

LEA128 processing on the LOFAR EoR GPU cluster

Lofar Status Meeting
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Hardware

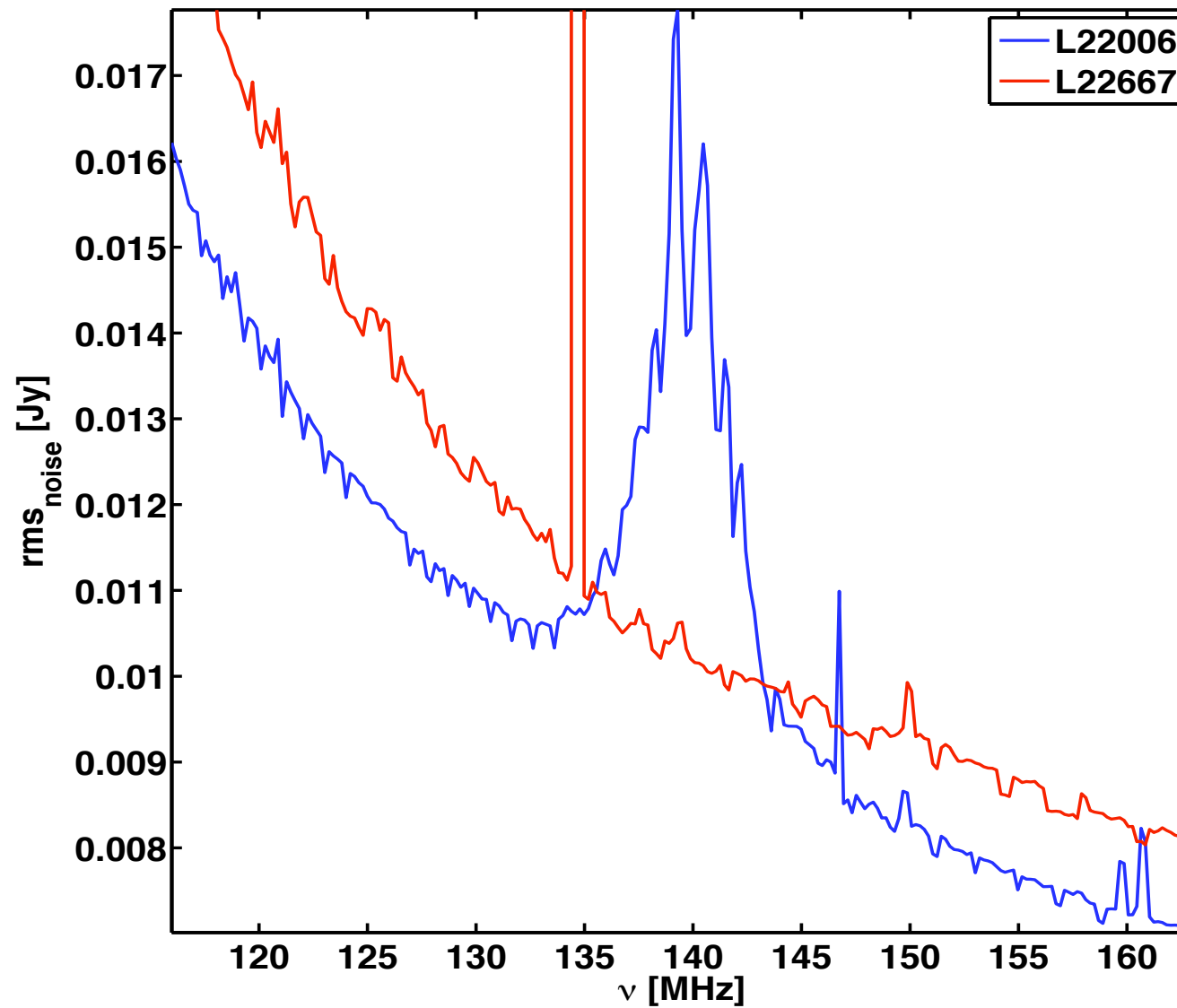
- 4x Intel Xeon E5520 @ 2.27 GHz
- 12 GB RAM
- 2x 2TB SATA HDDs
- 2x 1GBps NICs
- 2x NVIDIA TESLA C1060 GPUs (4G DDR3 RAM)
- Centos LINUX 5.5
- LOFAR software installed
- Experimental versions (GPU acceleration,
- EoR Imager)

- Transfers are made through the LTA
- Transferring several files simultaneously to maximize bandwidth usage
- 96% of bandwidth used (1 Gbps)
- Experimenting with a load balancing gateway (2x 1 Gbps)
- Transfer speed significantly improved since January (5-10x speed gain)

