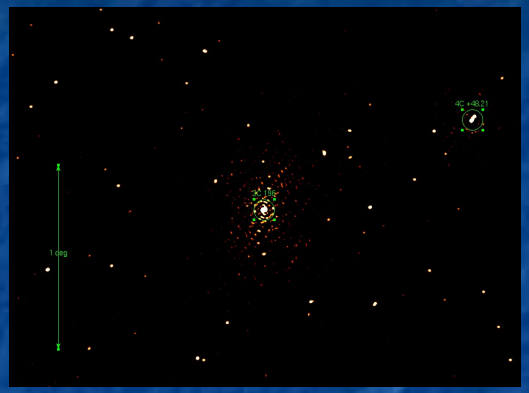
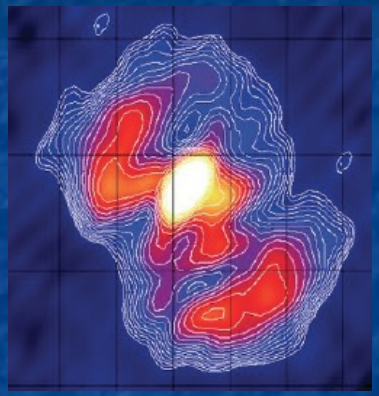
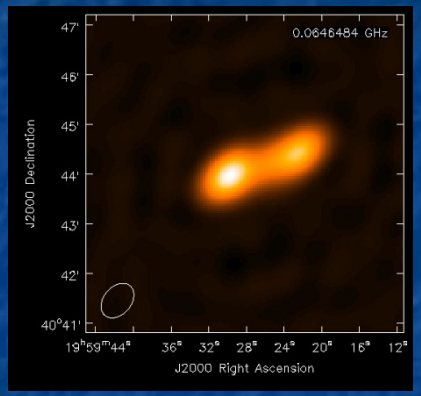
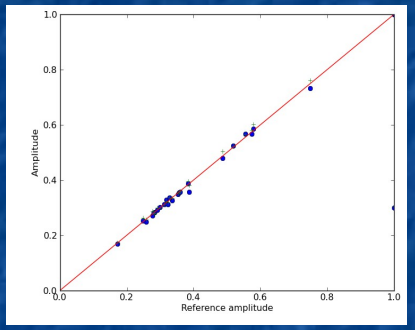
Report from Imaging Busy Week 9

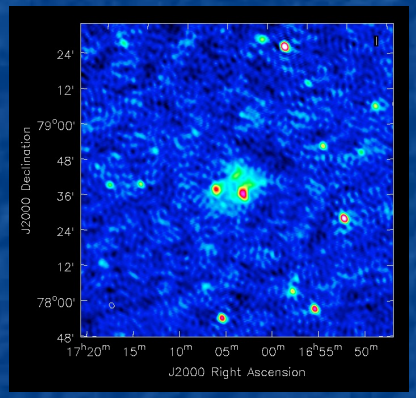
ASTRON, 17-21 January 2011

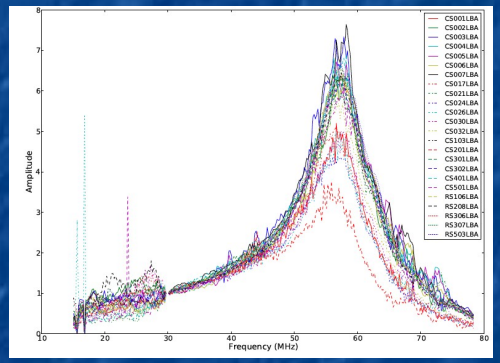


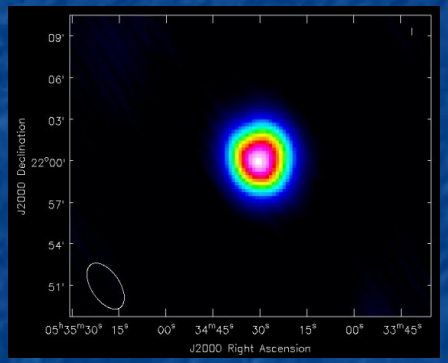


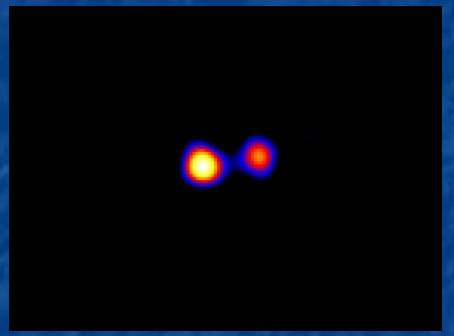












Roberto Pizzo, John McKean, Huub Rottgering, George Heald, Emanuela Orru', Chiara Ferrari, Francesco de Gasperin, Annalisa Bonafede, Glenn White, Kiz Natt, Neal Jackson, Judith Croston, Sjoert van Velzen, Matteo Murgia, Alice di Vincenzo, Alejo Martinez, Reinout van Weeren, David Rafferty, Laura Birzan, Bas van der Tol, Matthias Hoeft, Ilse van Bemmel, John Conway, Fabien Betajat, Alexander Mueller, Martin Hardcastle, Louise M. Ker, Cyril Tasse, Sandra Shurmann

