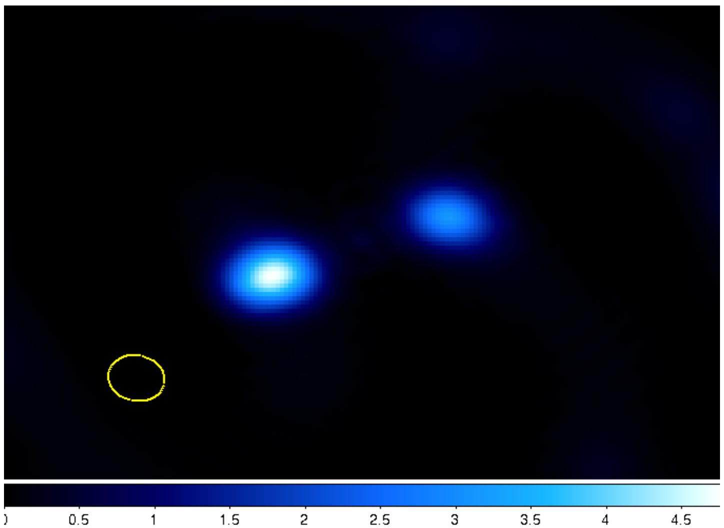
Recent observations L14319/L14473

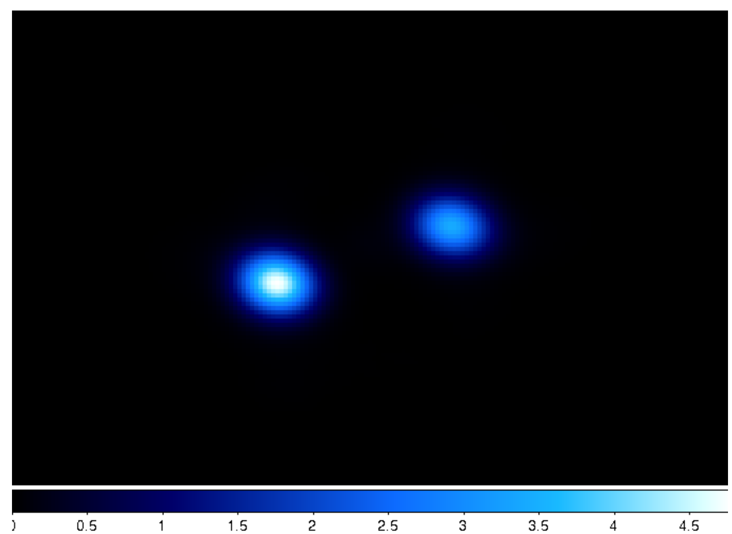
Sarod Yatawatta

CygA

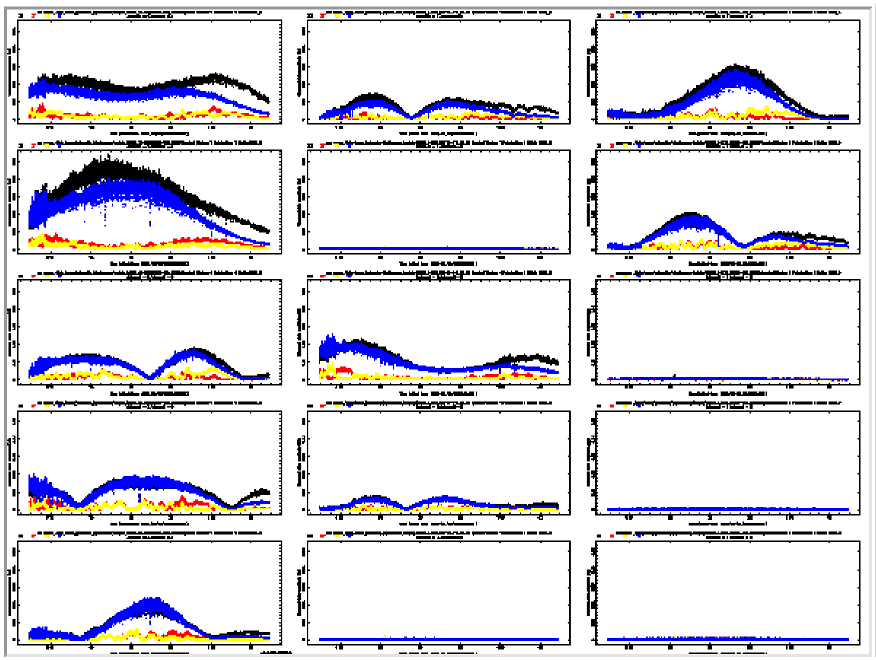


⟸ CygA image 15-30 MHz

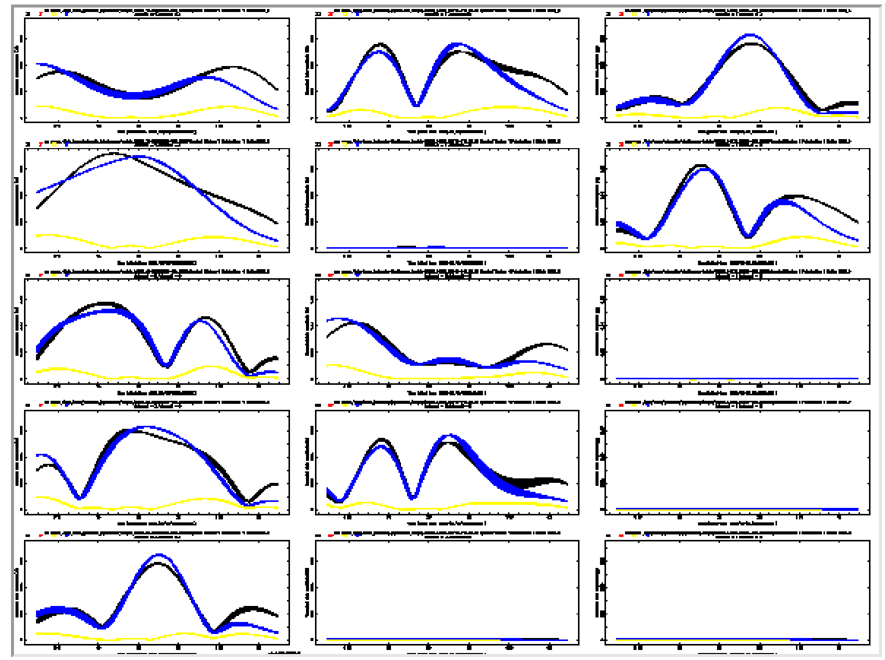
CygA model ⟹



CygA