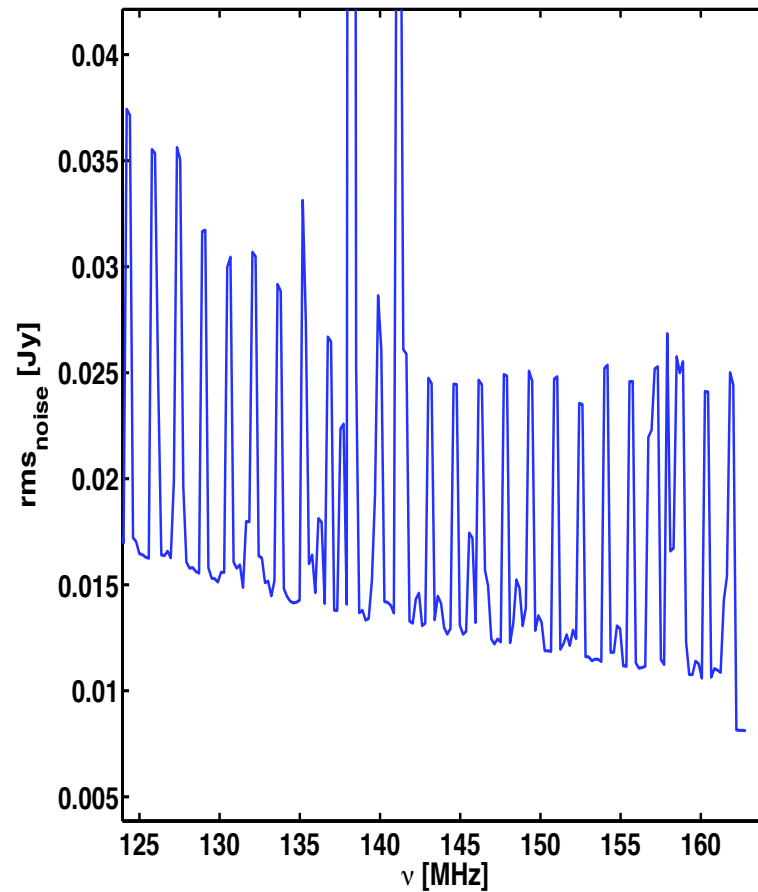
Processing steps

- RFI flagging + averaging to 15 ch. via NDPPP (if not done by the observatory).
- BBS – DI solutions
- (BBS – DD solutions)
- Add imaging columns
- Flag bad solutions/stations
- Imaging
- Update sky model (not automatic, fine-tuning needed)