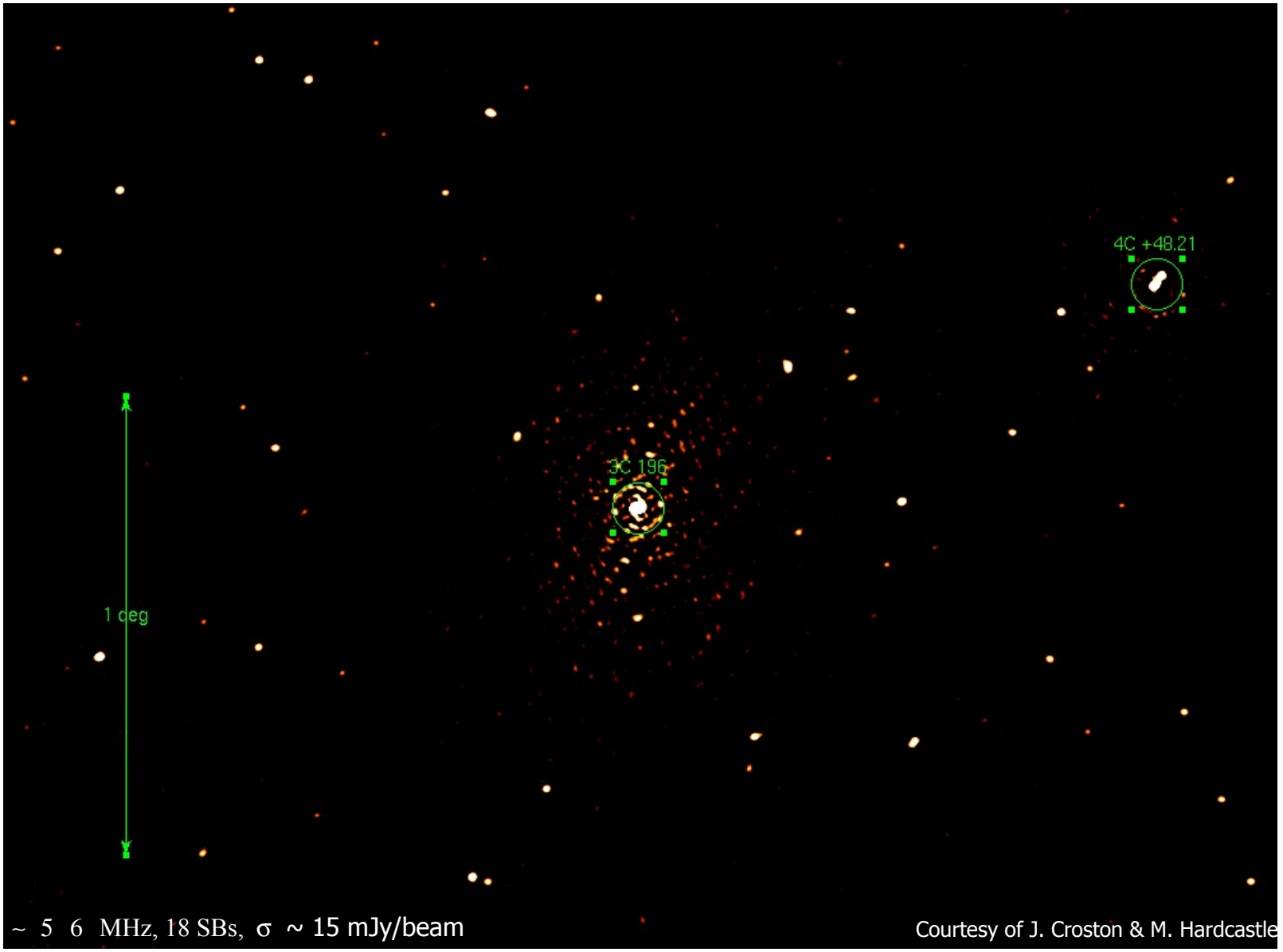
Imaging Busy Week 9

- 29 participants: 23 at ASTRON, 6 in remote through an EVO session
- 2 groups: ‘beginners’ and ‘experienced’ commissioners
- Beginners were initiated to Lofar data reduction
- The experienced commissioners worked on important imaging tasks:
    - production of good models for A-team sources;
    - subtraction of the A-team from the data;
    - production of scientific quality images

AVAILABLE DATA

Source	Observation ID	Band	Δν (MHz)	Duration	Multi beam	Status
3C196	L2010_21604_pizzo	LBA	30-90	10 h	NO	AOF+NDP3
	L2011_22793		15-30	10 h		AOF+NDP3
A-team (Cyg A, Cas A, Vir A, Tau A, Her A)	L2010_22120	LBA	30-90	1.5 h	YES	AOF + NDP3
	L2010_22121					
	L2010_22122					
	L2010_22123					AOF
	L2010_22124					
A2256	L2011_22663	LBA	10-58	6 h	NO	AOF + NDP3
Calibrators (3C147, 3C196, 3C286, 3C295, 3C298, 3C380)	L2011_23105 L2011_23124-40	HBA 0	110-190	1 m	NO	---

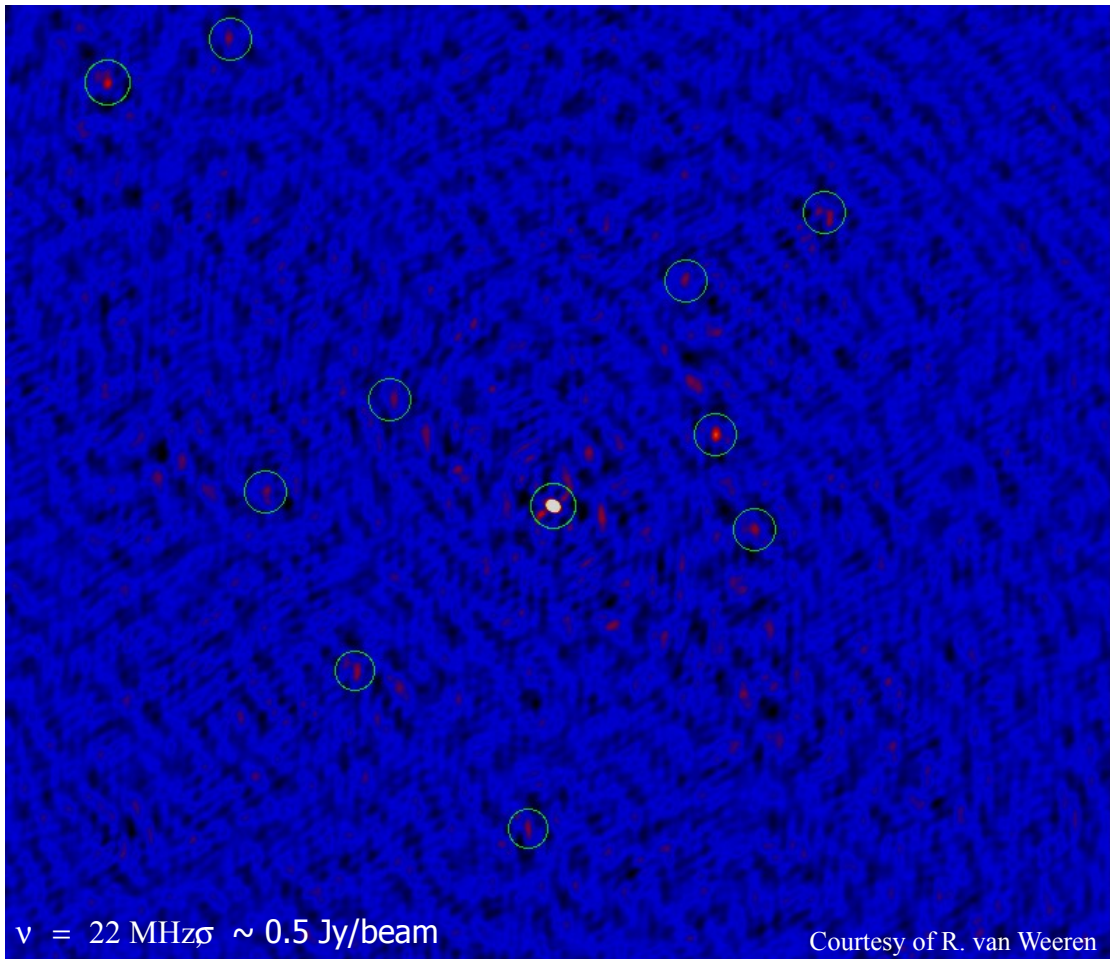
3C196 field (30-90 MHz)



