

Testing and comparing different types of antennae for LSS and other LF instruments

2 setups

- Quasi-simultaneous acquisition setup.
- Correlation acquisitions.

Quasi-simultaneous acquisition setup

- Available : Antenna designer reports
 - but heterogenous : difficult to compare them
- Recording of the whole sky :
 - with the different antennae to test
 - with the same recorder (sp. an, num. rec., ...)
 - at the same location (ex: Nançay Station)
 - at the same time (~ 10 s appart)
 - for 3-4 days, several times

What does this provide?

- Evaluation of the **relative** sensitivity of the antennas against sky noise evolution
- Evaluation of the **relative** system noise of the antennae.
- Amplifier linearity (RFI robustness)

Questions to answer:

- Can't put antennae at exactly the same place :
 - min. distance appart antennas (coupling) ?

Can repeat measure after switching antenna locations.



Questions to answer:

- Can't record all antennae full time at the exact same time :
 - What about a RF switch (will modify all measures in the same way)?
 - 50 dB attenuation between chans OK ?
 - Integrate each antenna over the whole band for 1-2 s and start over?

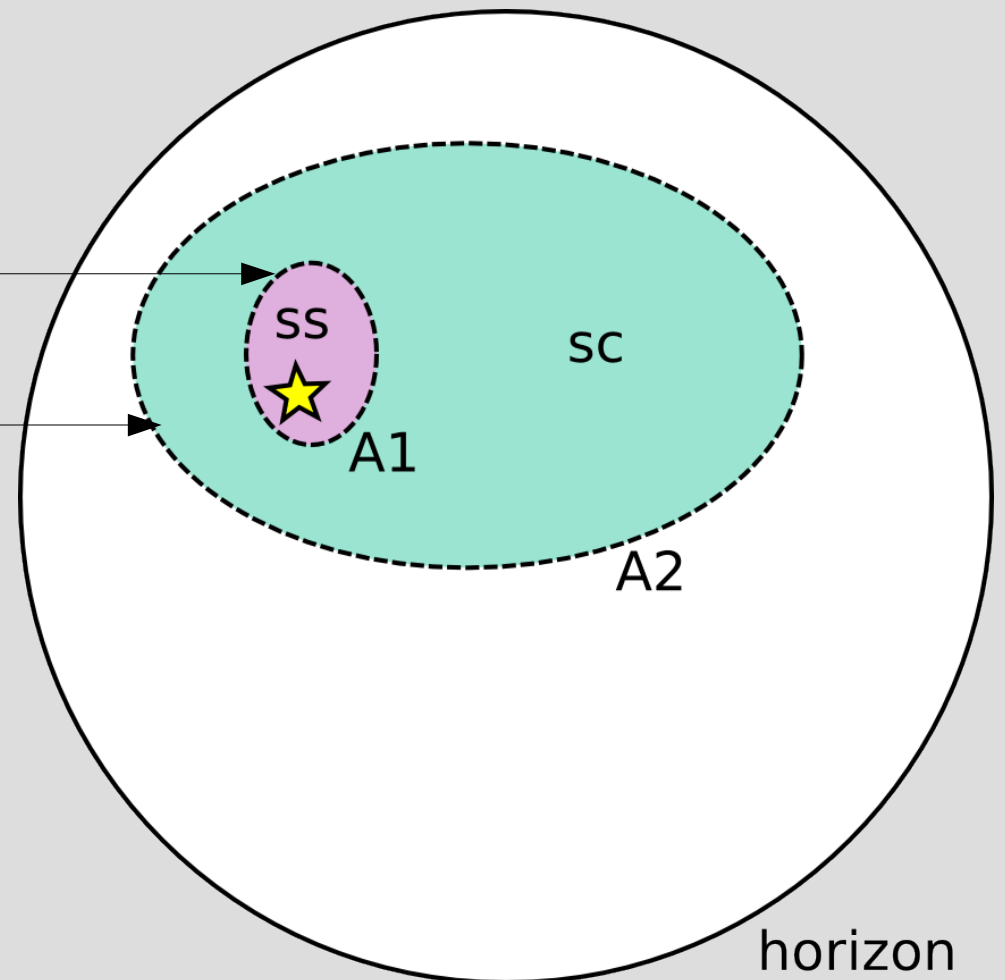
Others questions or suggestions?

Correlation between each antenna to test and a high(er) gain antenna (ex: NDA)

Effect of correlation between the antennae over the sky

Seen by antenna 1

Seen by antenna 2



Effect of correlation between antennas for sensitivity

$$X_{NDA} = S_{NDA} N_{SS} + N_{sys_0}$$
$$X_{test} = S_{test} [N_{SS} + N_{SC}] + N_{sys_1}$$

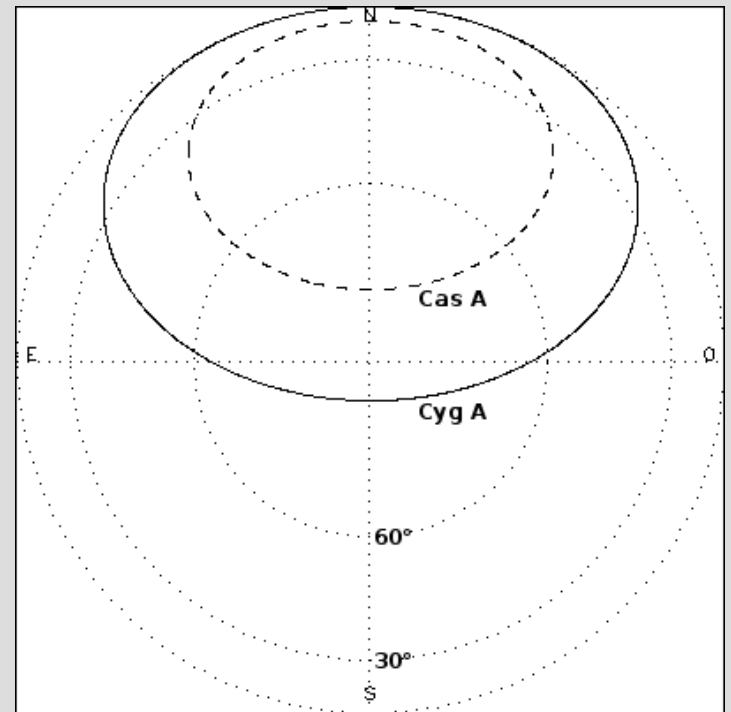
$$\langle X_{NDA} \overline{X_{NDA}} \rangle = S_{NDA}^2 \sigma_{SS}^2 + \sigma_{sys_0}^2$$
$$\langle X_{test} \overline{X_{test}} \rangle = S_{test}^2 [\sigma_{SS}^2 + \sigma_{SC}^2] + \sigma_{sys_1}^2$$

$$\left| \langle X_{NDA} \overline{X_{test}} \rangle \right| = S_{NDA} S_{test} \sigma_{SS}^2$$

- => reduces antenna amplifier system noises
- => increases sensitivity ($\sqrt{s_{NDA} s_{test}}$ instead of s_{test})
- => better comparison of antennae lobe patterns

Setups

- Cyg A or Cas A tracking with NDA
=> provides relative antenna gain for the specified slices



- Whole sky scanning with NDA
=> provide relative antenna gain for whole sky

Others questions or suggestions?