Bayesian optimal estimation techniques in radio astronomy

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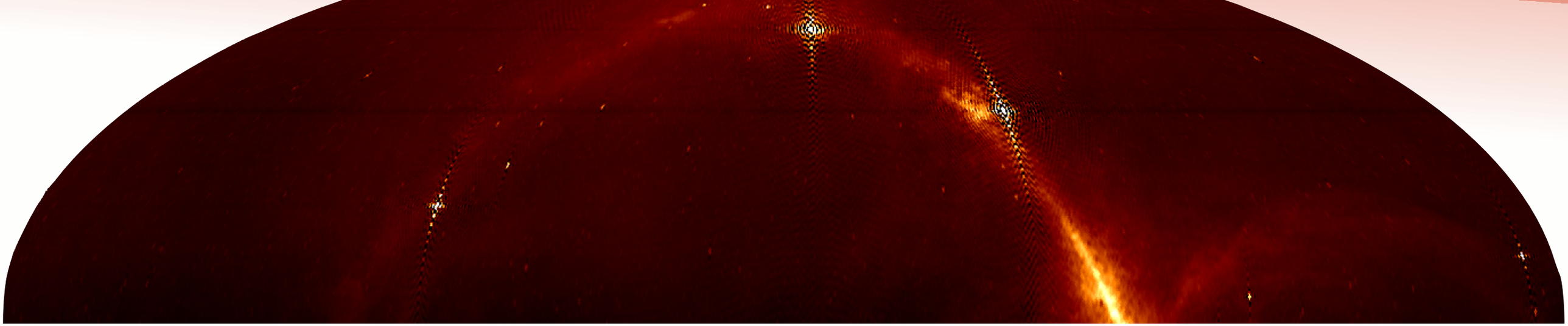