System stability: differential noise

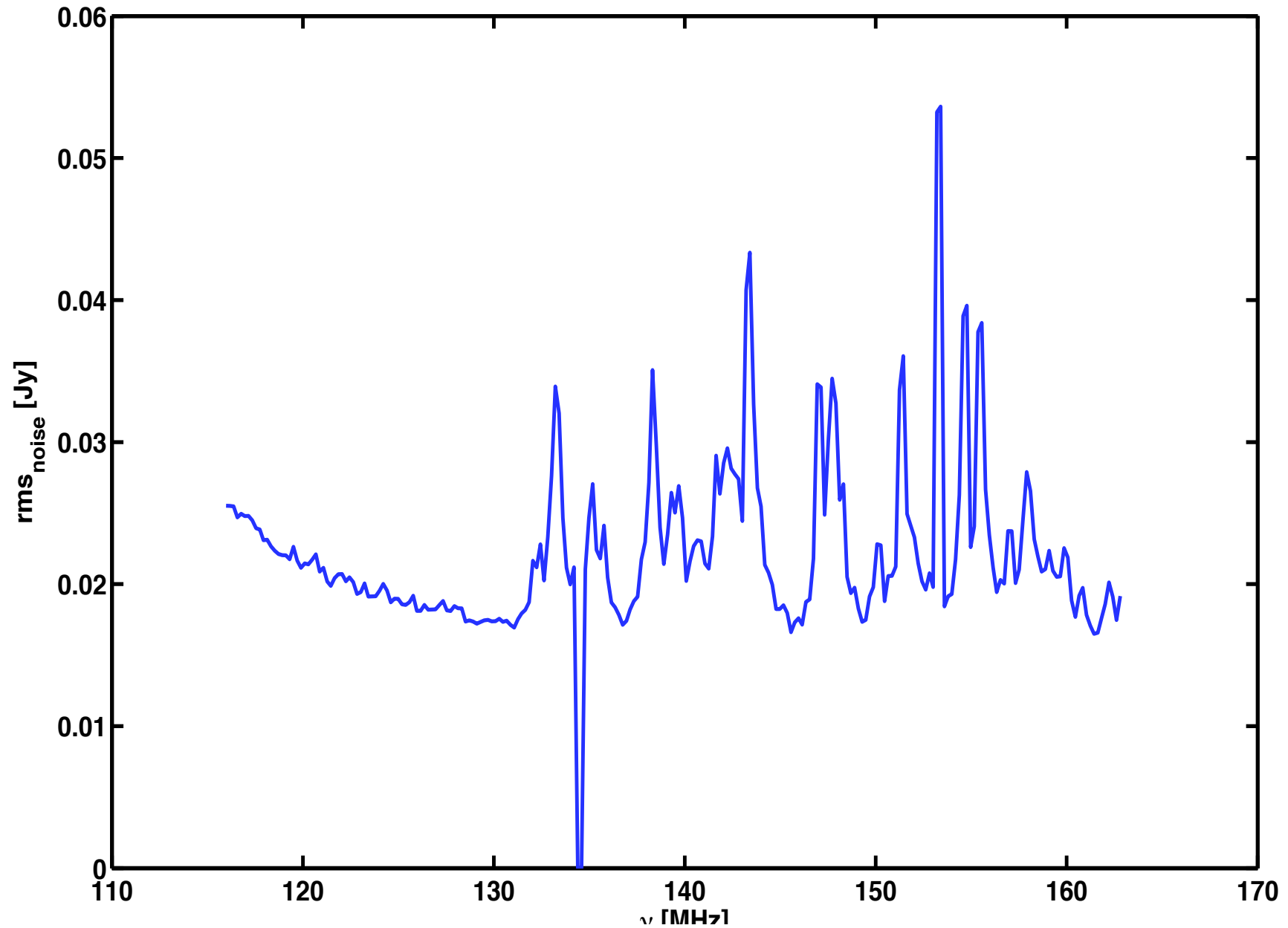


Stability: 23092



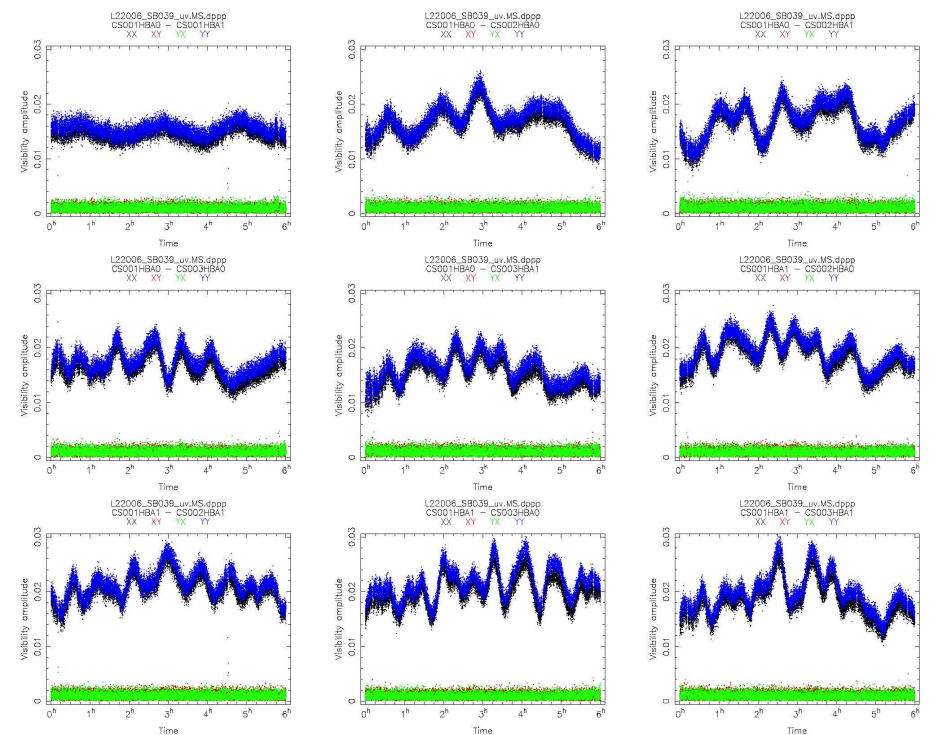
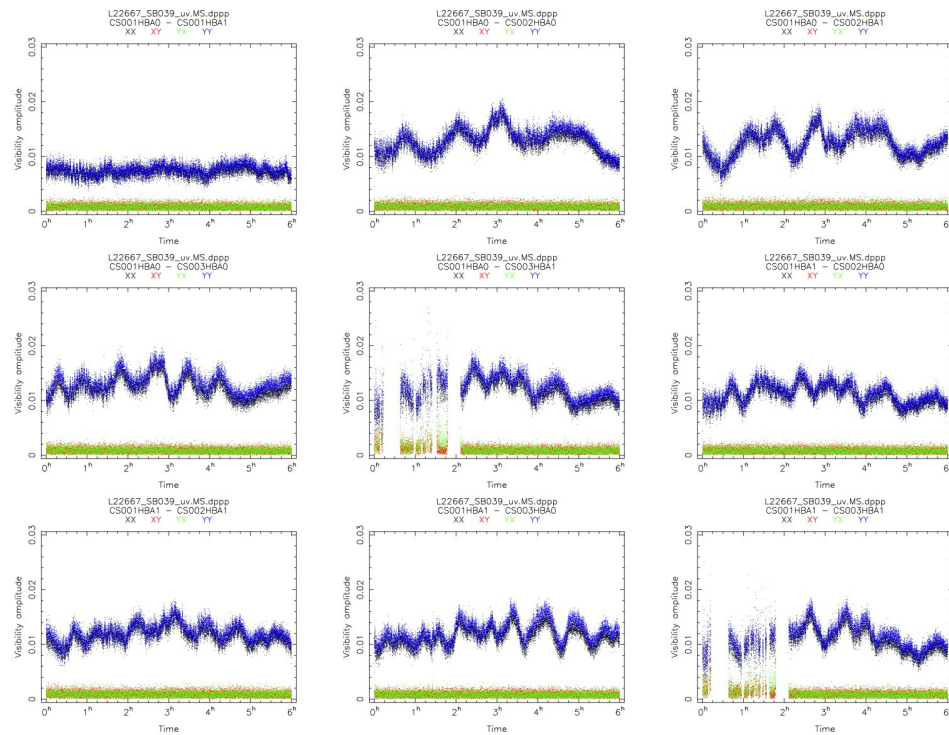
- The result came out of batch processing so caution in interpretation must be exercised.
- This observation included new stations
- Used different sky model

System stability: 1 bad station (CS501)