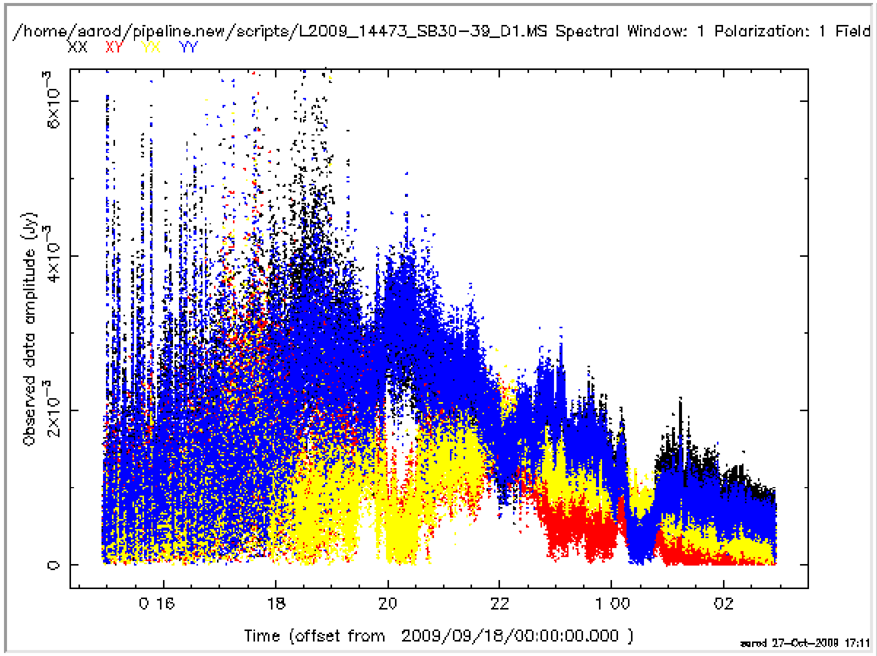


Observed 30 MHz

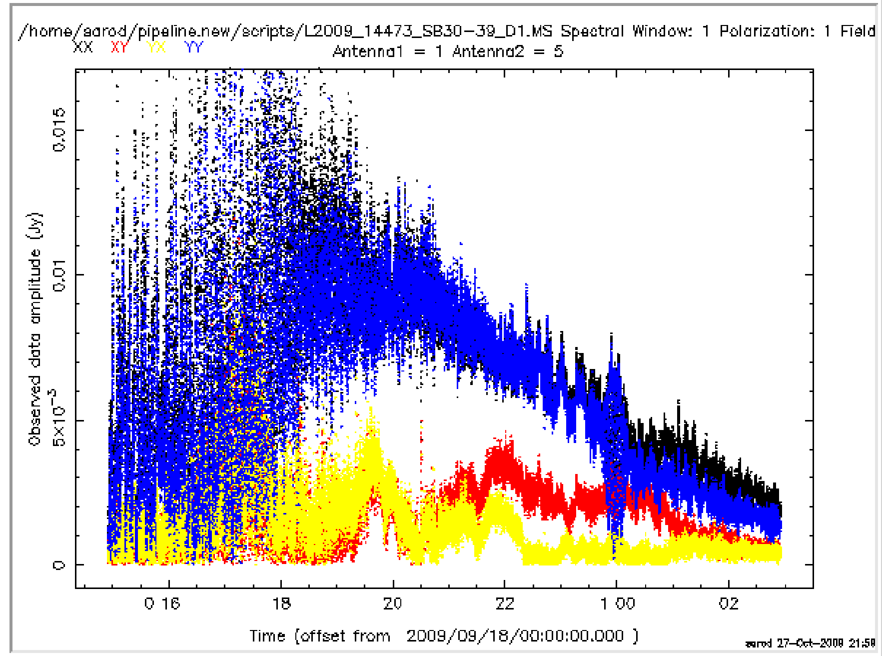


Predicted 30 MHz

CygA



Observed 16 MHz, CS302-RS208



Observed 16 MHz, CS302-RS503

Measurement Equation

$$\mathbf{V}_{pq} = \mathbf{G}_p\mathbf{E}_p\mathbf{F}_p\mathbf{C}\mathbf{F}_q^H\mathbf{E}_q^H\mathbf{G}_q^H + \mathbf{N}_{pq}$$

- ☐ $\mathbf{C}$, identity (diagonal), unpolarized source
- ☐ Faraday rotation θ

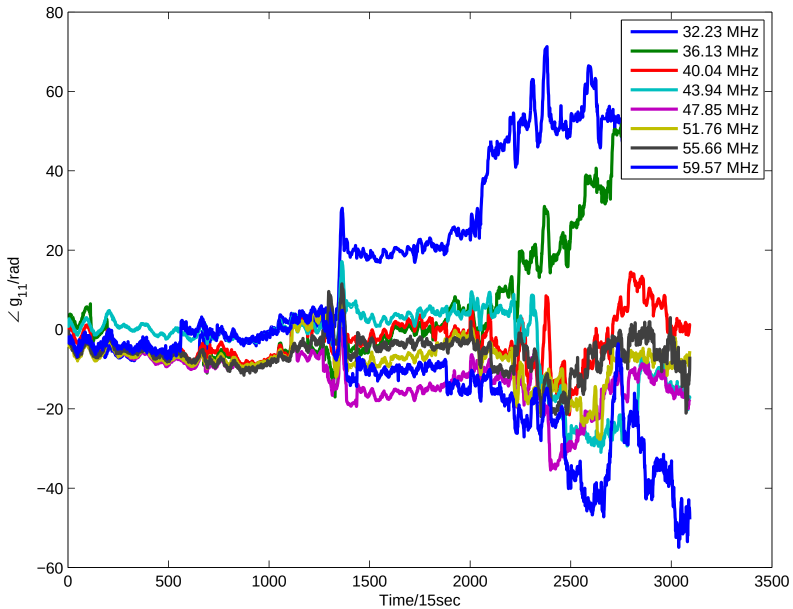
$$\mathbf{F} = \begin{bmatrix} \cos(\theta) & \sin(\theta) \\ -\sin(\theta) & \cos(\theta) \end{bmatrix}$$