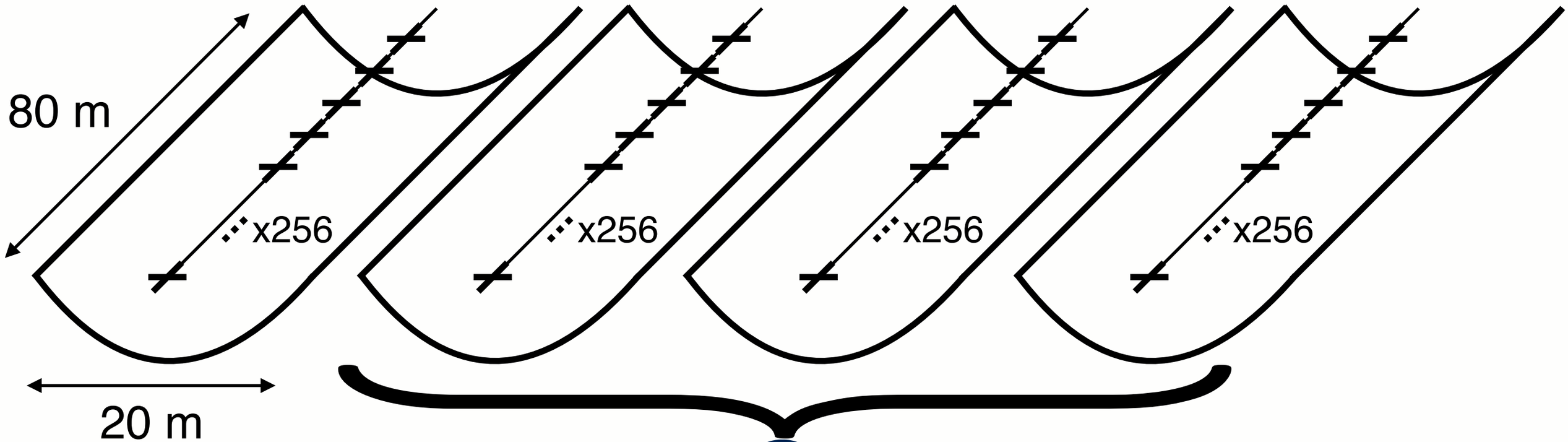
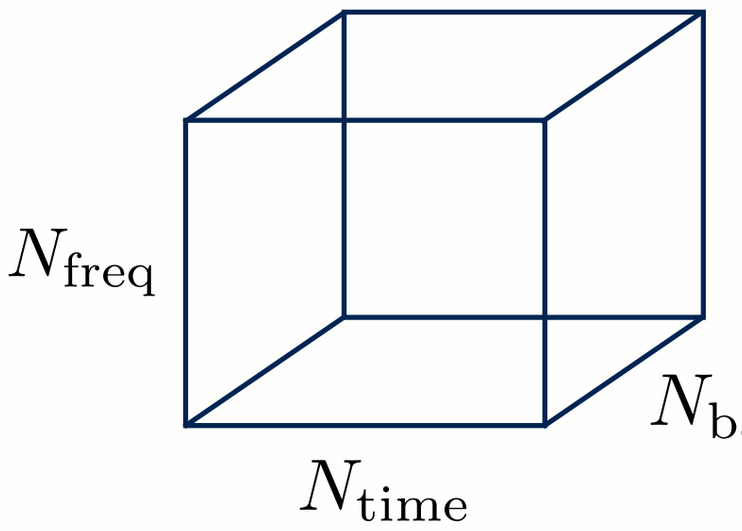
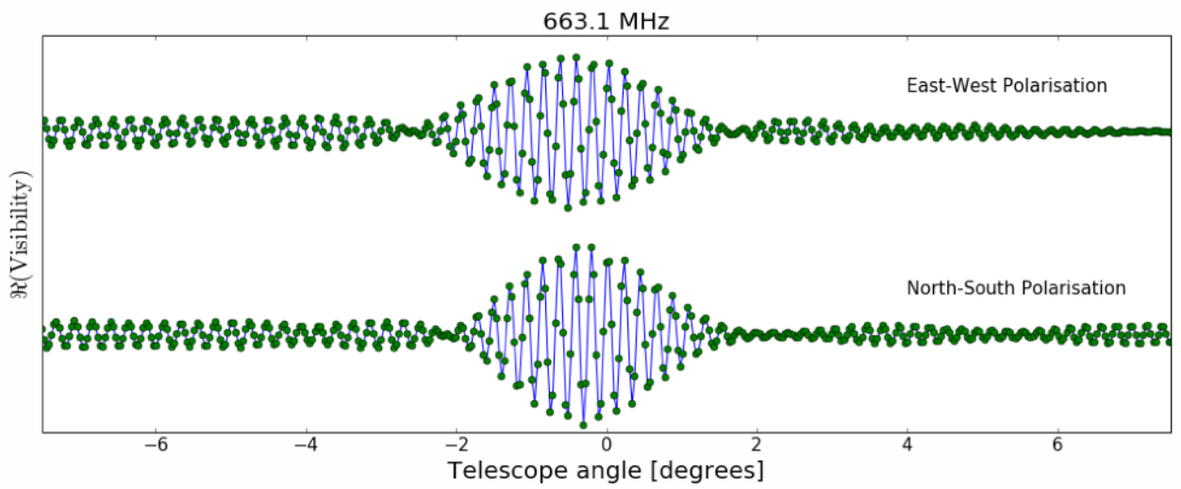



