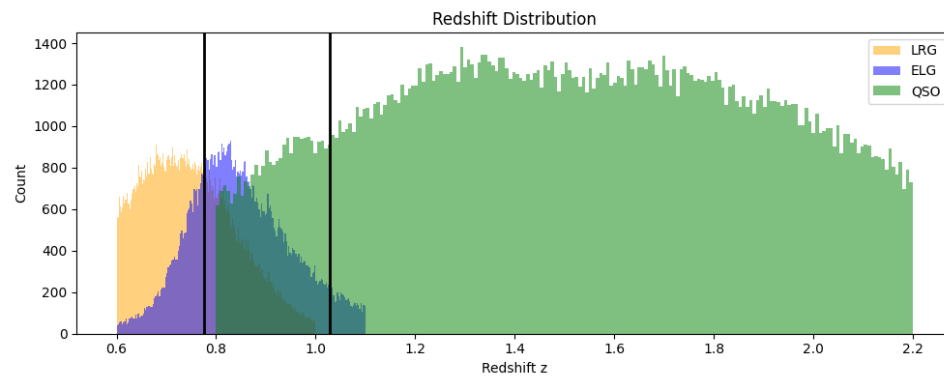
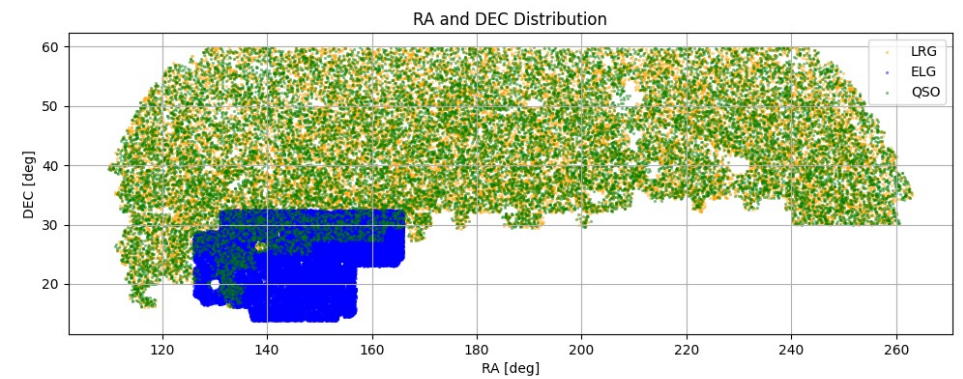
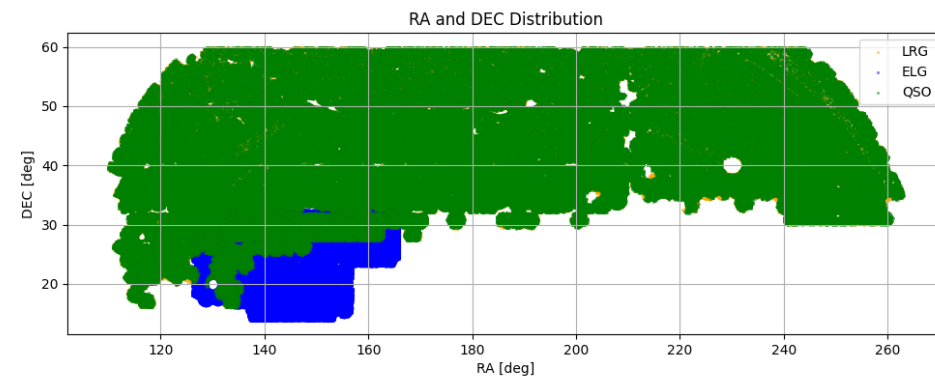
Model beam at 750 MHz