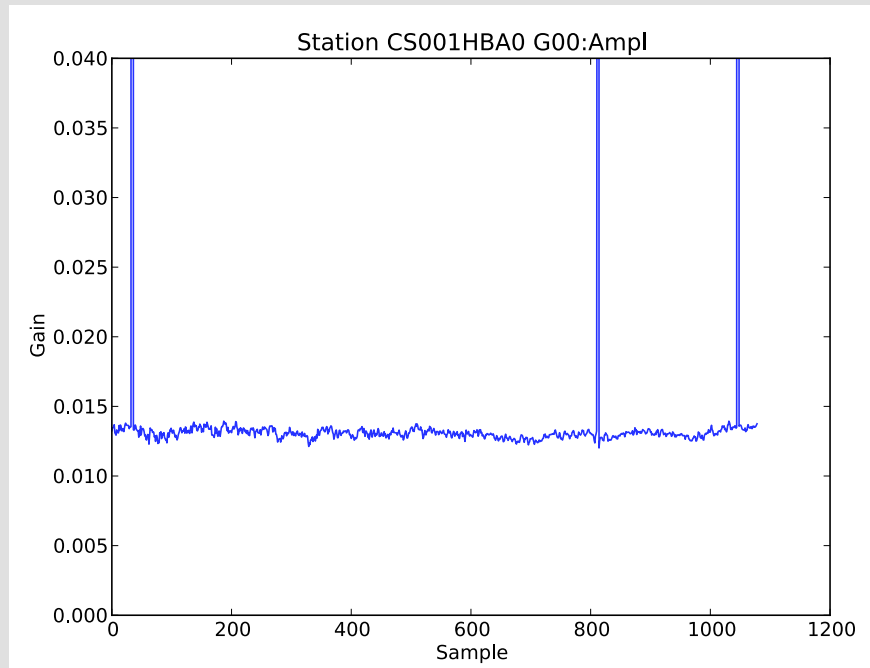
22006

22667

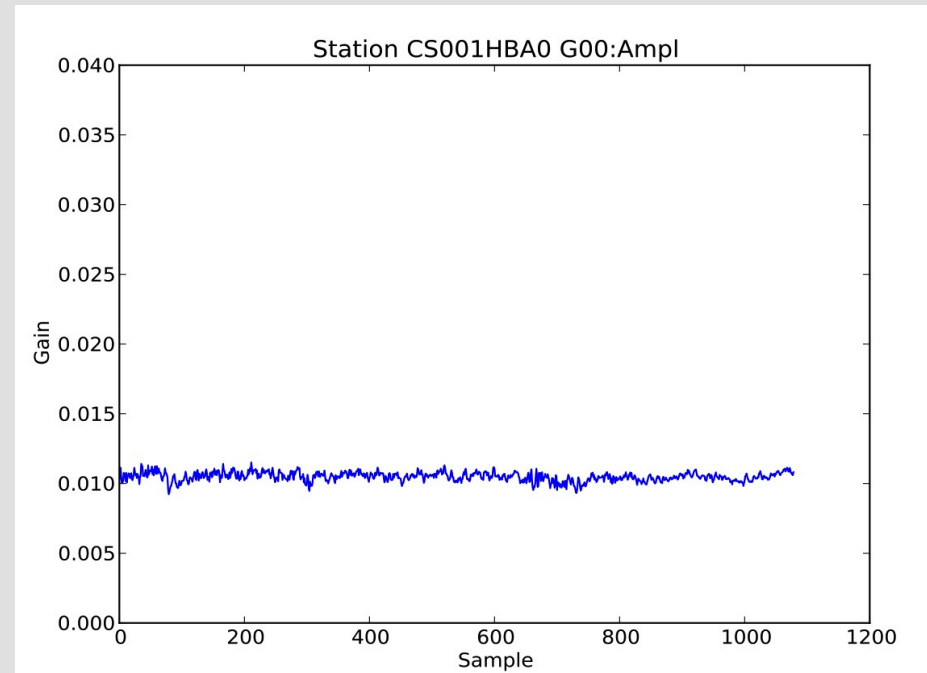


Gain Ampl

22006



22667

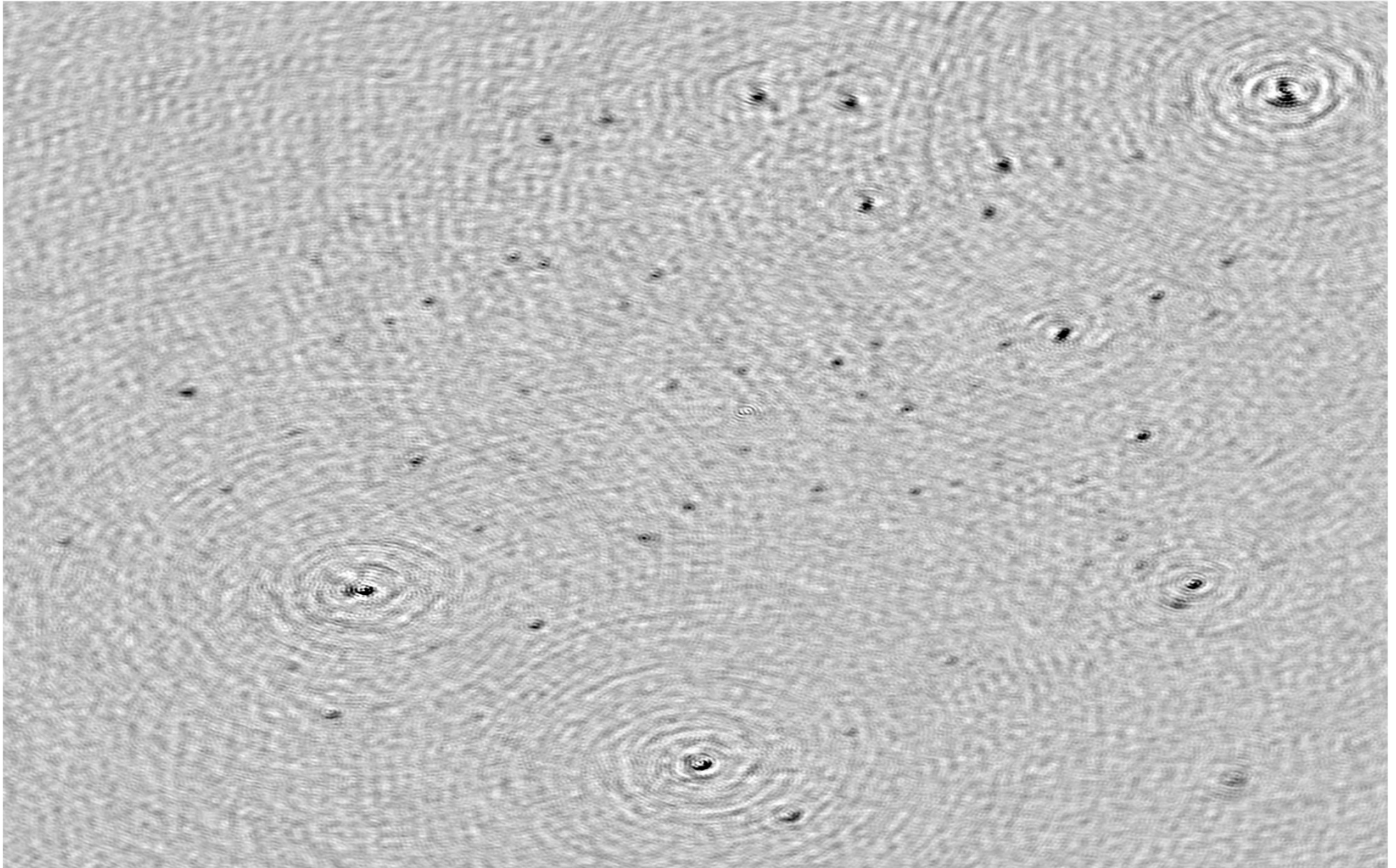


3C196 Observation (22006,22667,23093)