80 m
x256
x256
x256
x256
20 m
FX


N_{freq}
$N_{\text{baselines (pairs)}}$
N_{time}

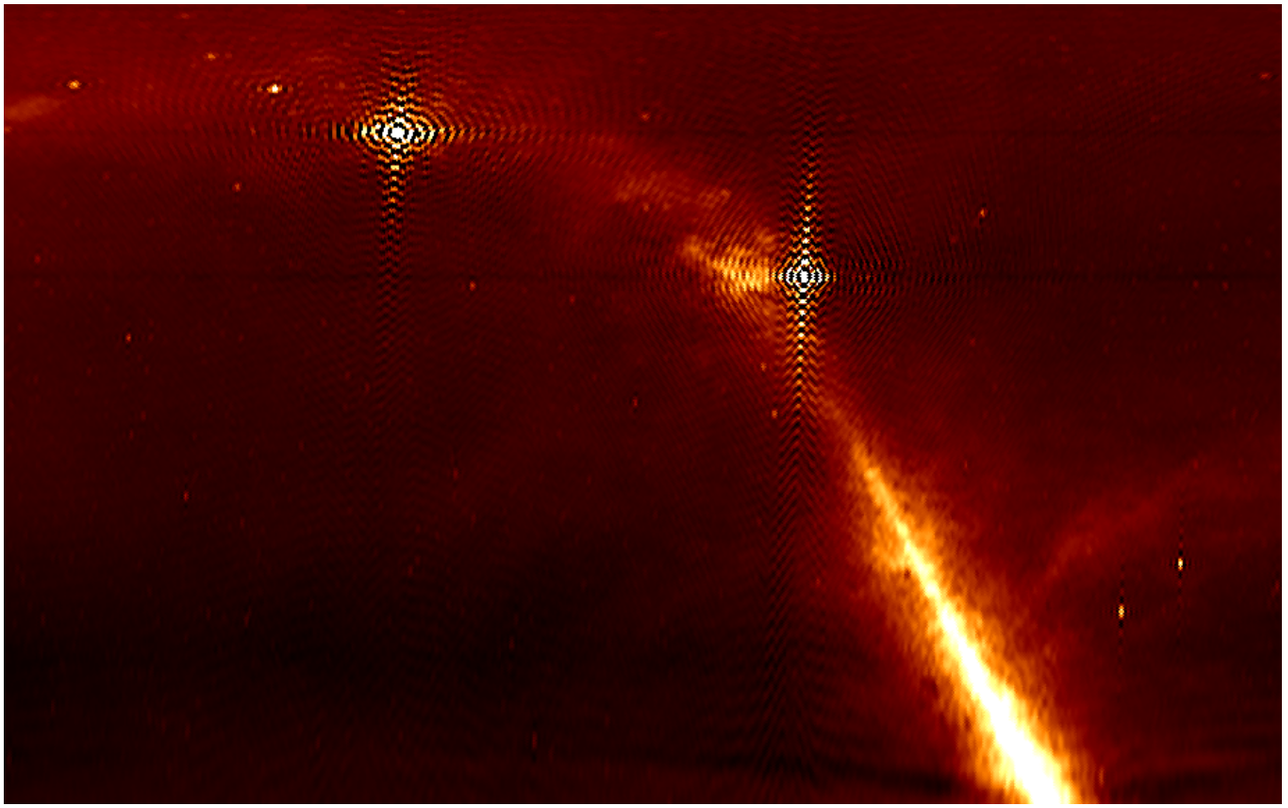

663.1 MHz
East-West Polarisation
North-South Polarisation
ℜ(Visibility)
−6
−4
−2
0
2
4
6
Telescope angle [degrees]

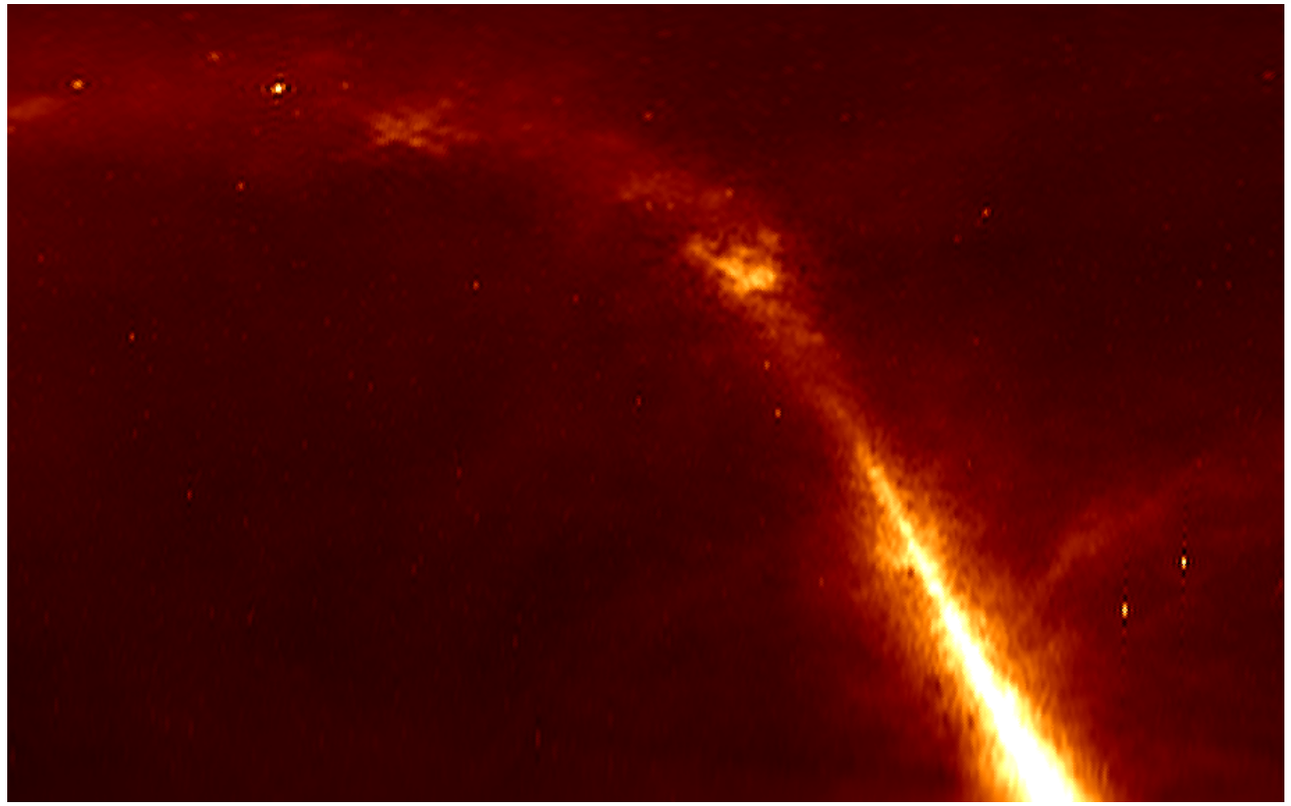
$$d = B(s_{\rm signal} + s_{\rm foreground}) + n$$

singular!