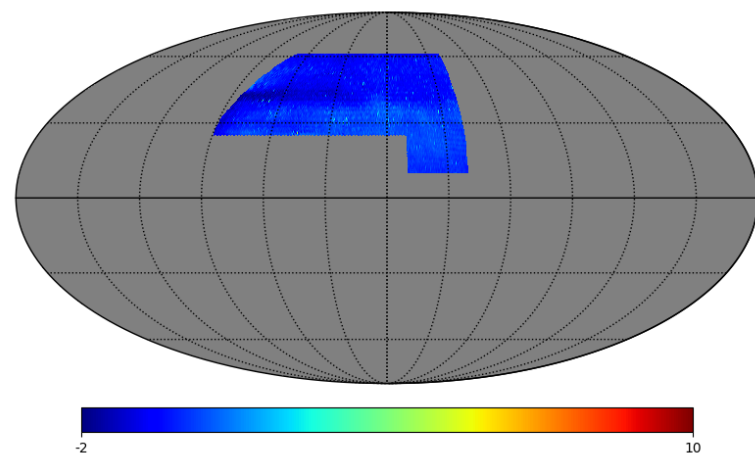
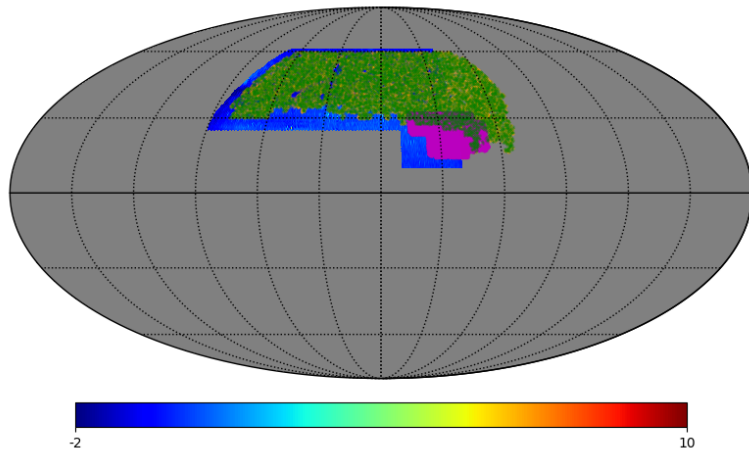
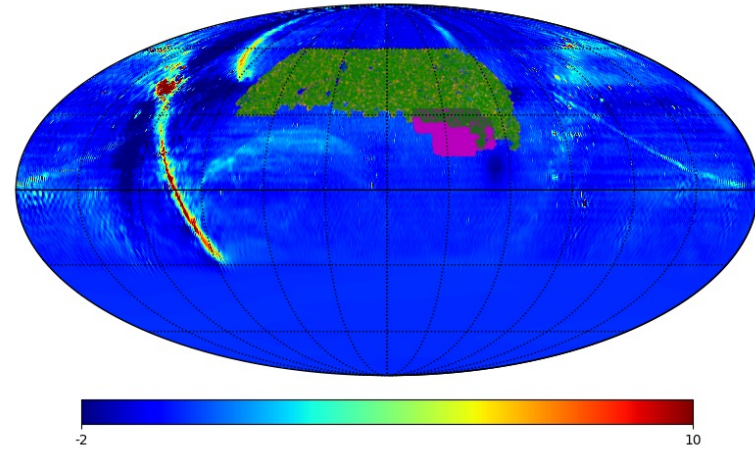
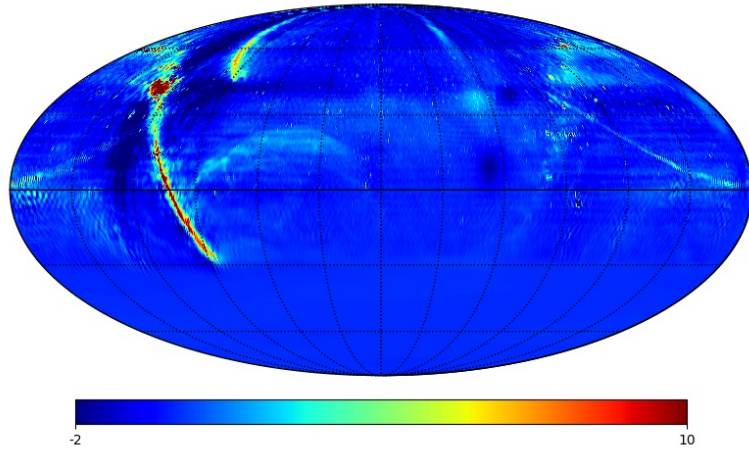
Stacking Analysis