~ 5 6 MHz, 18 SBs, σ ~ 15 mJy/beam

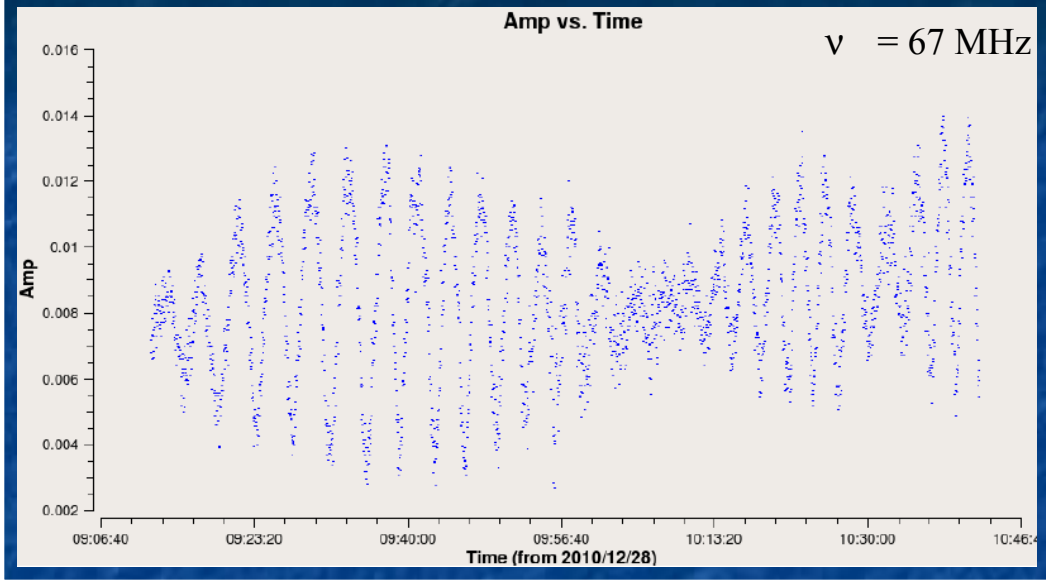
Courtesy of J. Croston & M. Hardcastle

3C196 field (10-30 MHz)



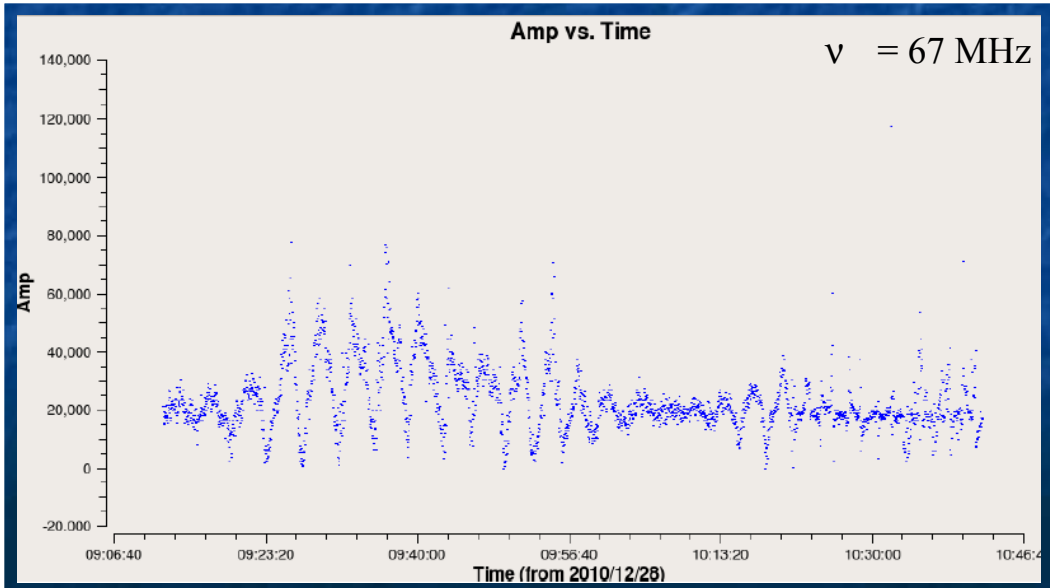
- Calibration on 3C196 (using UVrange > 2.0 km)
- No Cas A/Cyg A subtraction
- Imaging with UVrange > 2.0 km

Cas A (30-90 MHz)