- ☐ $\mathbf{E}$, LBA beam (Station+Hamaker dipole)
- ☐ Clock/Ionospheric gain/phase

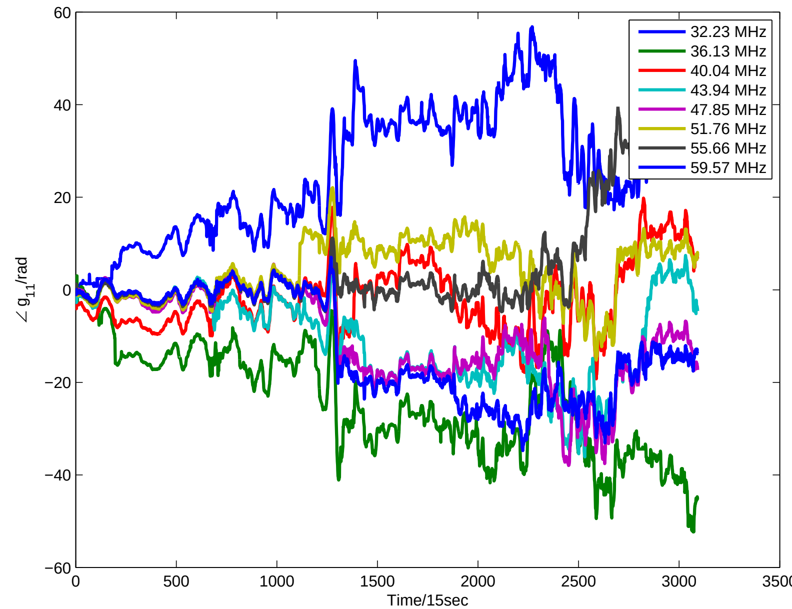
$$\mathbf{G} = \begin{bmatrix} g_{11} & 0 \\ 0 & g_{22} \end{bmatrix}$$

- ☐ Solve for $\mathbf{G}$ and θ, timescale 15/5 sec, 10 subbands (some with a frequency slope).
- ☐ Antenna 1, reference for θ.
- ☐ Constraints: $15 \times 4 \times 2 = 120$, Unknowns: $6 \times 2 \times 2 + 5 = 29$

