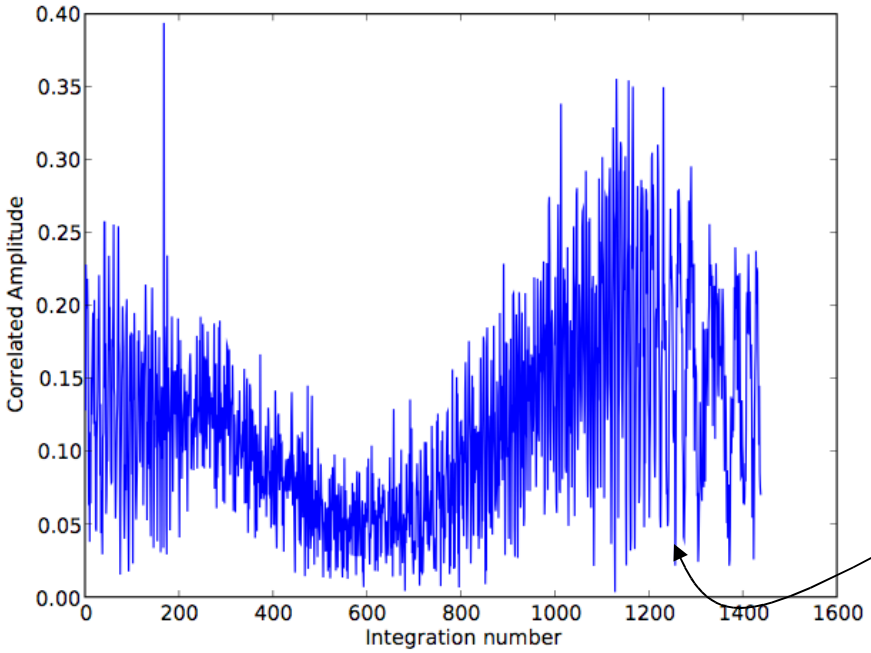
Measuring the Noise in CS1

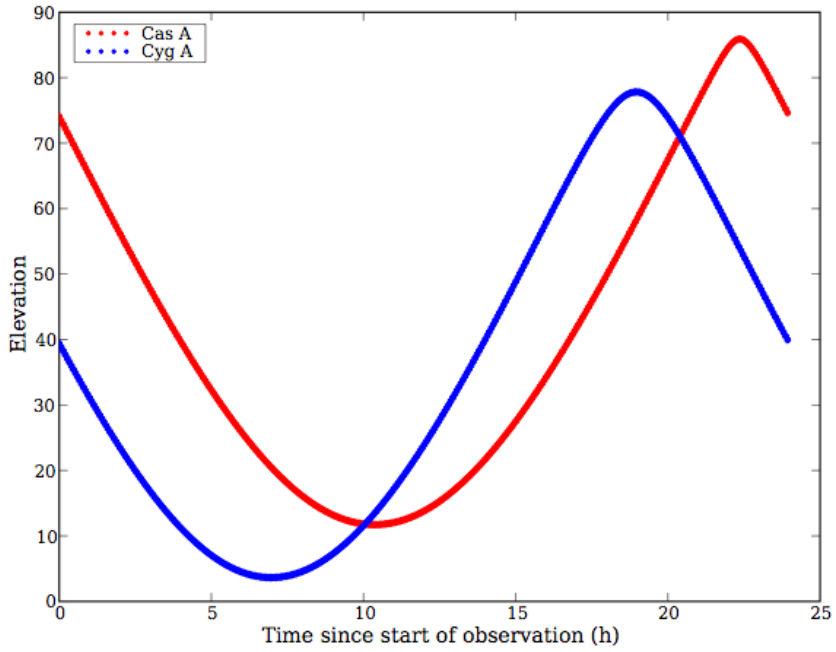
Casey Law

Q. What is the noise as a function of ν?

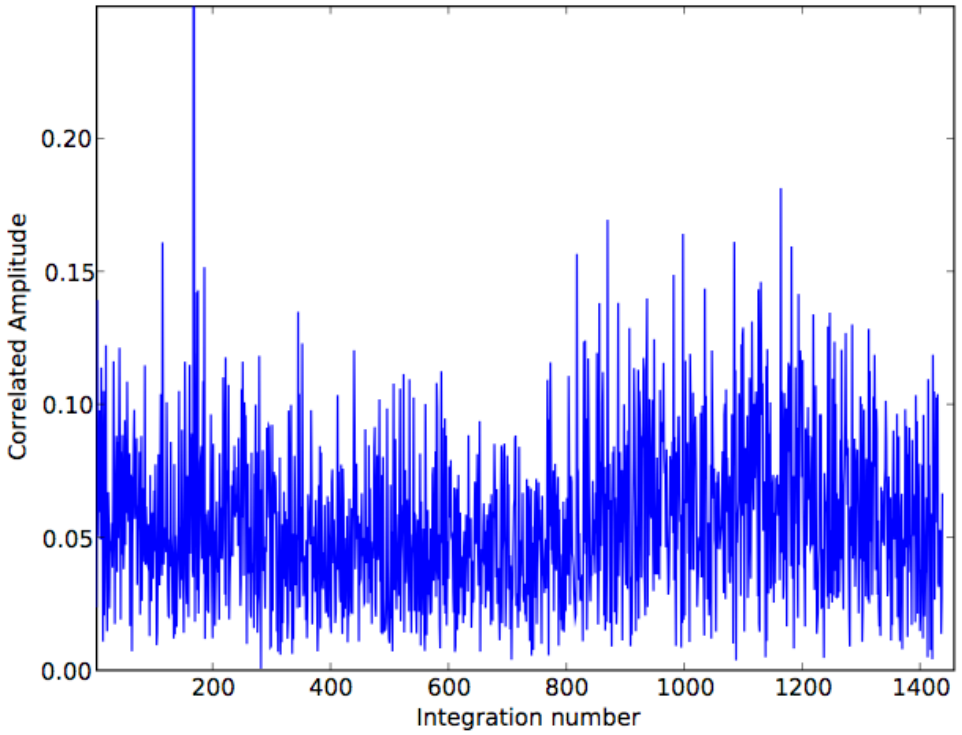
- Find good observation:
  observation # 1065 -- DPT on Cas A, 16 dipoles.