Process all the sub-bands at full resolution

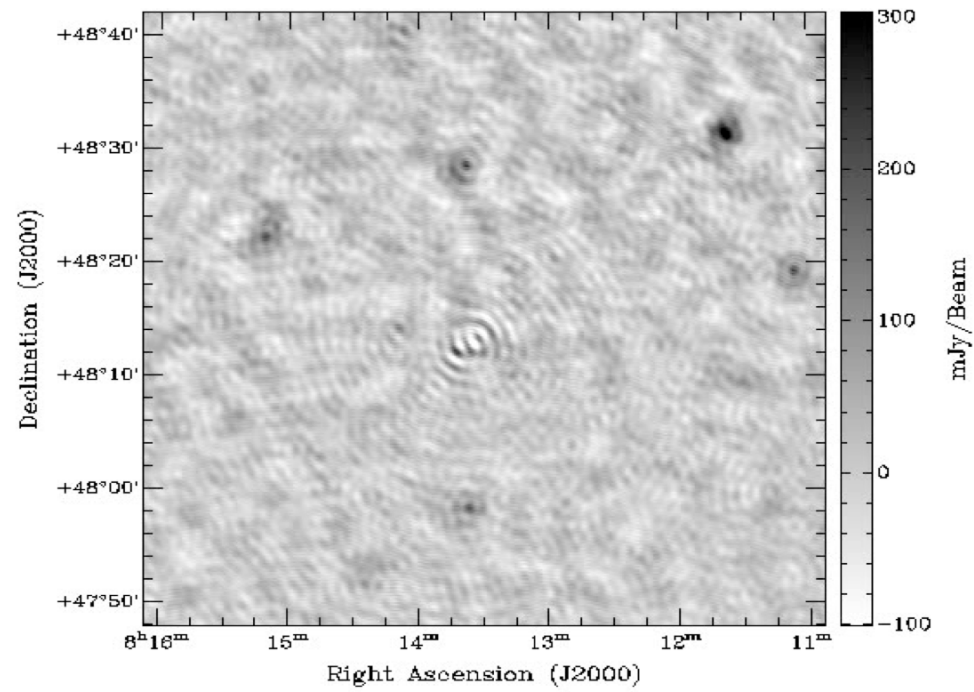
1. AOFLagger for bad solution identification
2. BBS for calibration using 124 sources extracted from the cubes
3. 23092: Imager run in channel mode (14 ch x 242 SBBs) -> 120 GB image cubes (2196x2196 pixel, 8 arcsec beam)

