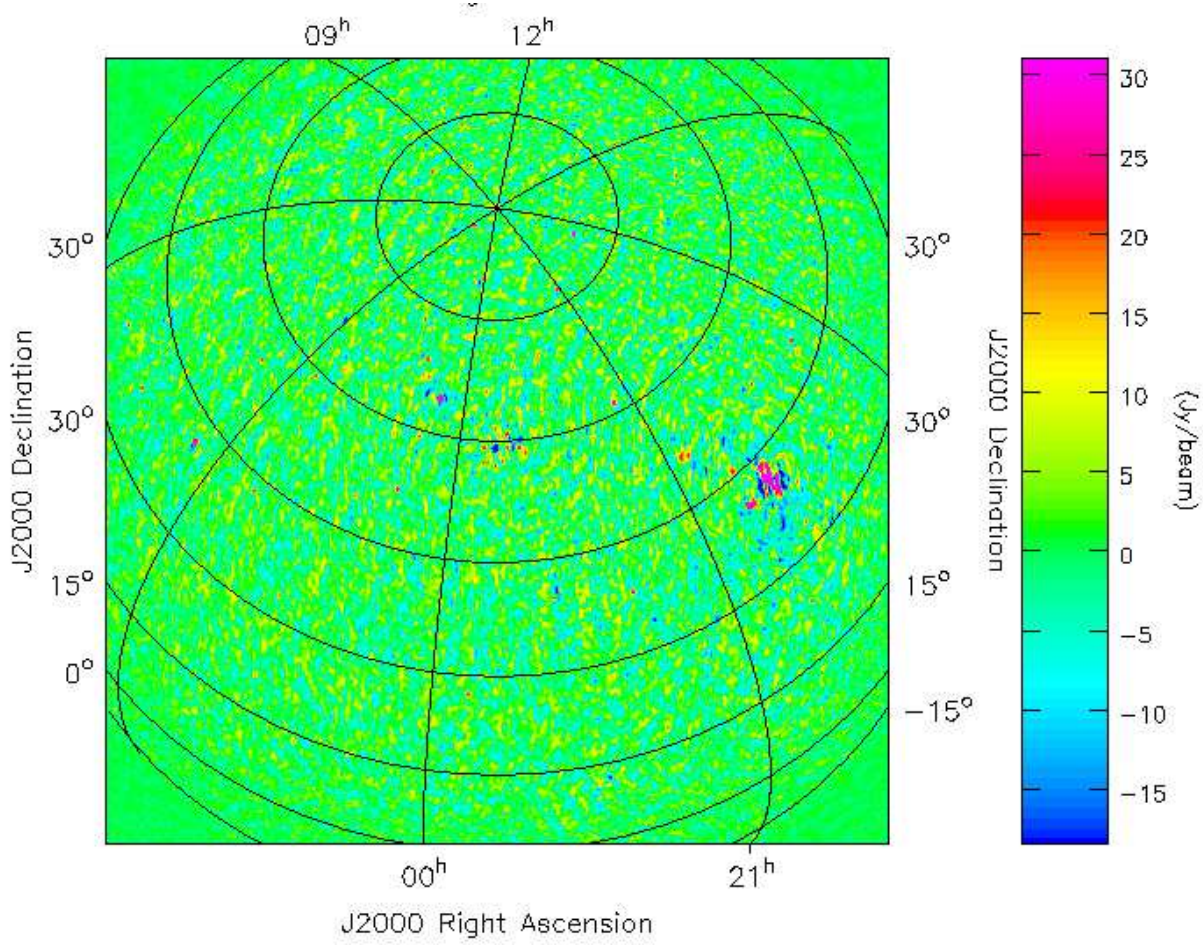
LOFAR CS1

Calibration and Imaging

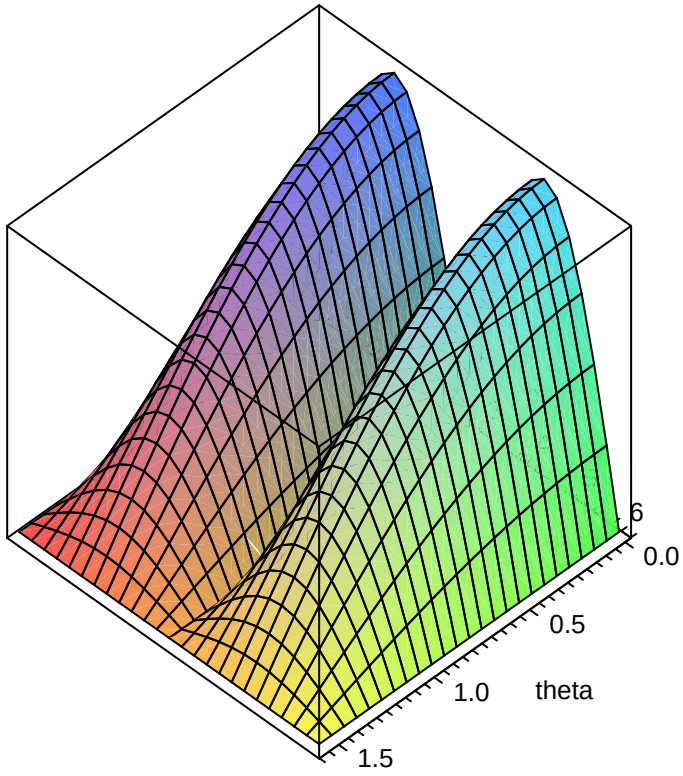
(cont.)

You've seen this!

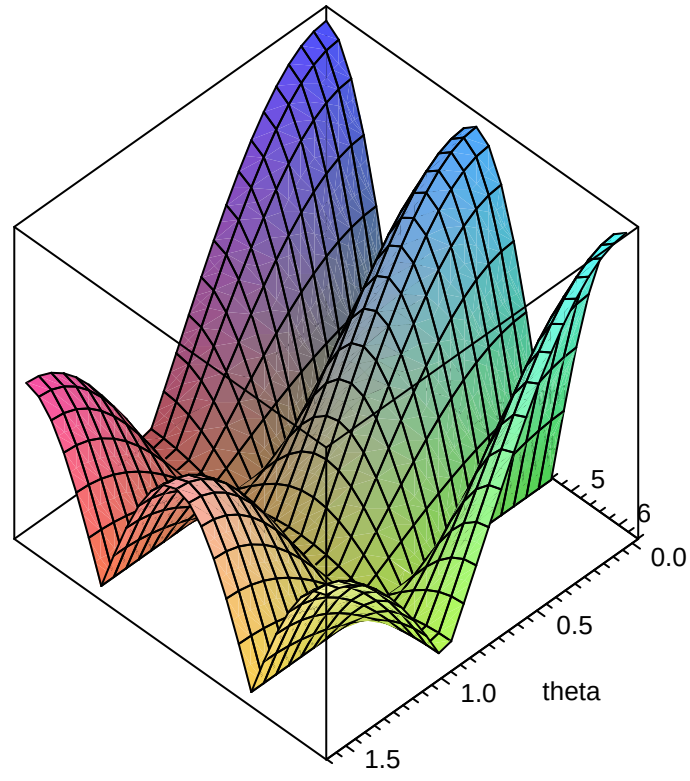


L2007_01576, subbands 2,3,4,5

Droopy Dipole Beam



$|E_\phi|$



$|E_\theta|$

Linear thin finite length wire antenna, far field, sinusoidal current distribution