3C196

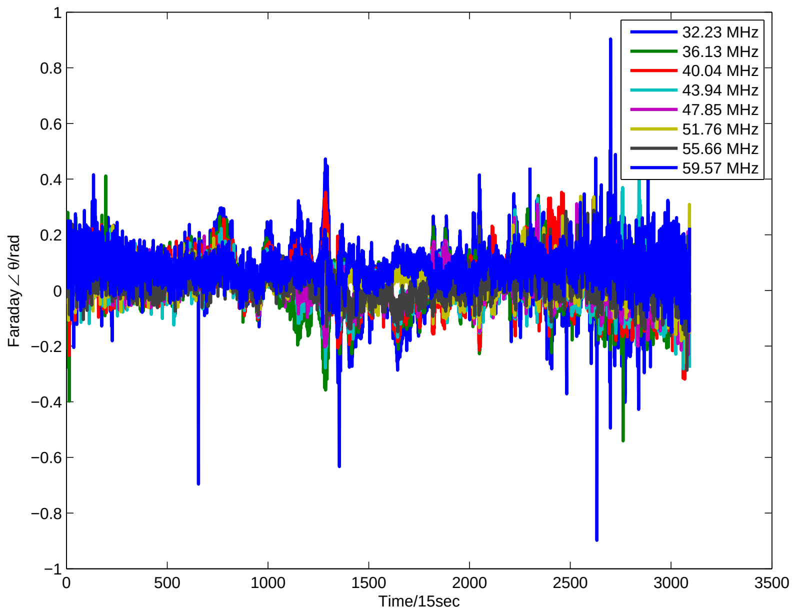


g_{11} phase for station 3

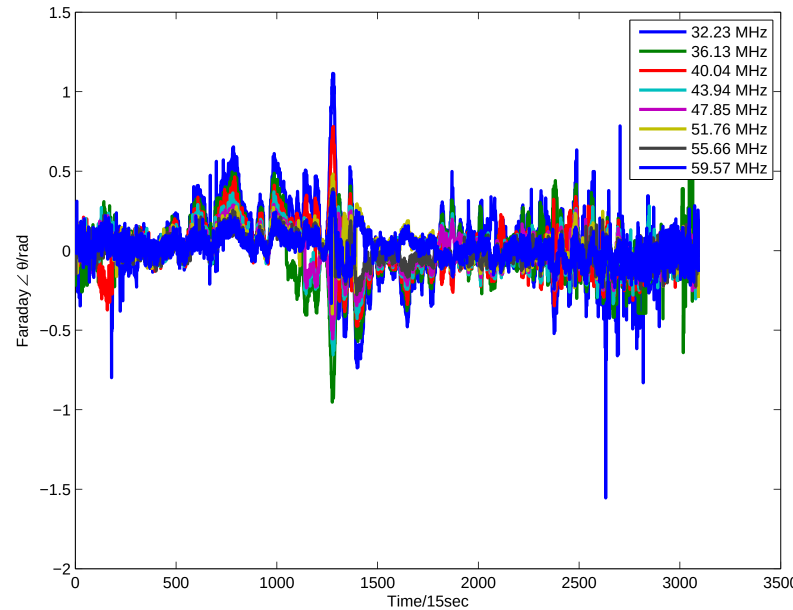


g_{11} phase for station 4

3C196

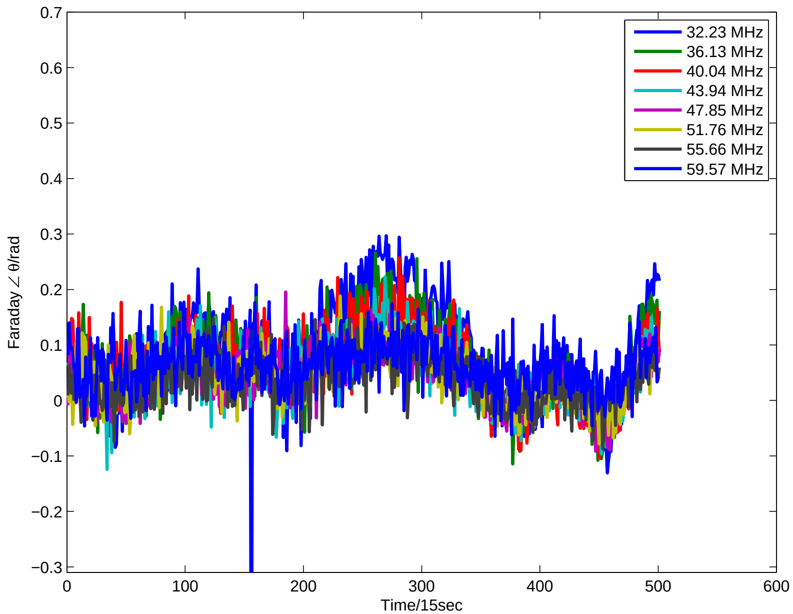


differential Faraday θ for station 3

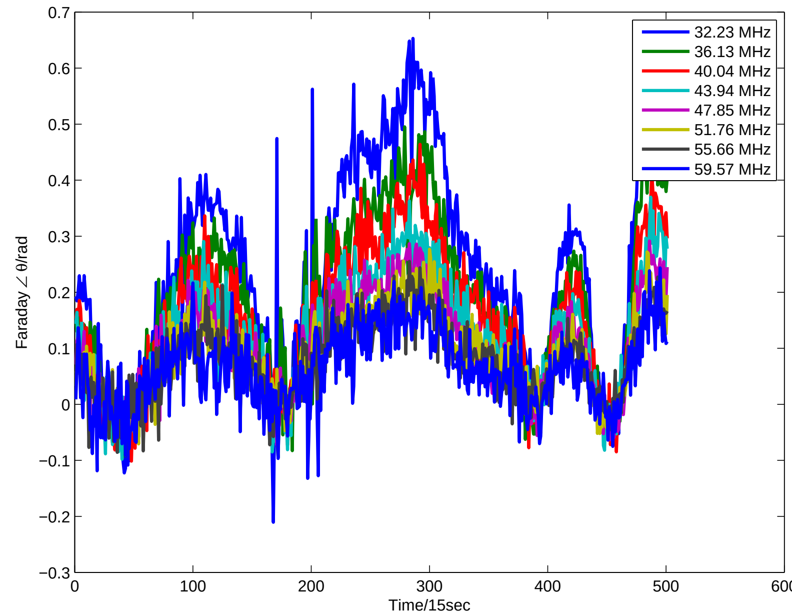