Frequency cube



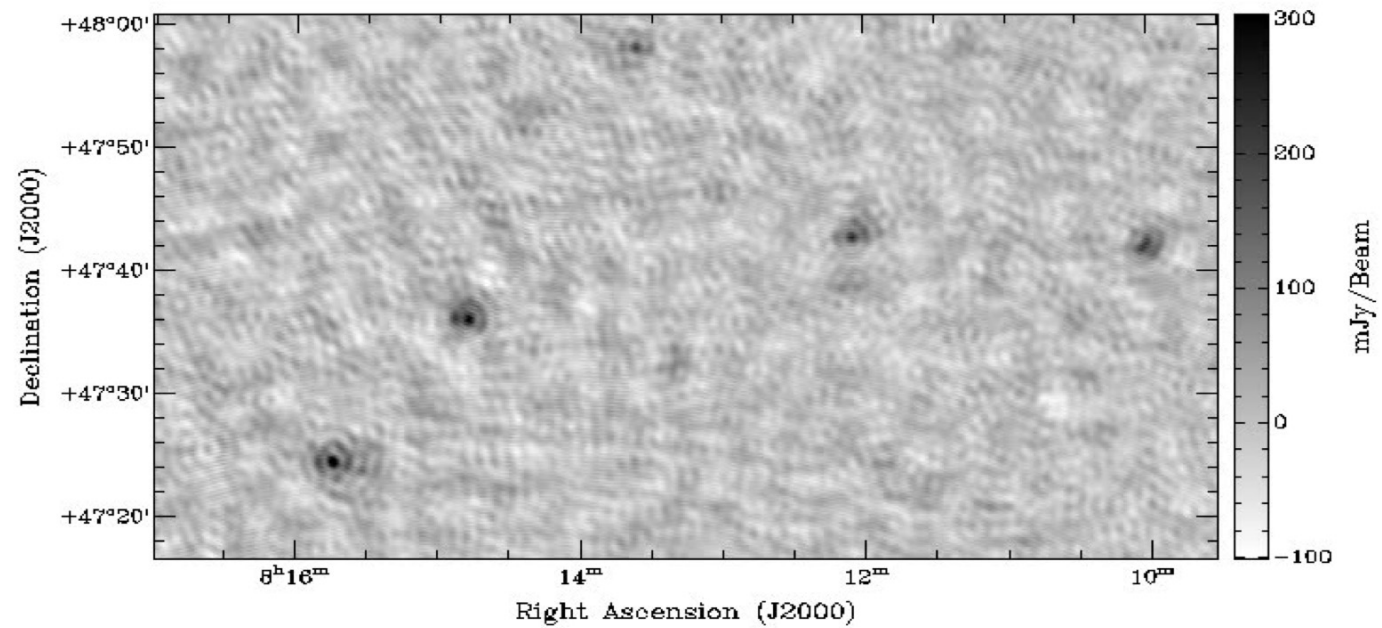
Frequency cube: zoom in

Frequency: 115.149 MHz



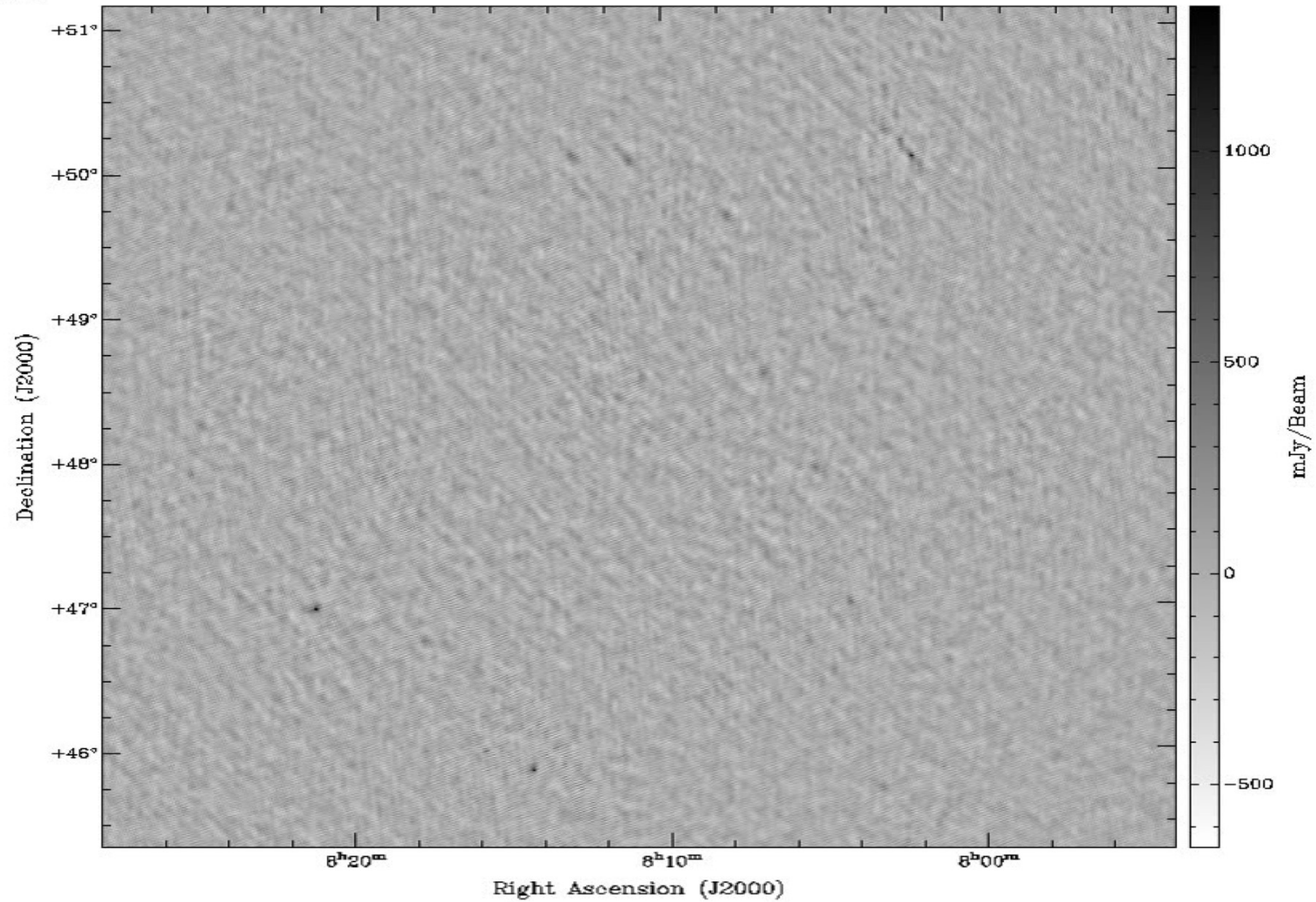
Frequency cube: zoom in