Raw

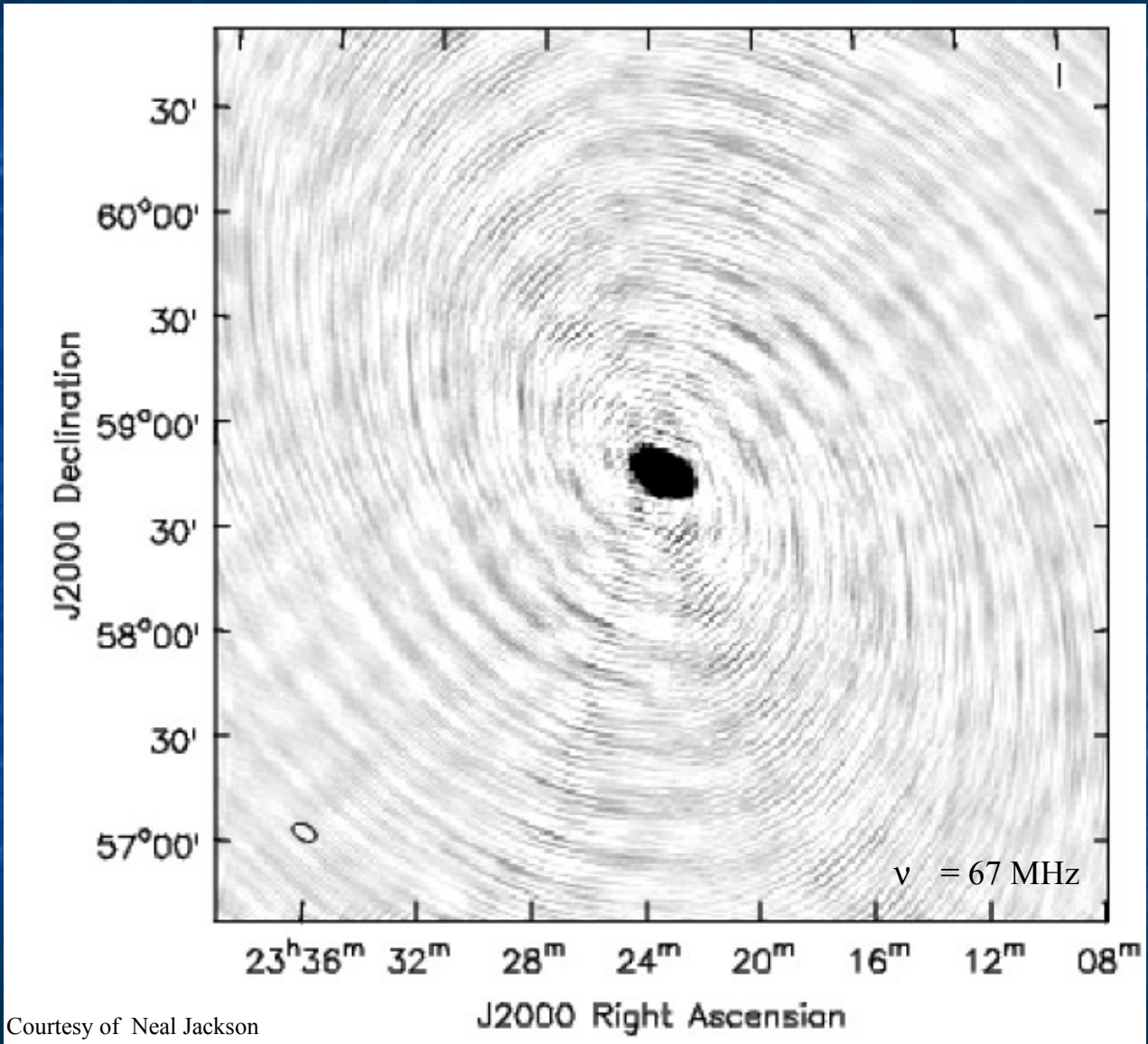
- Plots of baseline CS001-CS030
- BBS parset removing Cyg A and correcting for Cas A



Corrected

- Beating due to Cyg A is probably being attenuated on many baselines but not removed altogether

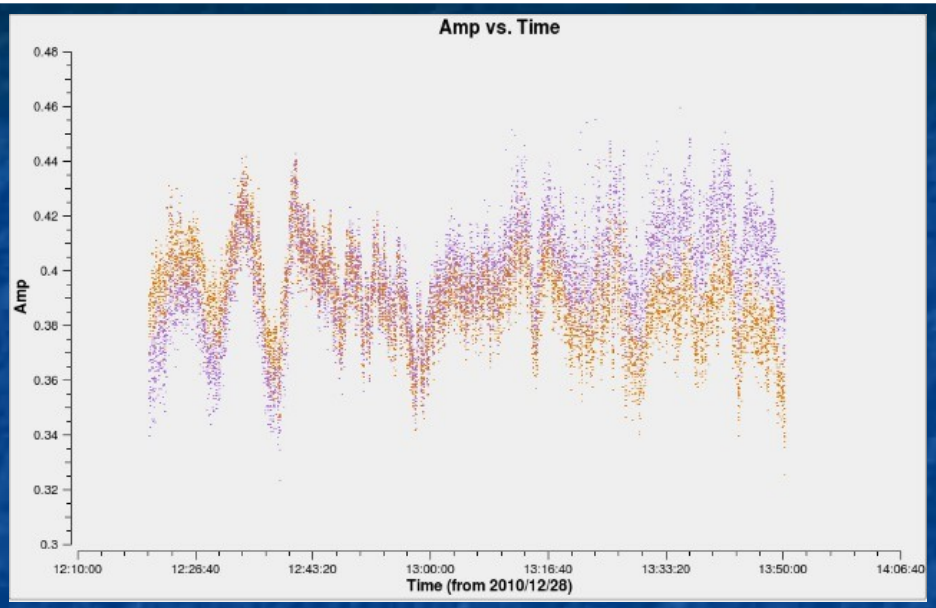
Cas A (30-90 MHz)