differential Faraday θ for station 4

3C196

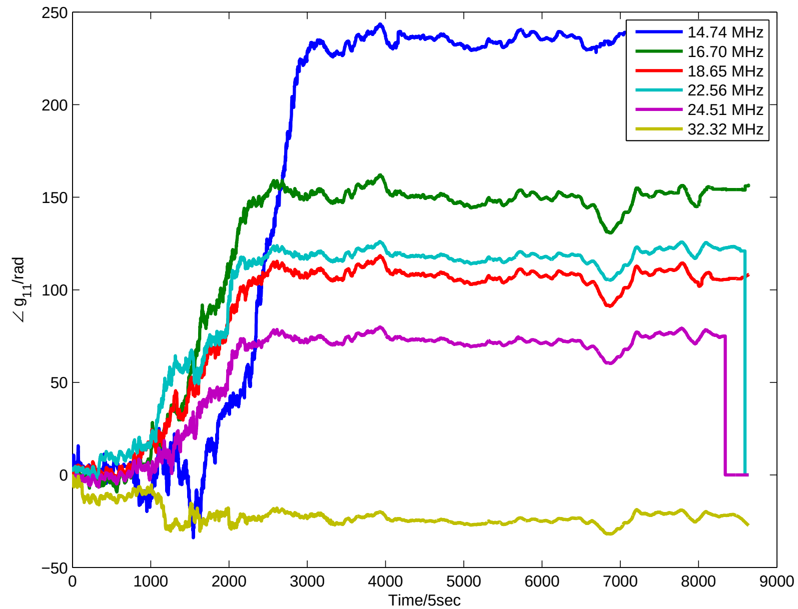


differential Faraday θ for station 3
(2 km baseline 1-3)

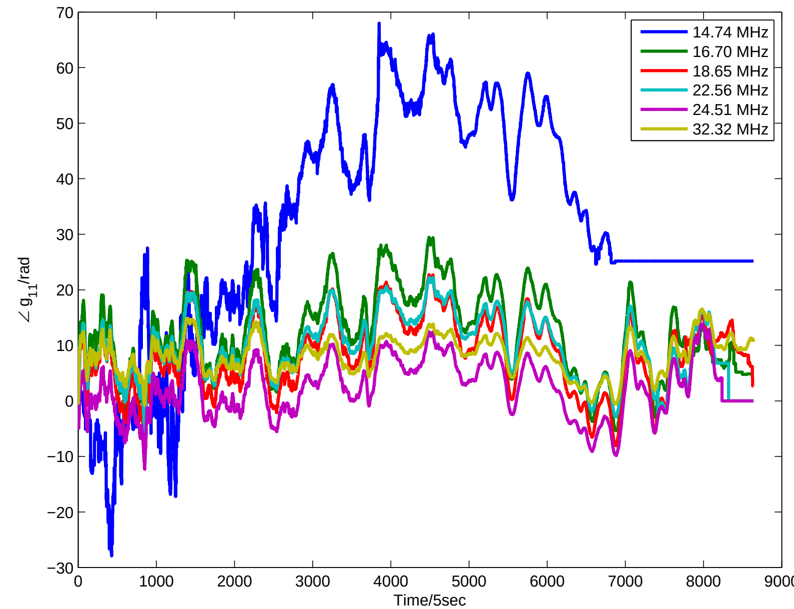


differential Faraday θ for station 4
(20 km baseline 1-4)