eBOSS catalogs

- LRG: luminous red galaxies
- ELG: emission line galaxies
- QSO: quasars

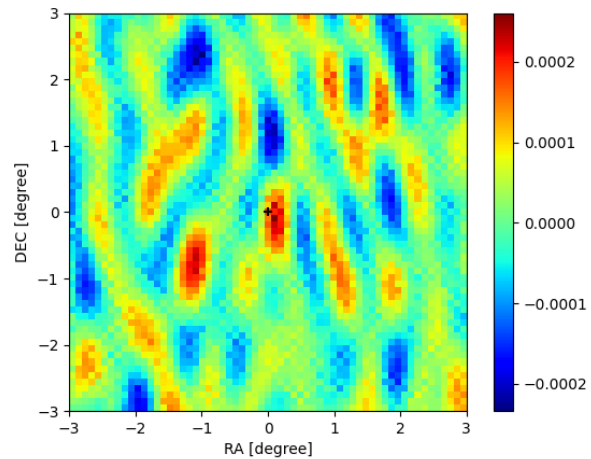


Stacking Analysis

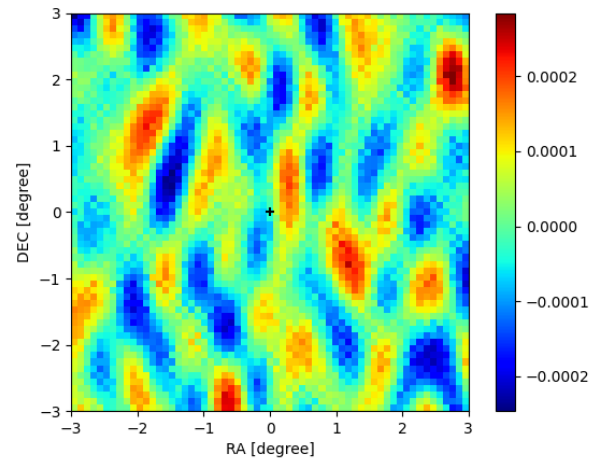


Stacking Analysis

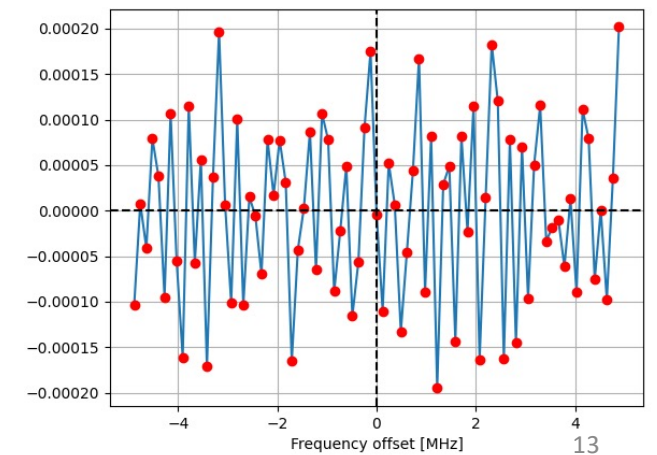
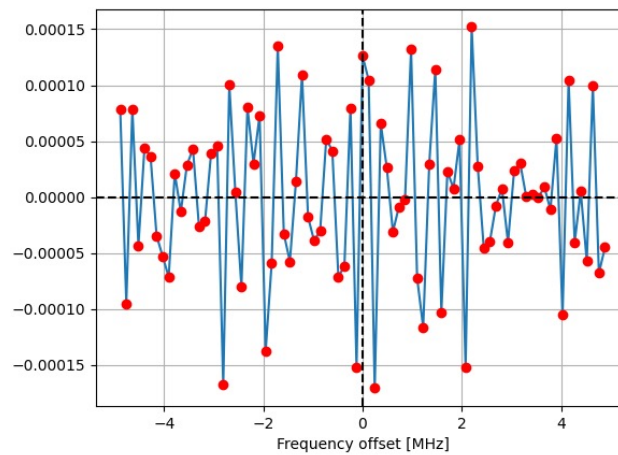
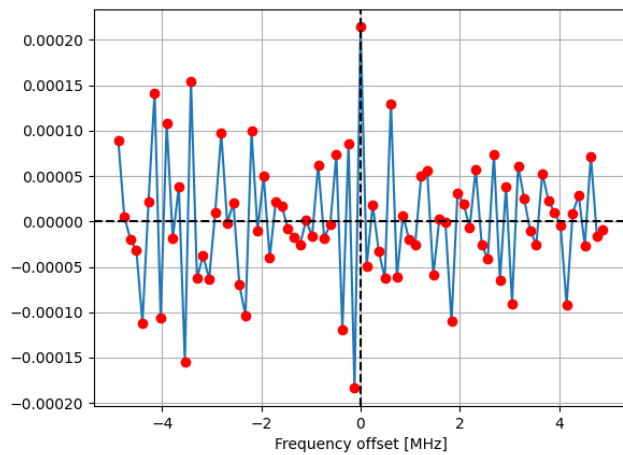
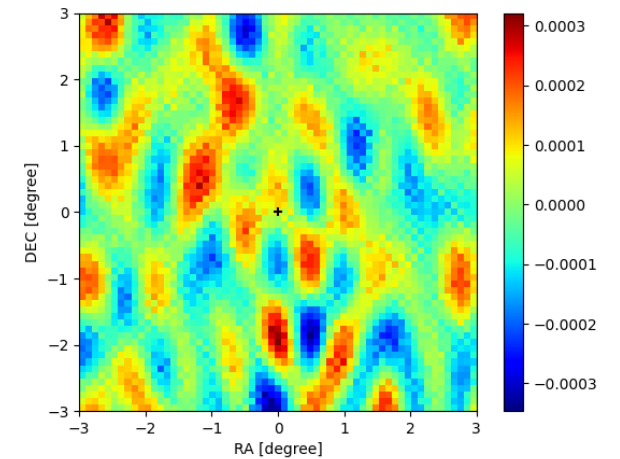
ELG