Data Correction

Noisy $\mathbf{J}$ Jones solution using $\mathbf{J}^{-1}$, but $\mathbf{J}$ can be singular.
Consider a linear system:

$$\mathbf{y} = \mathbf{A}\mathbf{x} + \mathbf{n}$$

Zero Forcing correction

$$\hat{\mathbf{x}}_{ZF} = \mathbf{A}^{-1}\mathbf{y}$$

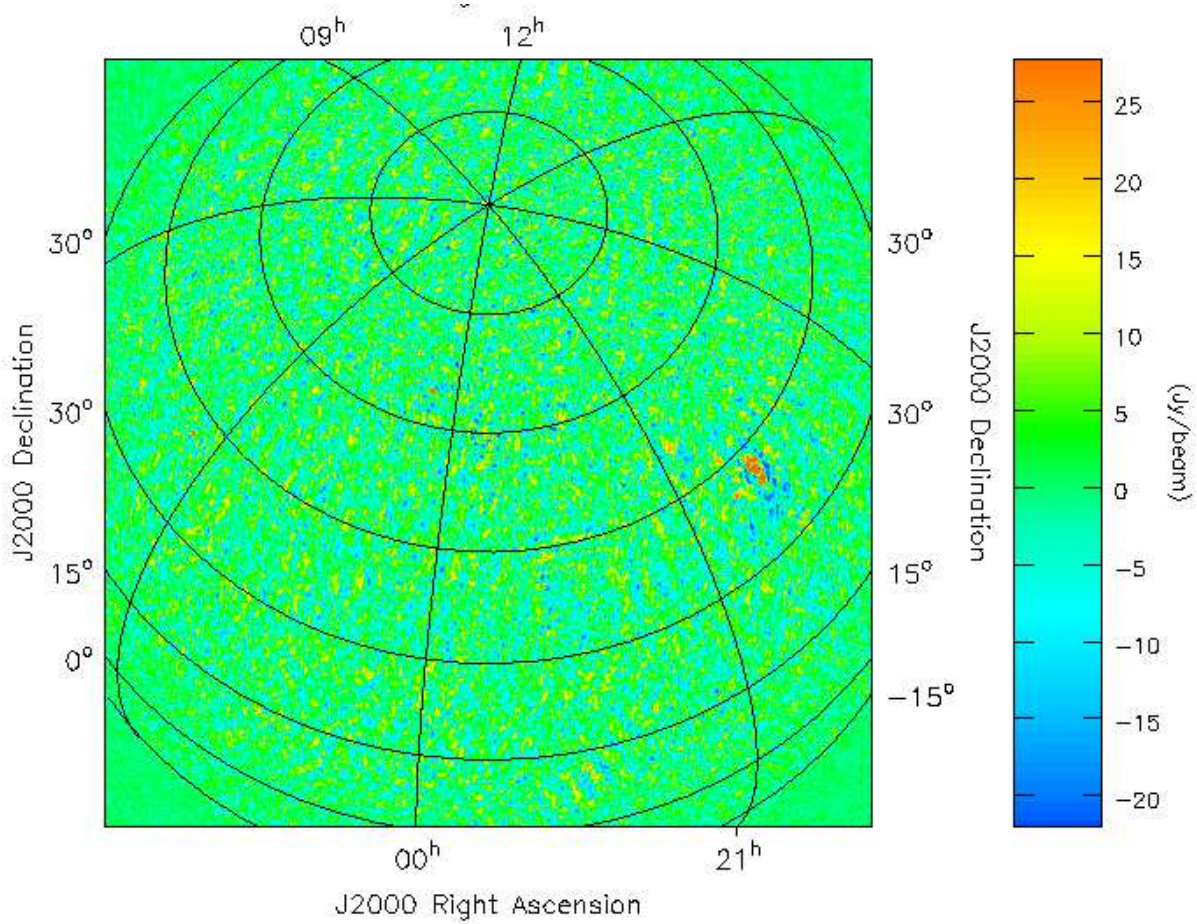
Minimum Mean Squared Error (MMSE) correction

$$\hat{\mathbf{x}}_{MMSE} = (\mathbf{A} + \mathbf{R}_{nn})^{-1}\mathbf{y}, \;\; \mathbf{R}_{nn} = E\{\mathbf{n}\mathbf{n}^H\}$$

Also we can flag by condition number $cond(\mathbf{J})$

$$cond(\mathbf{J}) = ||\mathbf{J}^{-1}|| \times ||\mathbf{J}||$$

MMSE correction 5% data



L2007_01576, subbands 4,5 (5%)