Frequency: 115.149 MHz



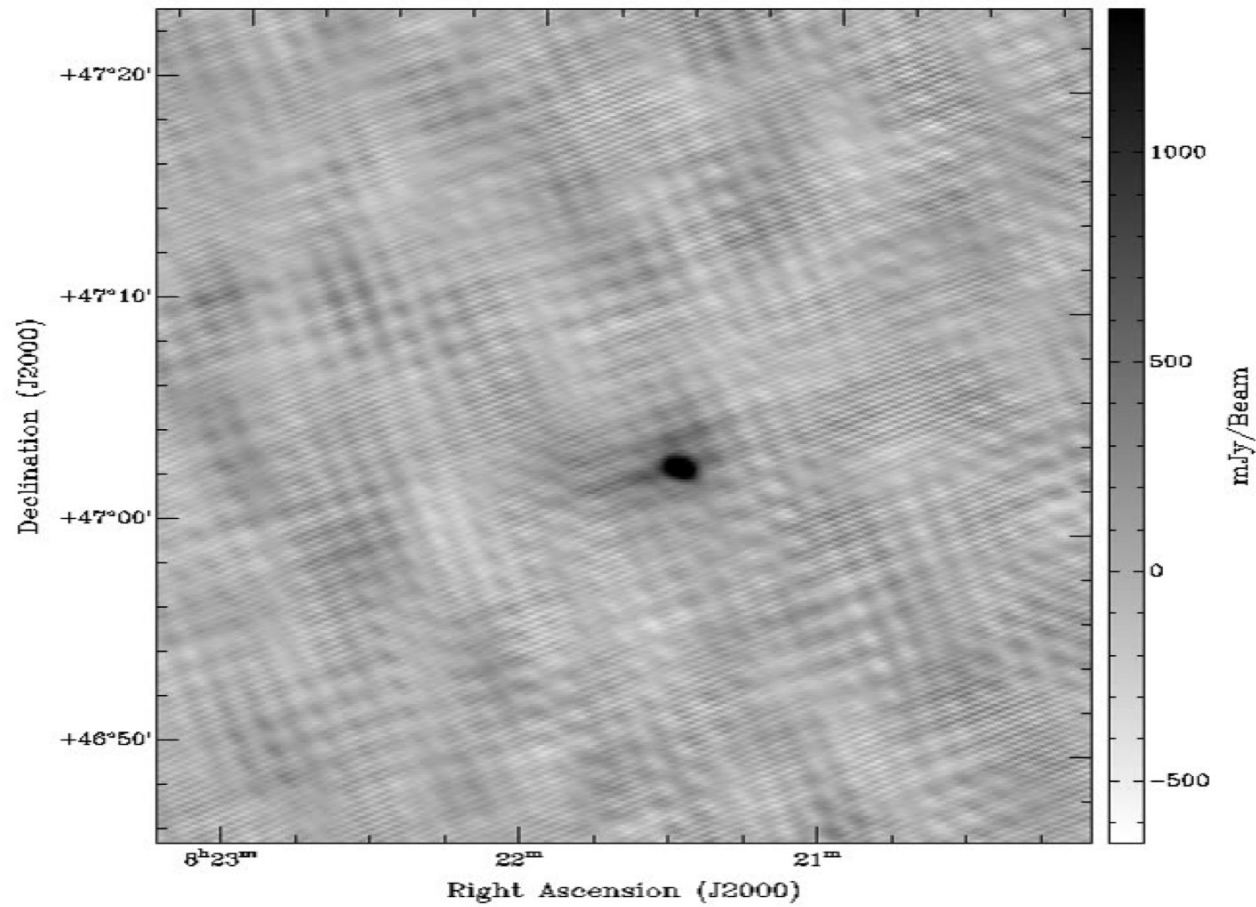
Snapshots (12 min.)

STOKES: 1.000000e+00



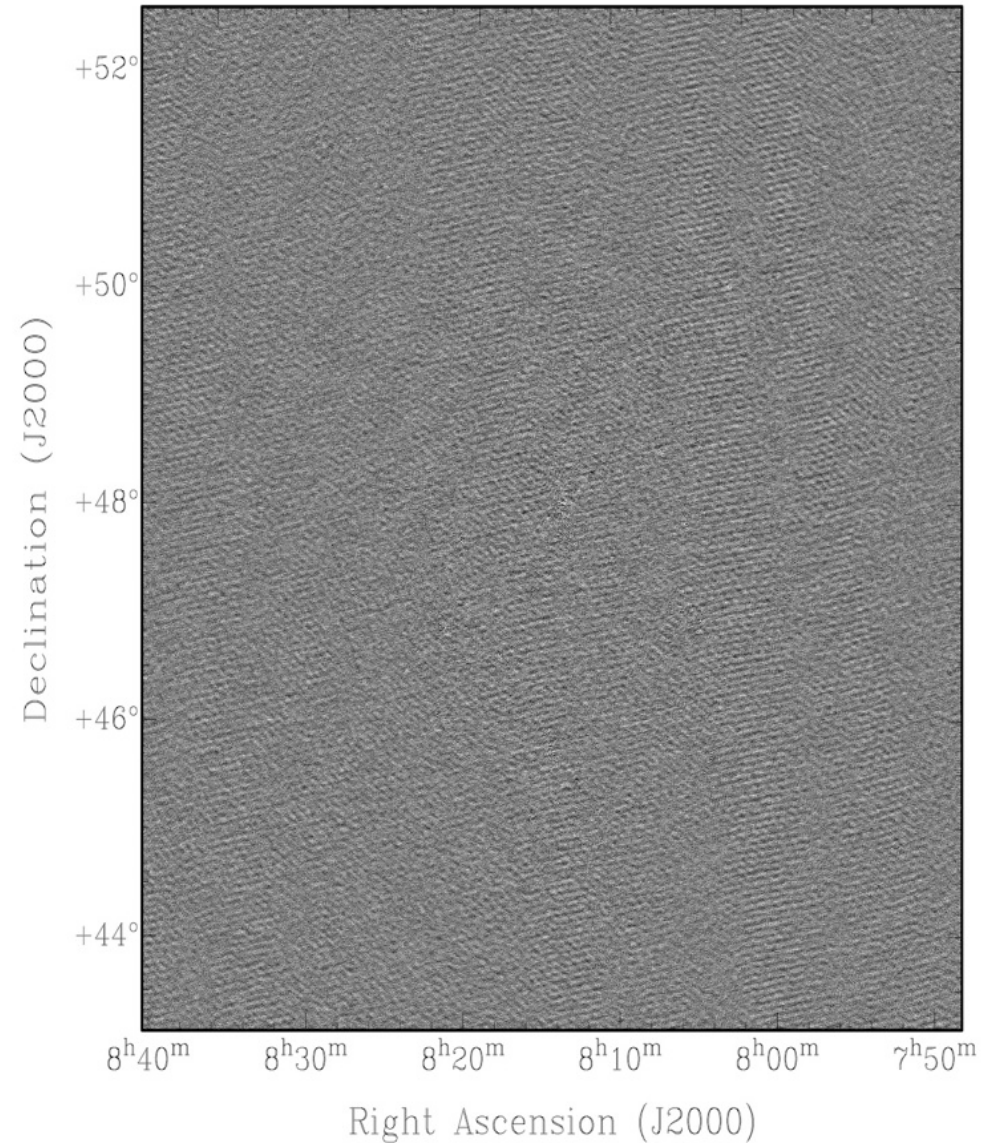
Snapshot (zoom in)