Courtesy of Neal Jackson

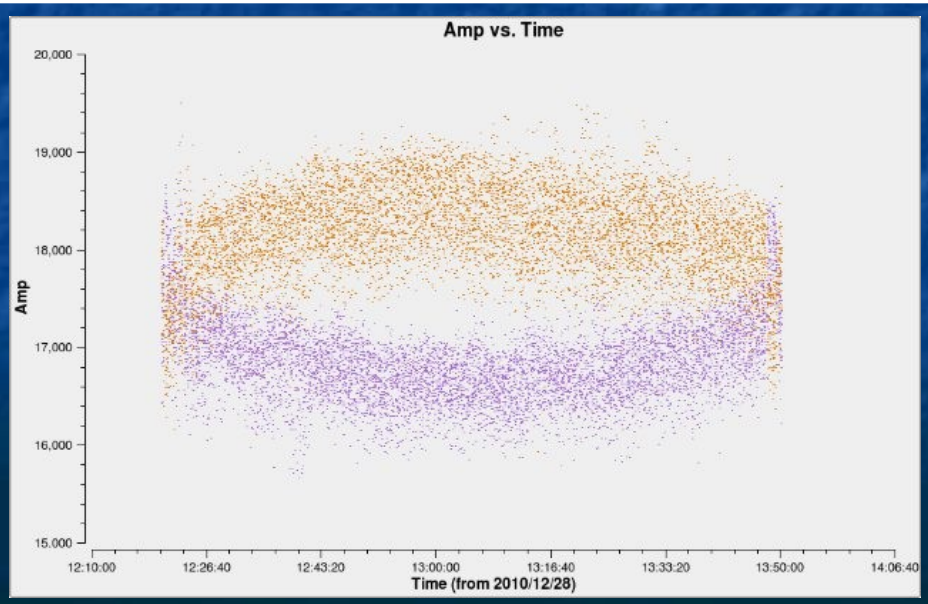
- A better removal of Cyg A from the visibilities is currently worked on

Cyg A (30-90 MHz)



Raw

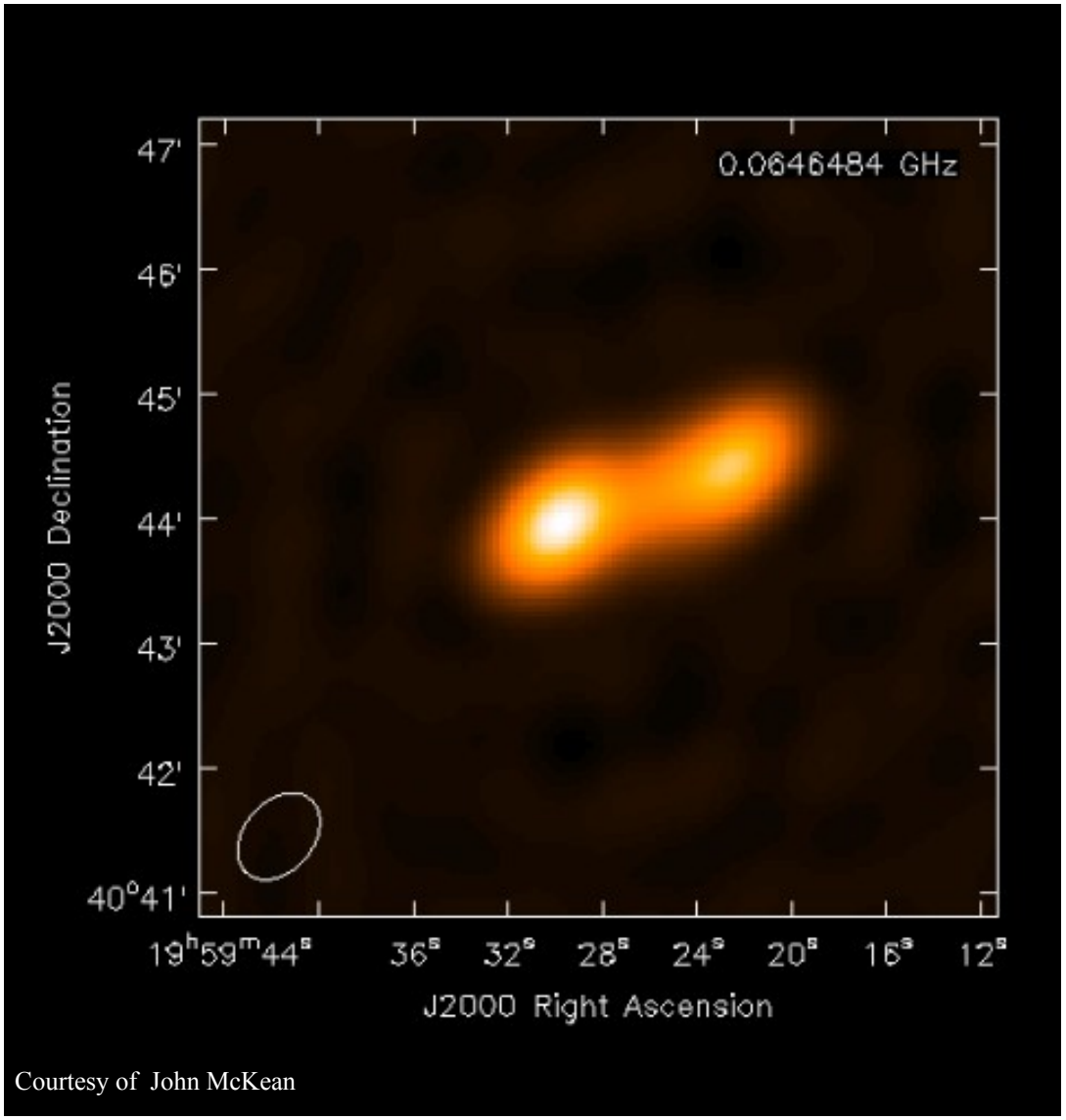
- Plots 300 m baseline
- BBS parset removing Cas A and Vir A