CygA

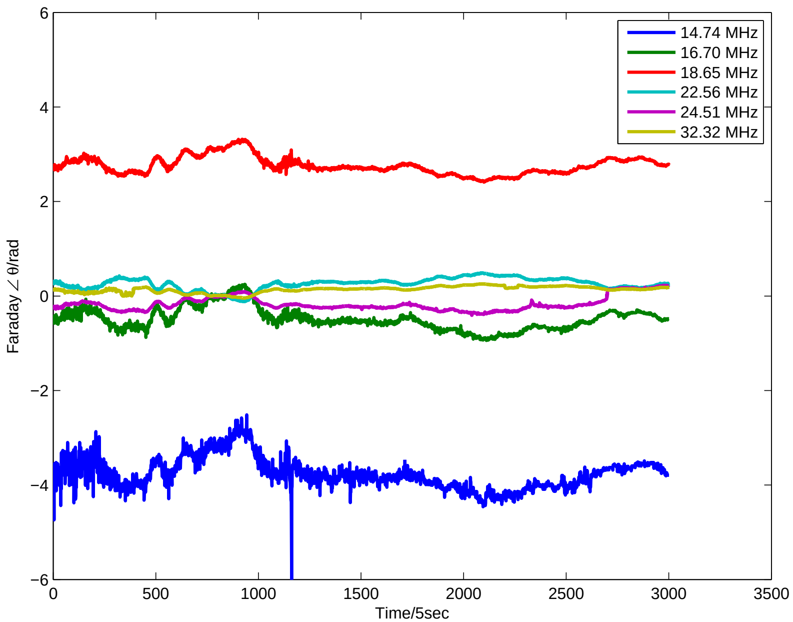


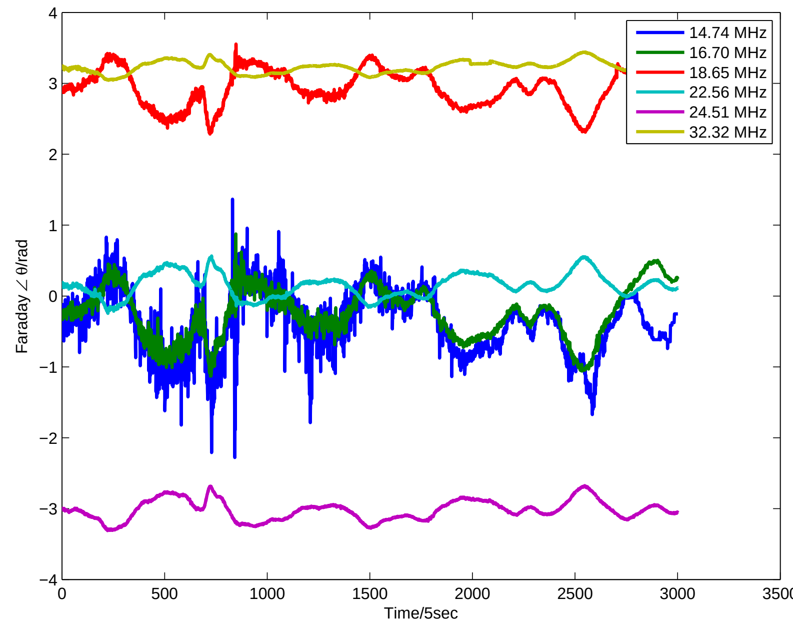
g_{11} phase for station 4 (day 1)



g_{11} phase for station 4 (day 2)

CygA





differential Faraday θ for station 4 (day 1)

differential Faraday θ for station 4 (day 2)