

CS1 Calibration

Here Comes the Sun

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Measurement Equation

Assume Sun to be circularly polarized, and beams to be identical.
Visibilities seen by baseline $p - q$

$$\begin{aligned} & \begin{bmatrix} XX & XY \\ YX & YY \end{bmatrix}_{pq} = \begin{bmatrix} g_{11,p} & 0 \\ 0 & g_{22,p} \end{bmatrix} \\ & \times \begin{bmatrix} \mathbf{E}_{\theta,x} & \mathbf{E}_{\phi,x} \\ \mathbf{E}_{\theta,y} & \mathbf{E}_{\phi,y} \end{bmatrix} \times \begin{bmatrix} I & -jV \\ jV & I \end{bmatrix} \\ & \times \begin{bmatrix} \mathbf{E}_{\theta,x} & \mathbf{E}_{\phi,x} \\ \mathbf{E}_{\theta,y} & \mathbf{E}_{\phi,y} \end{bmatrix}^H \times \begin{bmatrix} g_{11,q} & 0 \\ 0 & g_{22,q} \end{bmatrix}^H \end{aligned}$$

Measurement Equation

$$\begin{bmatrix} XX & XY \\ YX & YY \end{bmatrix}_{pq} = \begin{bmatrix} g_{11,p} & 0 \\ 0 & g_{22,p} \end{bmatrix}$$

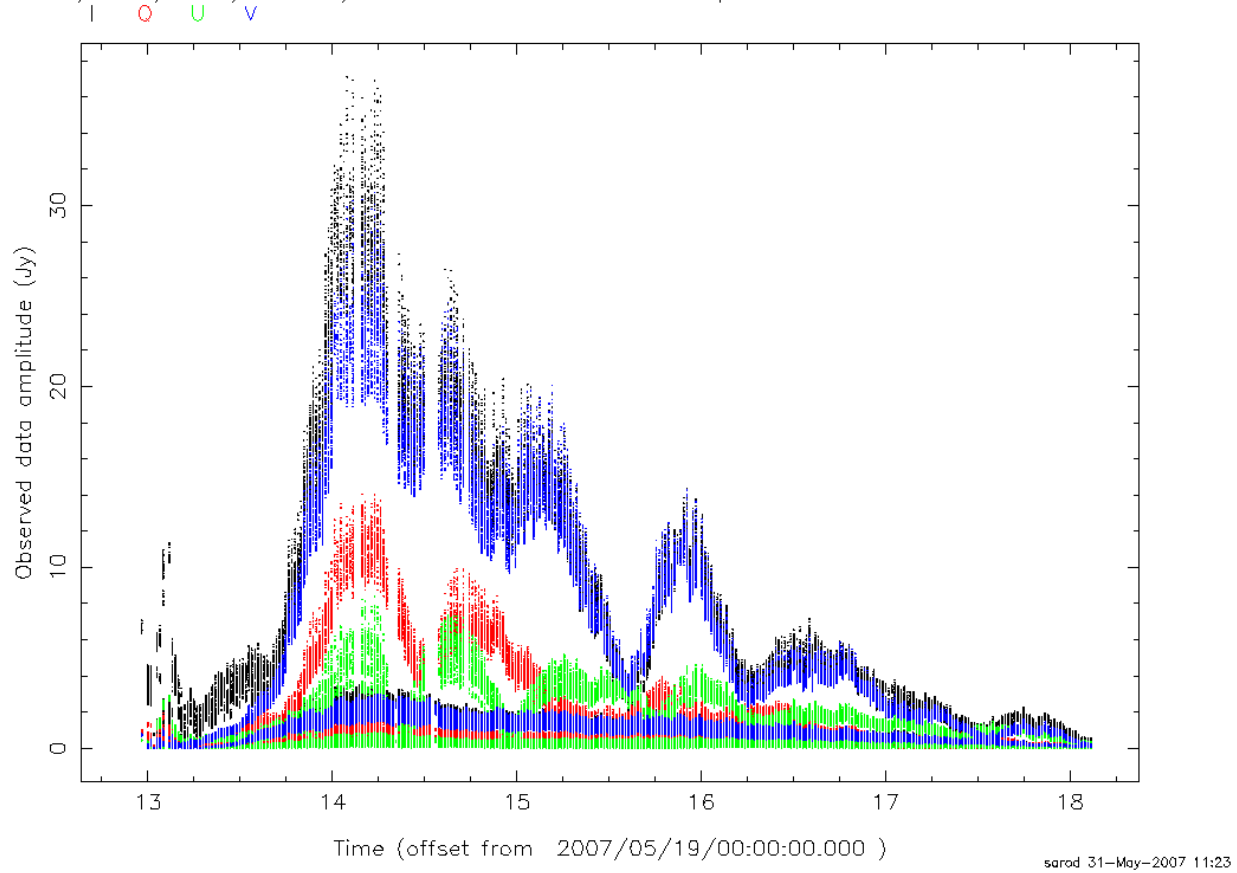
$$\times \begin{bmatrix} I(|\mathbf{E}_{\theta,x}|^2 + |\mathbf{E}_{\phi,x}|^2) & I(\mathbf{E}_{\theta,y}^* \mathbf{E}_{\theta,x} + \mathbf{E}_{\phi,y}^* \mathbf{E}_{\phi,x}) \\ +jV(\mathbf{E}_{\theta,x}^* \mathbf{E}_{\phi,x} - \mathbf{E}_{\theta,x} \mathbf{E}_{\phi,x}^*) & +jV(\mathbf{E}_{\theta,y}^* \mathbf{E}_{\phi,x} - \mathbf{E}_{\phi,y}^* \mathbf{E}_{\theta,x}) \\ I(\mathbf{E}_{\theta,x}^* \mathbf{E}_{\theta,y} + \mathbf{E}_{\phi,x}^* \mathbf{E}_{\phi,y}) & I(|\mathbf{E}_{\theta,y}|^2 + |\mathbf{E}_{\phi,y}|^2) \\ +jV(\mathbf{E}_{\theta,x}^* \mathbf{E}_{\phi,y} - \mathbf{E}_{\phi,x}^* \mathbf{E}_{\theta,y}) & +jV(\mathbf{E}_{\theta,y}^* \mathbf{E}_{\phi,y} - \mathbf{E}_{\theta,y} \mathbf{E}_{\phi,y}^*) \end{bmatrix} \times$$