Corrected

- Cas A and Vir A are subtracted

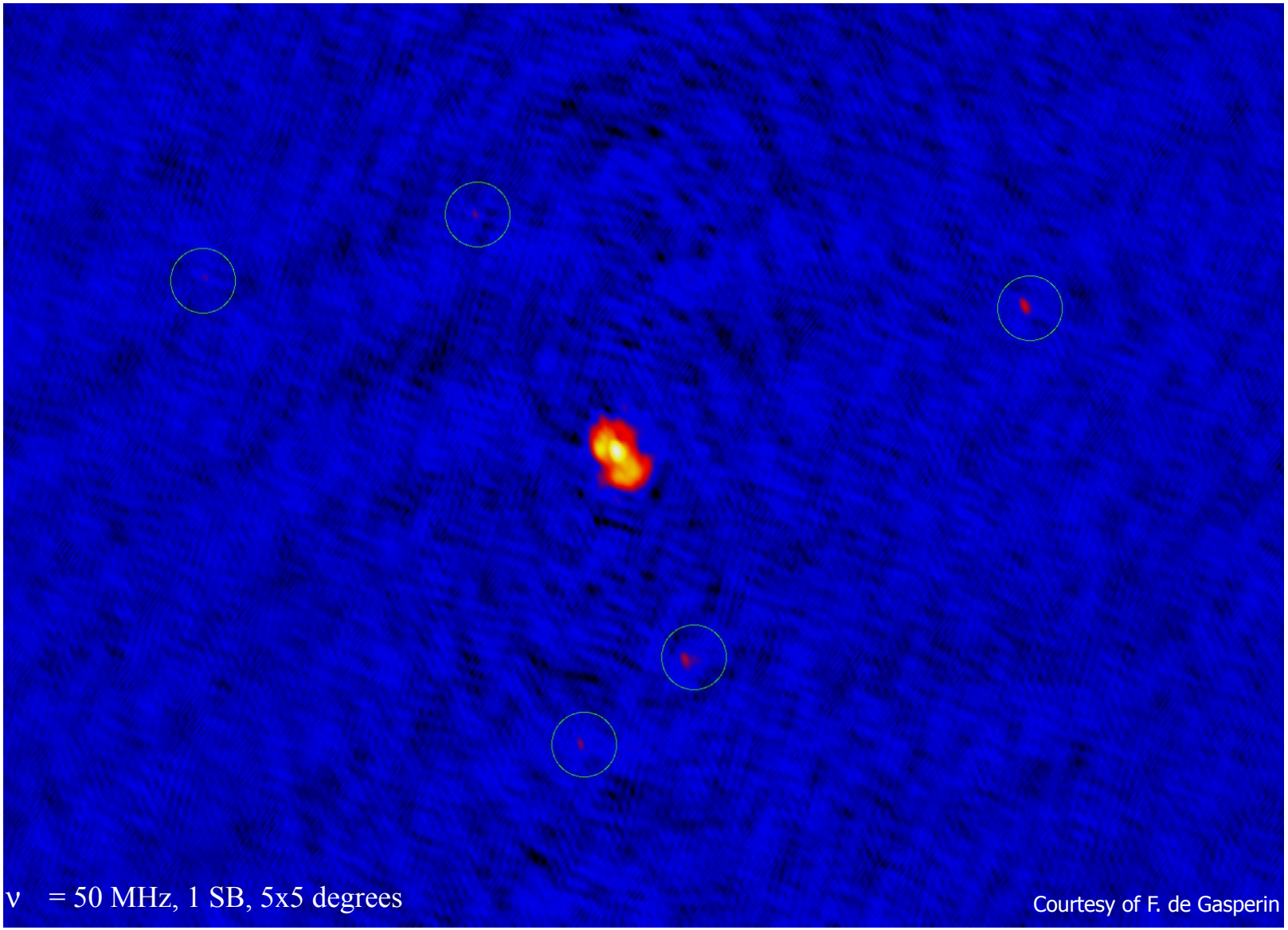
Cyg A (30-90 MHz)