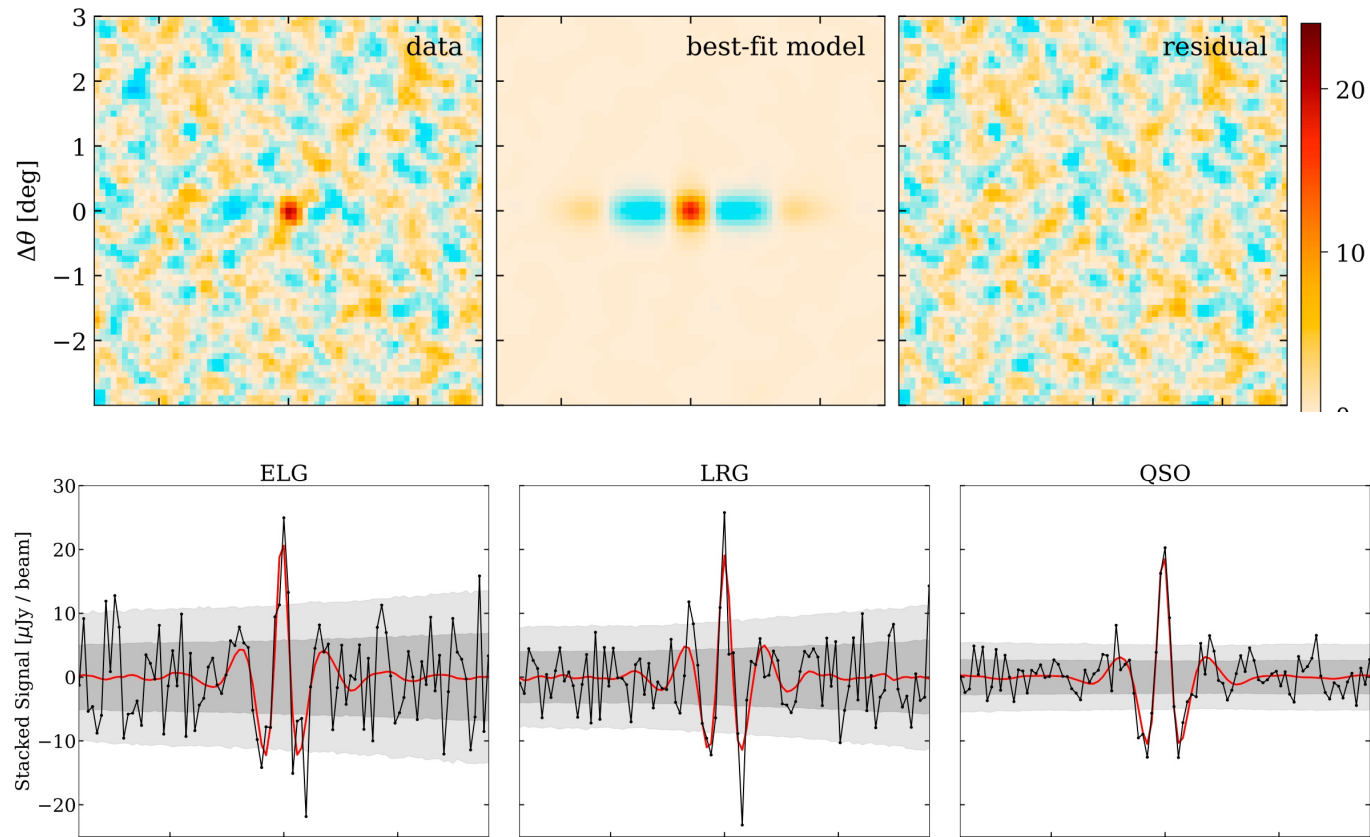
LRG



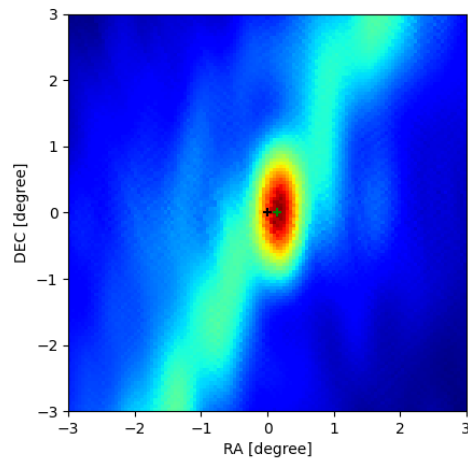
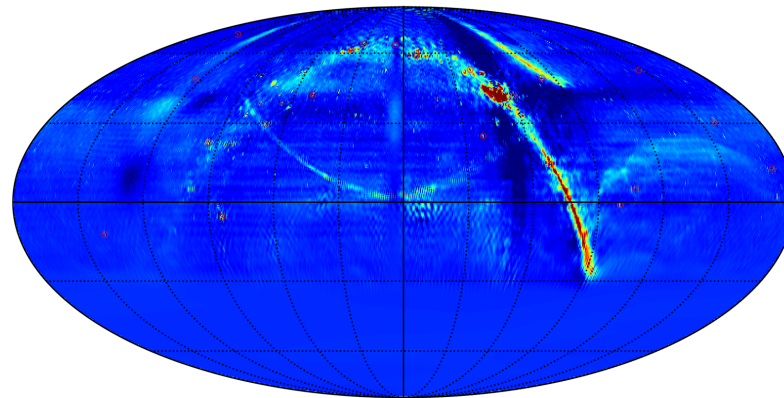
QSO



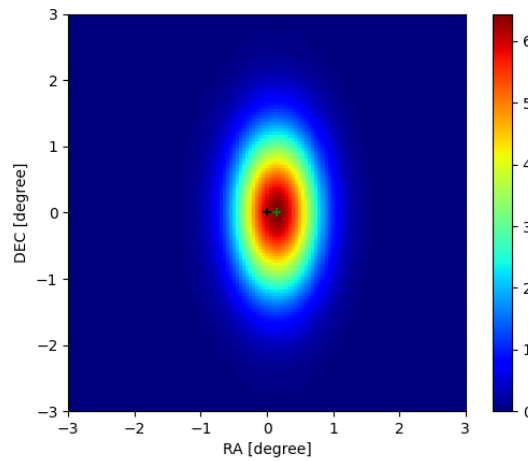
Stacking Analysis --- CHIME Results



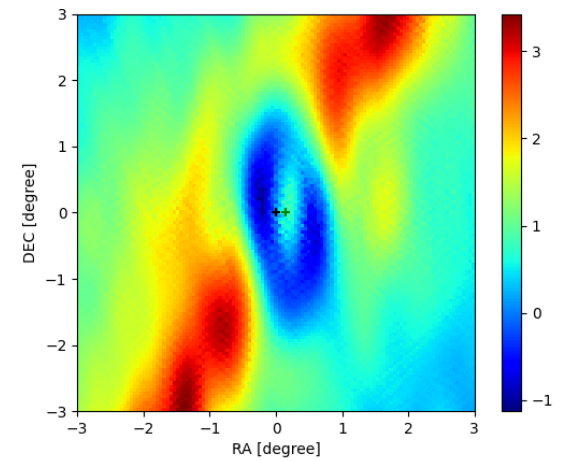
Stacking Analysis on Strong Sources



Stacked image



2D Gaussian fit



Residue