$$\begin{bmatrix} g_{11,q} & 0 \\ 0 & g_{22,q} \end{bmatrix}^H$$

Beam introduces zero phase to XX and YY .

Observed

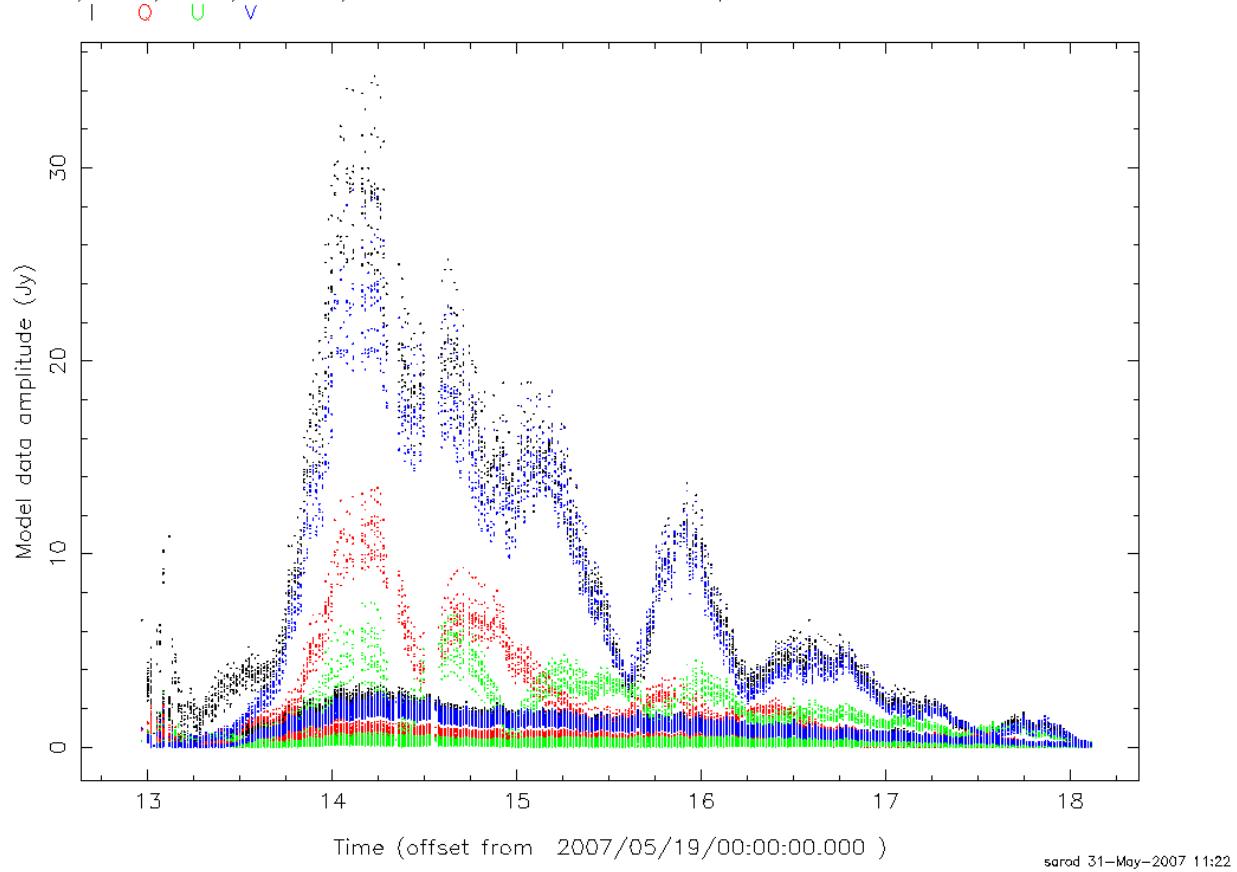
name: /home/sarod/CS1calib/L2007_02339_SB18-23_T.M5 Spectral Window: 1 Polarization: 1 Fields: BEAN