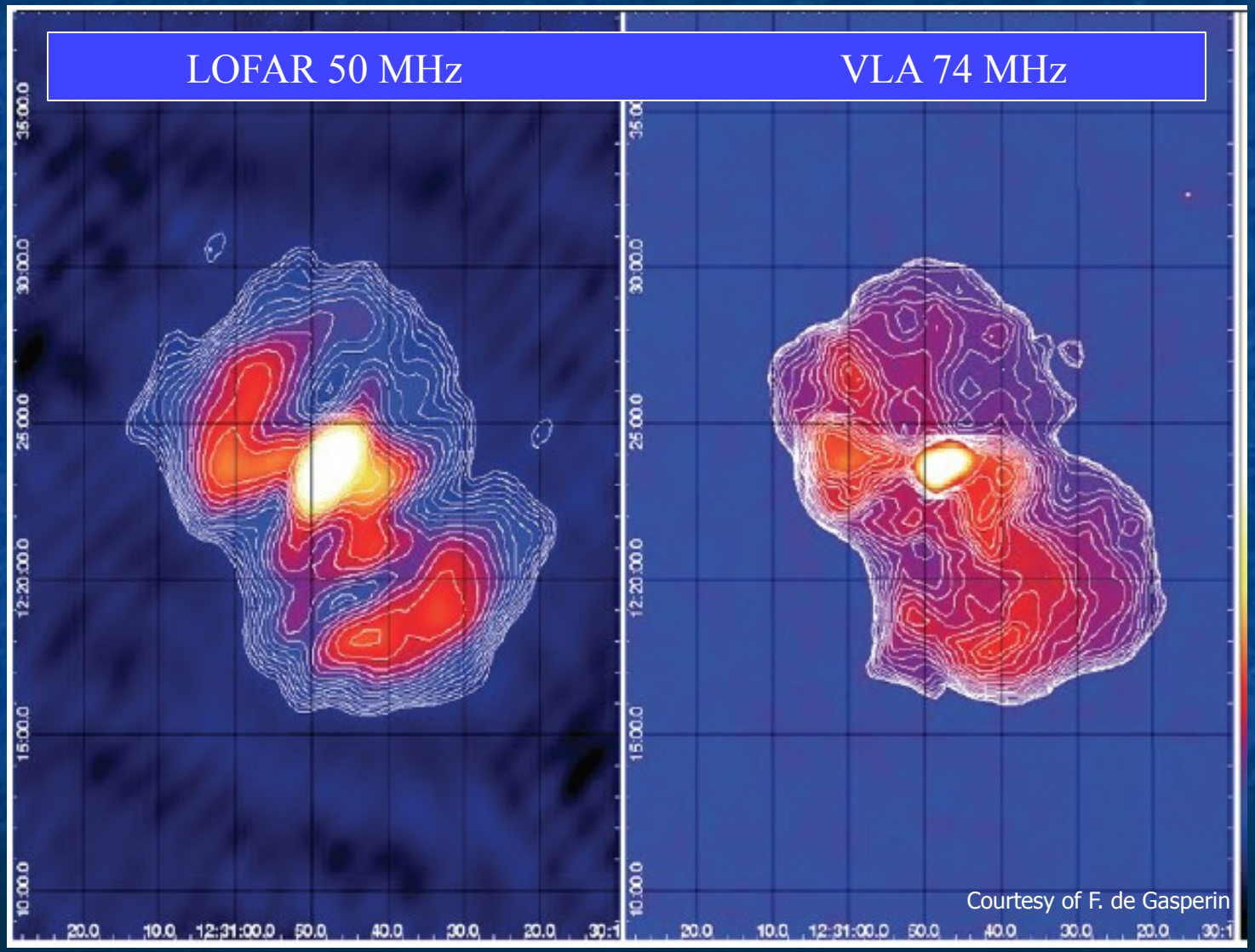
Courtesy of John McKean

- Dynamic range ~ 7000

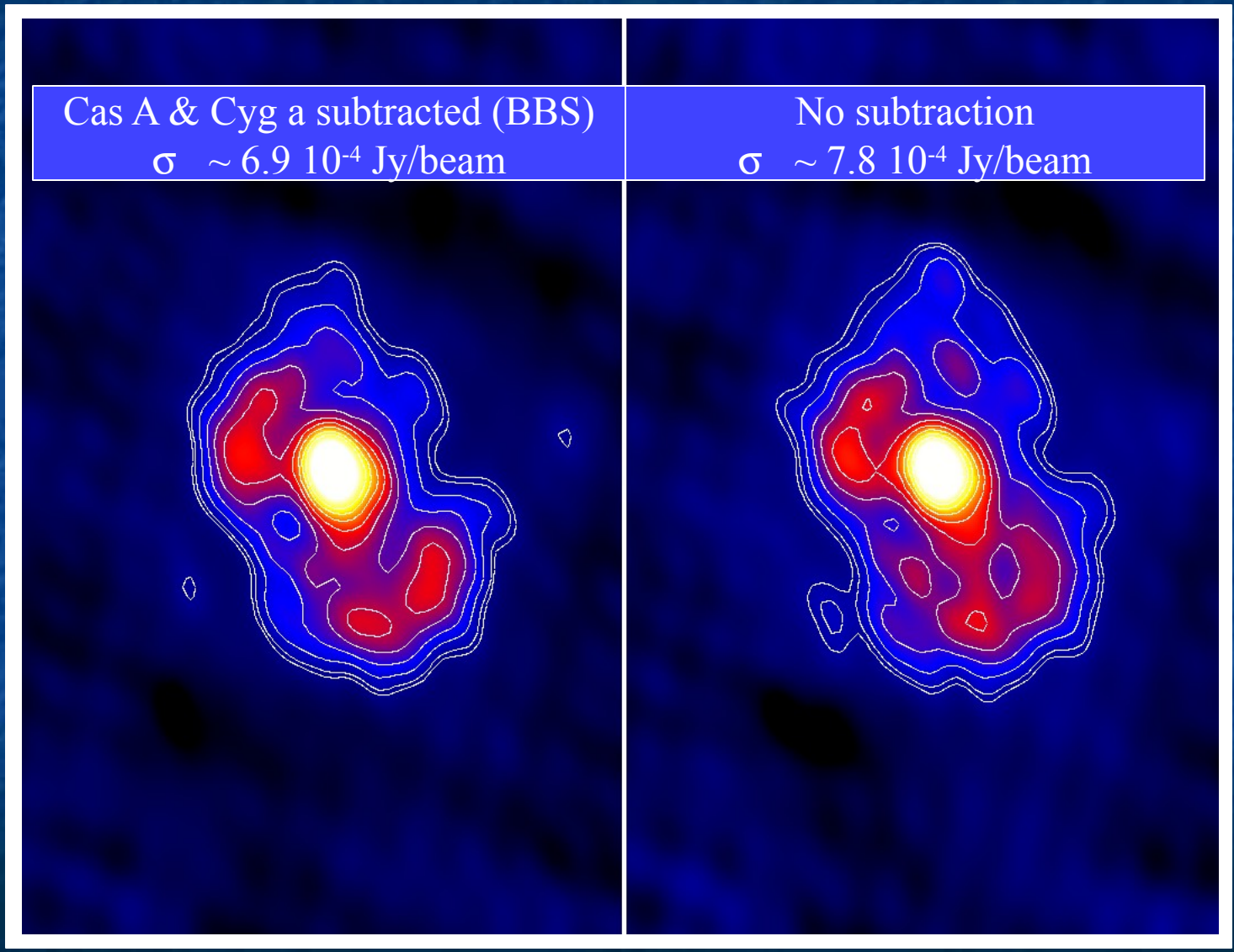
Virgo A (30-90 MHz)



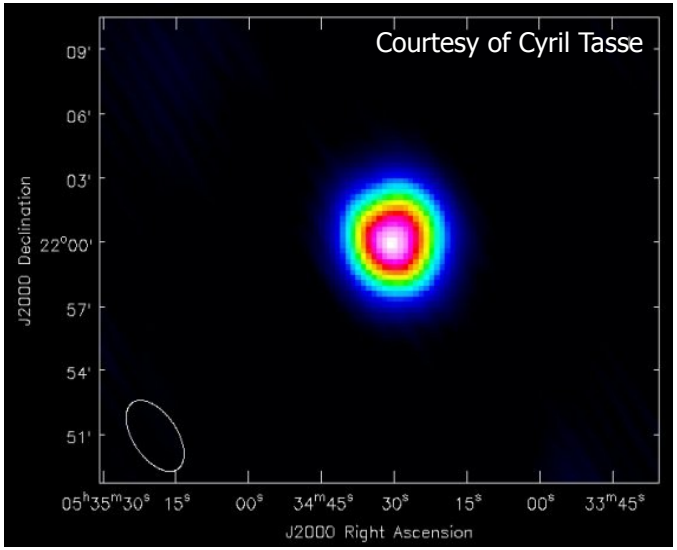
Virgo A (30-90 MHz)