STOKES: 1.000000e+00

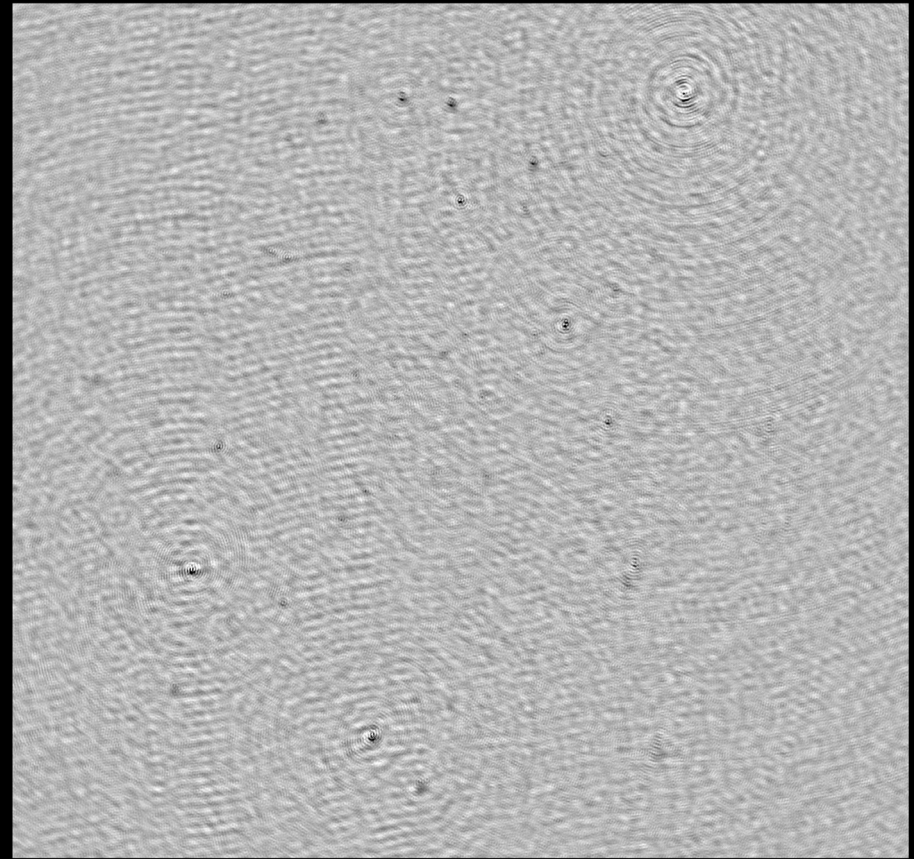
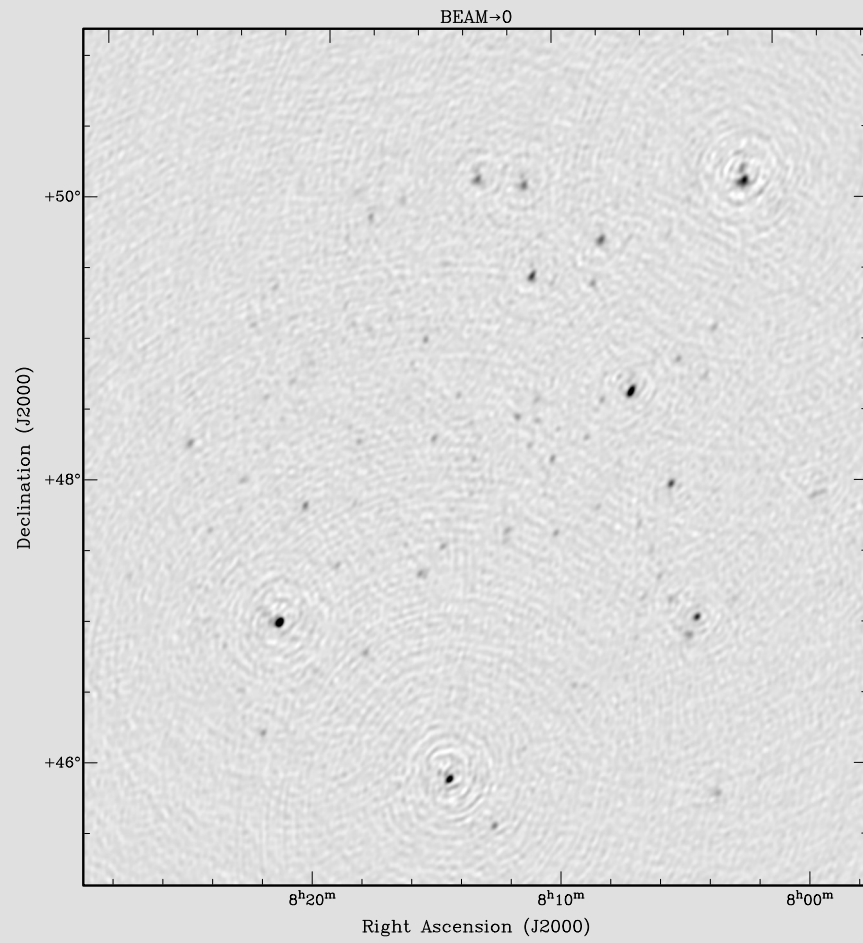


Residuals

- $\sim 6\text{mJy}$
- Few point sources can be seen
- Consistent with noise
- Gaussian histogram
- 10 SB average



Direction Dependent Calibration (BBS)



Conclusions

- Still far away from sensitivity limit
- Awaiting BBS beam verification

Devise DD standard calibration recipe for this field

- Data transfer issues solved for the time being

Thanks to E. Tiesinga, O. Martinez and S. Yatawatta