Observed Visibilities

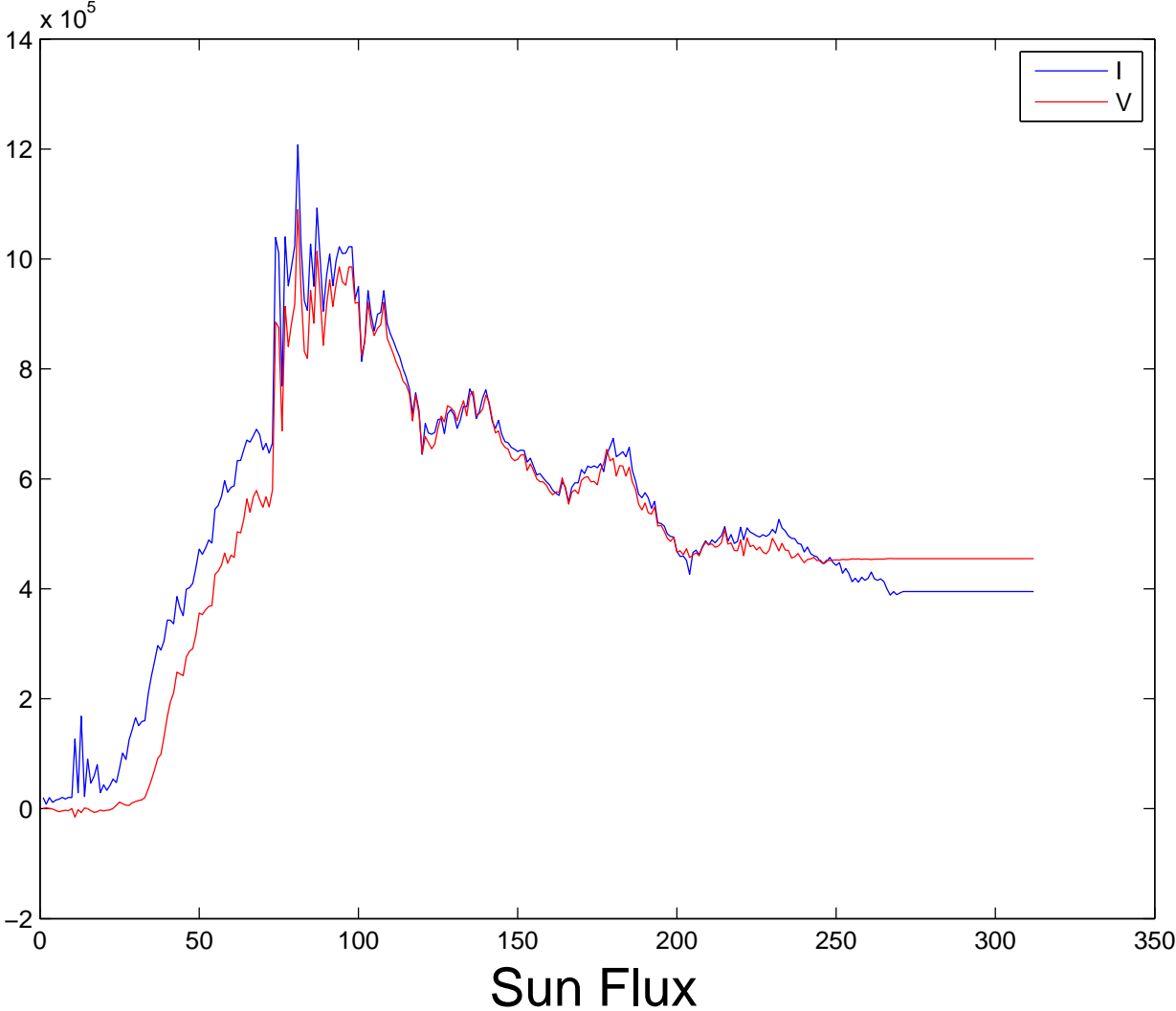
Predicted

name: /home/sarod/CS1calib/L2007_02339_SB18-23_T.M5 Spectral Window: 1 Polarization: 1 Fields: BEAN