2) Observe correlation coefficients on long baseline:
   ant 0-15 has a baseline of about 200 m.
3) Observe the fringes…





- 24 hour observation (60 s integrations)
- fringes appear for Cyg A.
- brightness dominated by Cas A at ~9 hrs from start

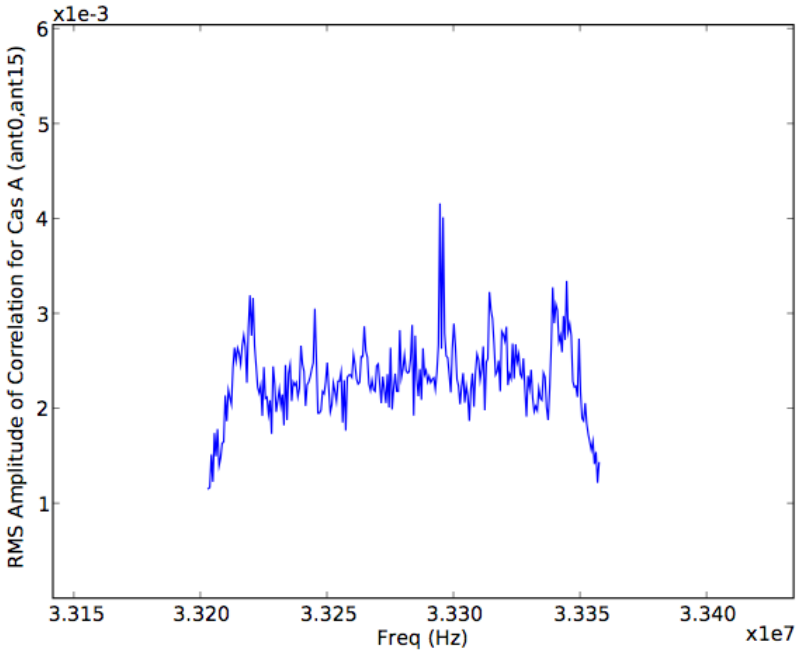


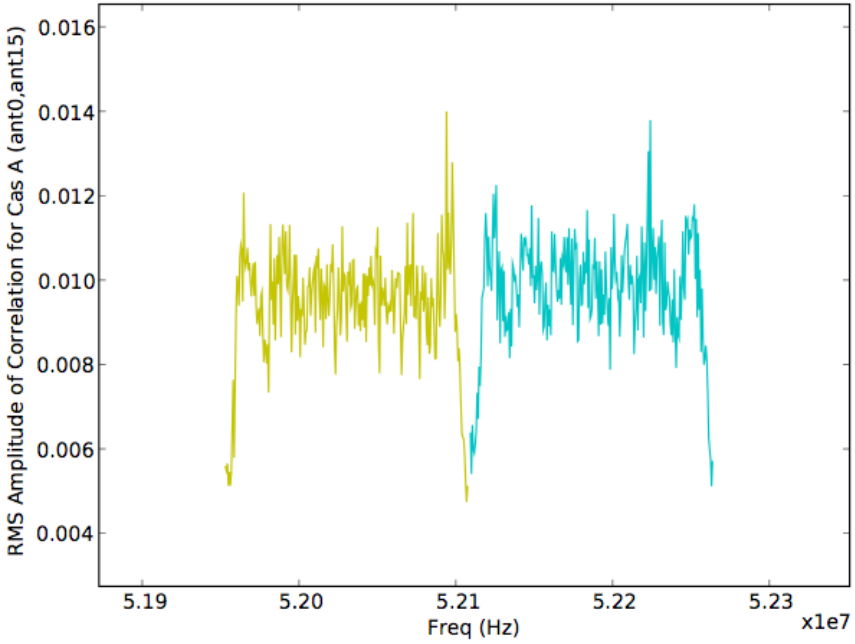
4) To remove fringes, either:

a) fit fringe

b) difference adjacent channels

← here we do difference

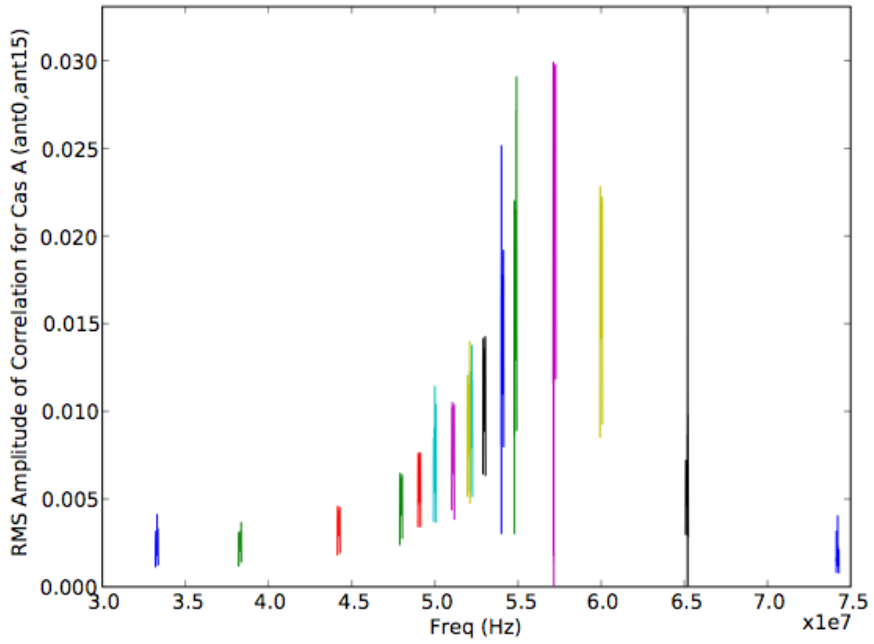


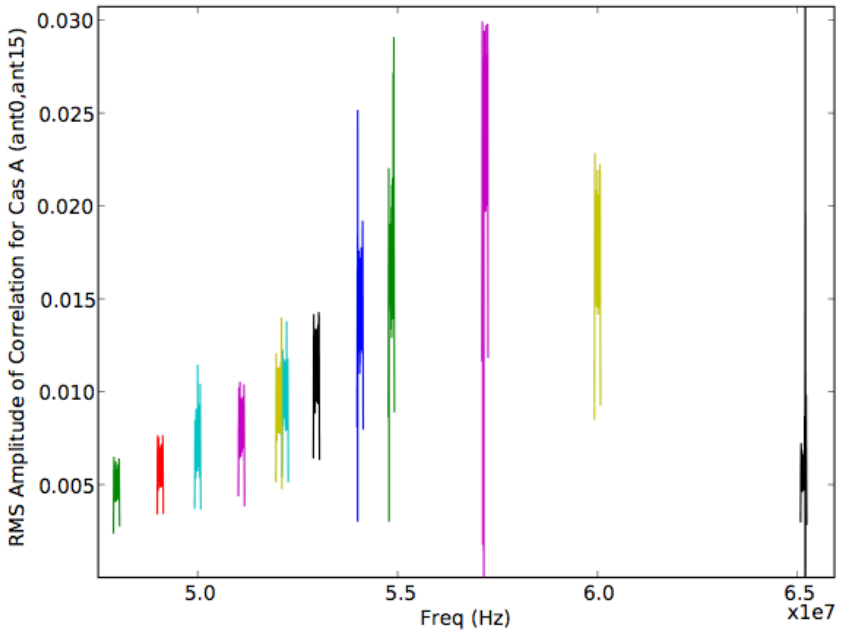


5) Measure amplitude rms for each channel.

- Fit distribution with Gaussian.
- RMS is proportional to width of Gaussian.

- RMS shows filter shape because it is proportional to the correlated power.





- Across 16 subbands, resonance peak is seen.
- No rise at edge.

- Data are dominated by sky brightness.

- S/N ~ 4
- if S_{CasA}=20000 Jy, then noise = 5000 Jy

Notes:
- measure rms/mean (S/N)
- fit with normal (poissonian?) dis'n
- then divide by S_CasA ~ S0^-0.77
- differenced amplitudes noise changes by factor of 1.5 when galactic plane and cyg a rise, because they contribute to total power.
- can we remove scp cap?

Talk Notes:
Andre:
- 4microst/st available => 16 microst total
- 200 MHz clock tested over 24 hrs on Cas A
- TBB: CEP interface tested, data captured and transported
Gijs:
- outline of clock correction system.
Ger:
- successful beamforming tests
- all microst obs have dpt-phase and uvw errors in ms. All after L1402 need to be corrected
- ncp 36 hr observation
- next obs: pulsars, jupiter with cs10 fully beam formed (*give times, pos'n, pref for weekend)
Joris:
- BBS has some results. Uses lioff001
- using beamforming, they can get calibration on cyg a and cas a. Primary beam centered at cyg a reduces cas a to almost nothing.
Sarod:
- beam pattern solutions look better with droopy dipole model, but assumes far field