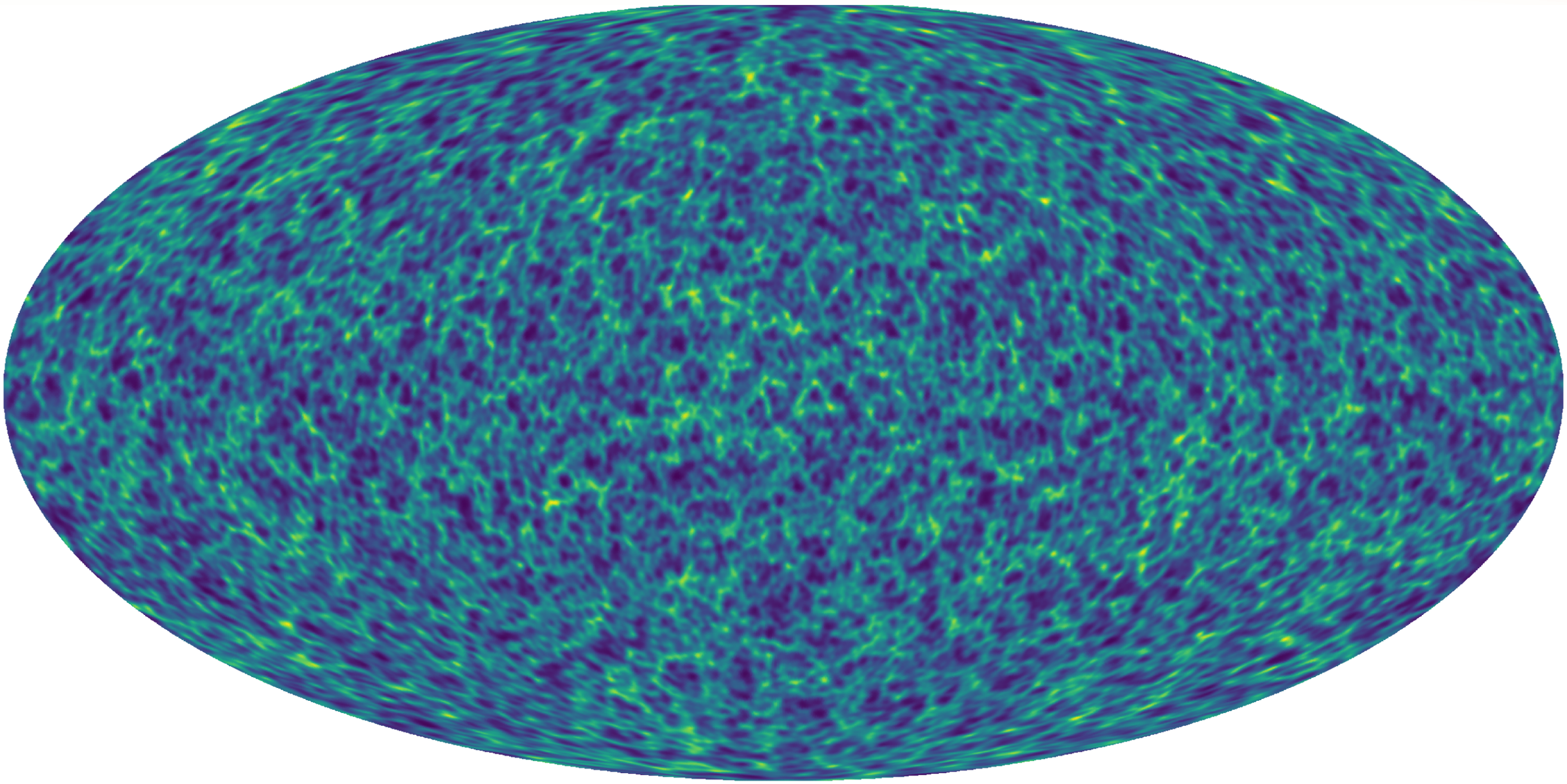
$$\hat{s}_{\rm signal} = S_{\rm signal} B^\dagger \left(N^{-1} + B S_{\rm signal} B^\dagger + B S_{\rm foreground} B^\dagger \right)^{-1} d$$

$$(N_{\rm freq} \times N_{\rm baseline} \times N_{\rm time})^2$$





$$z = 0.5, \delta\nu = 3.9\ MHz$$



0 $\delta T_b\ [K]$ 6x10^{-7}