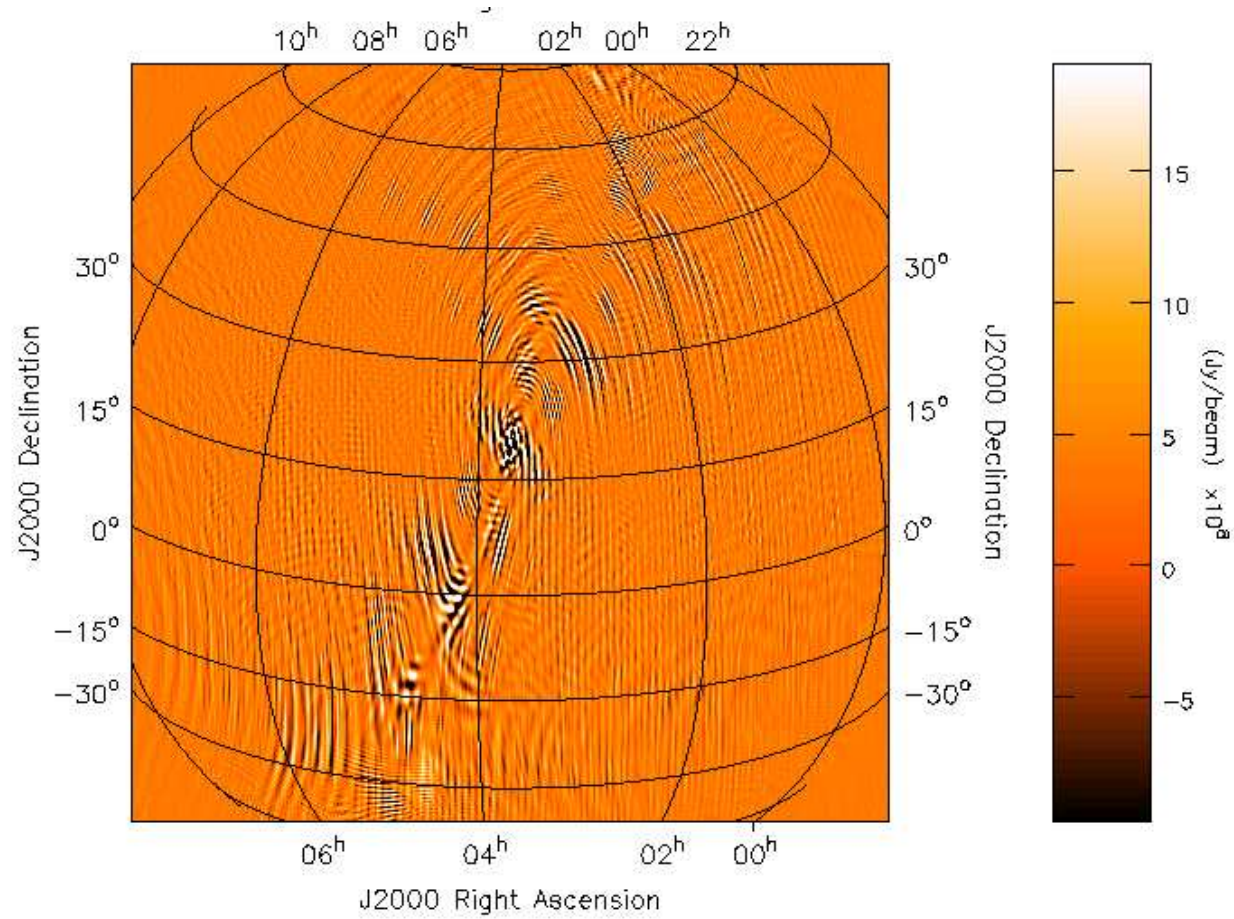


Predicted Visibilities

Sun

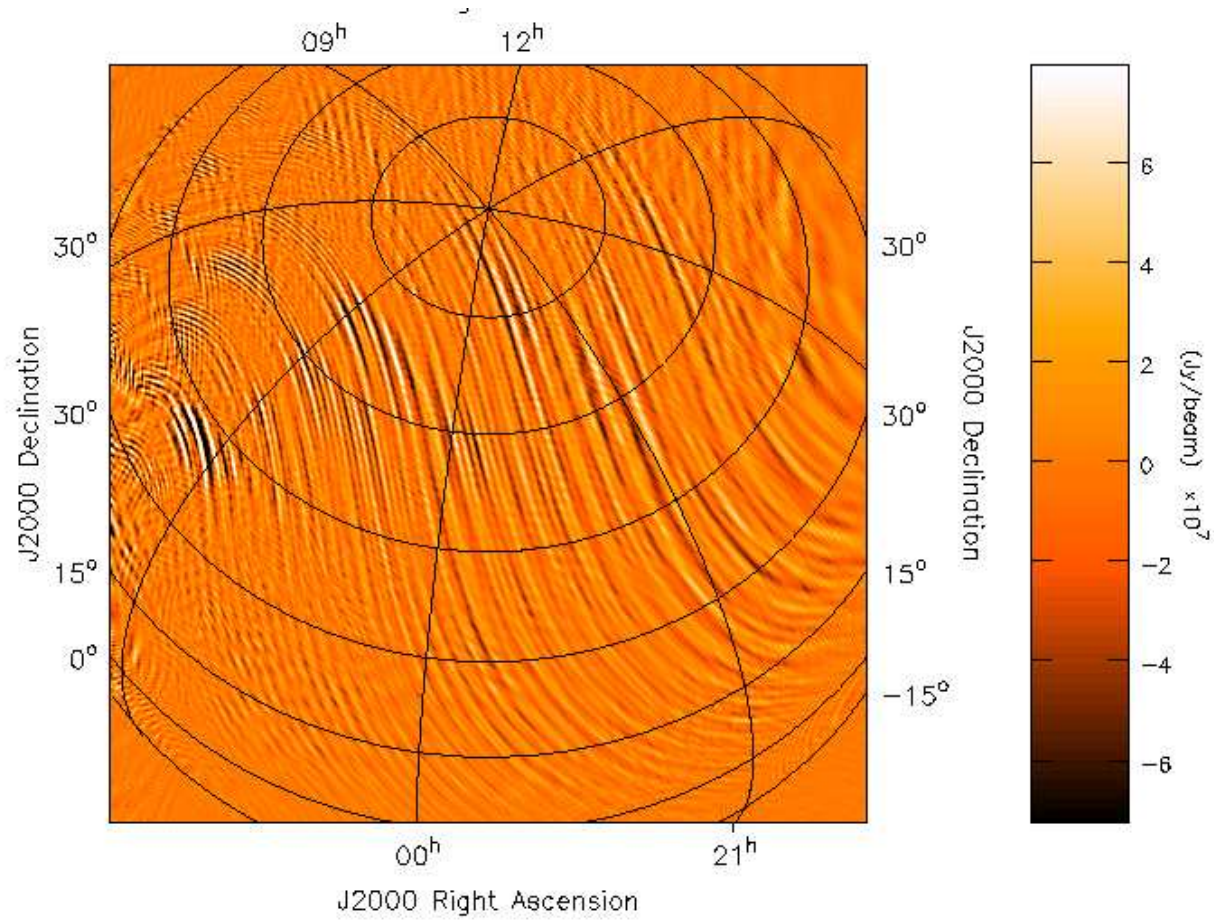


Sun



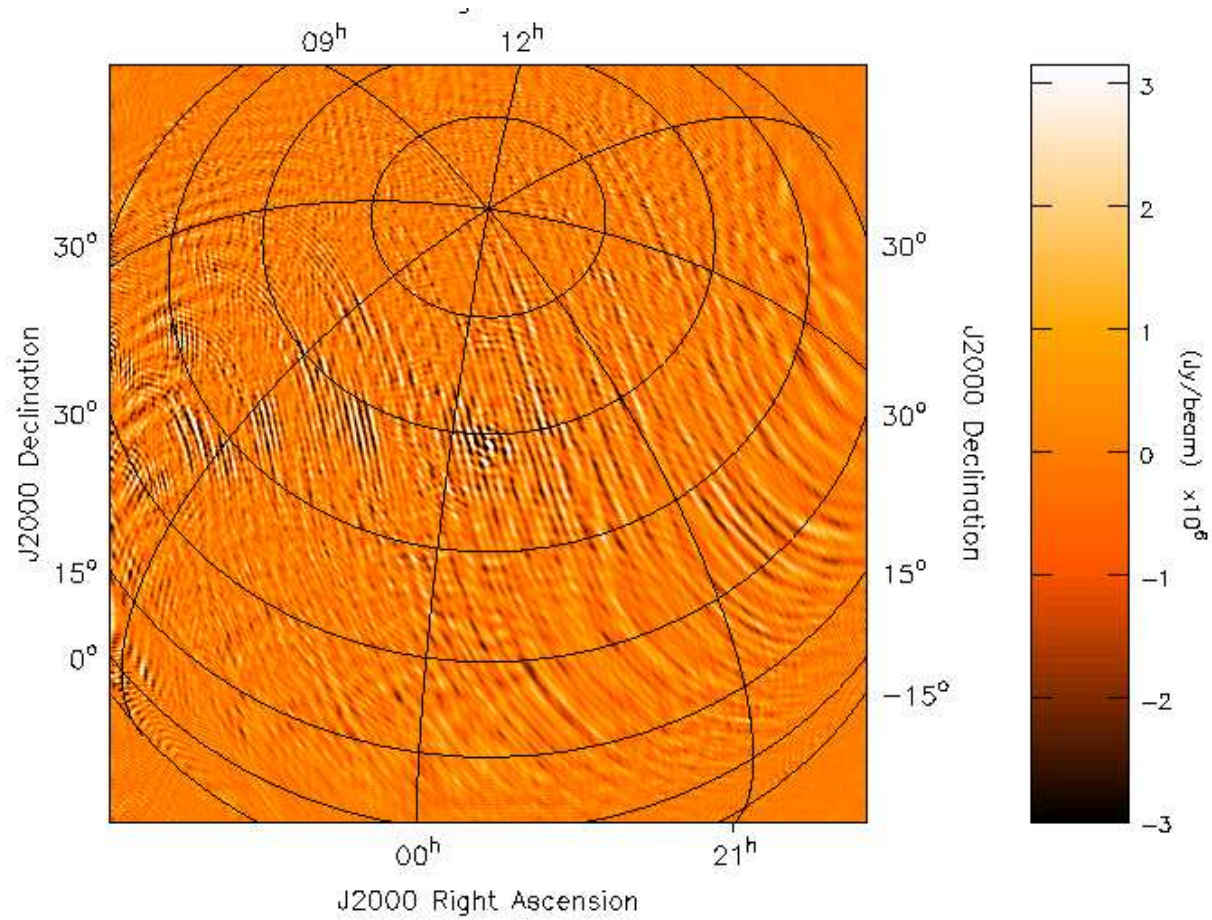
Sun (6hr data)

CasA



CasA, before Sun subtraction

CasA



CasA, after Sun subtraction