Virgo A (30-90 MHz)



Tau A & Her A (30-90 MHz)

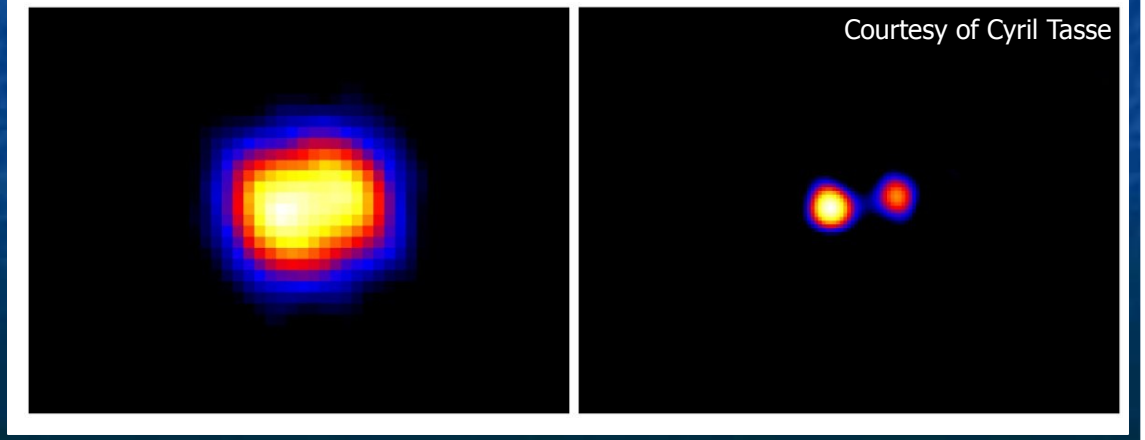


Tau A

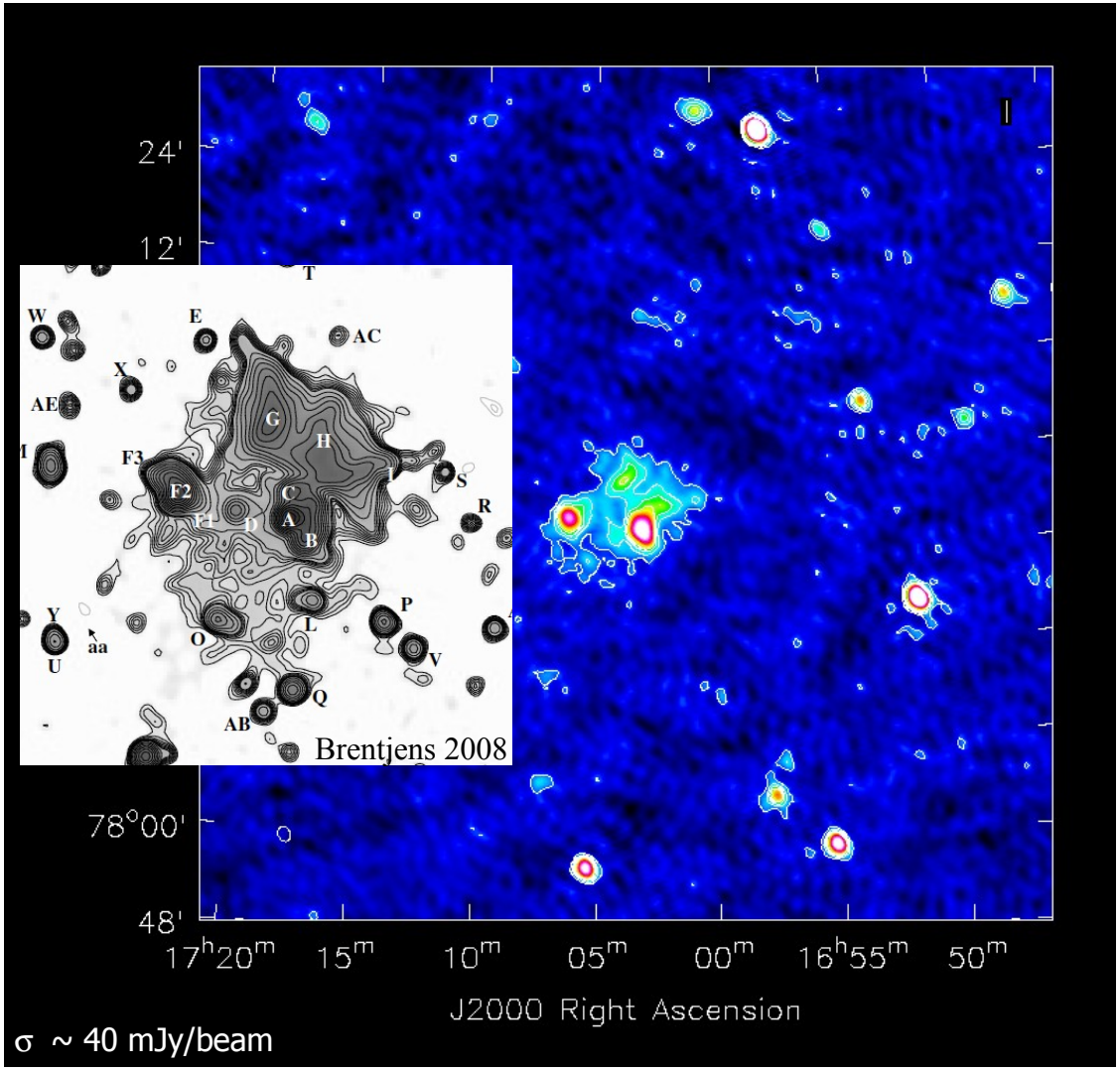
1 SB (55 MHz), concatenation of 4 time-separated observation. Calibration with a multi-component model on the individual observations. No A-team sources removal.

Her A

1 SB (53 MHz), concatenation of 4 time-separated observation. Calibration with a two-component model. No A-team sources removal. Right: uniform weighting. Left: natural weighting. The images have the same angular scale.

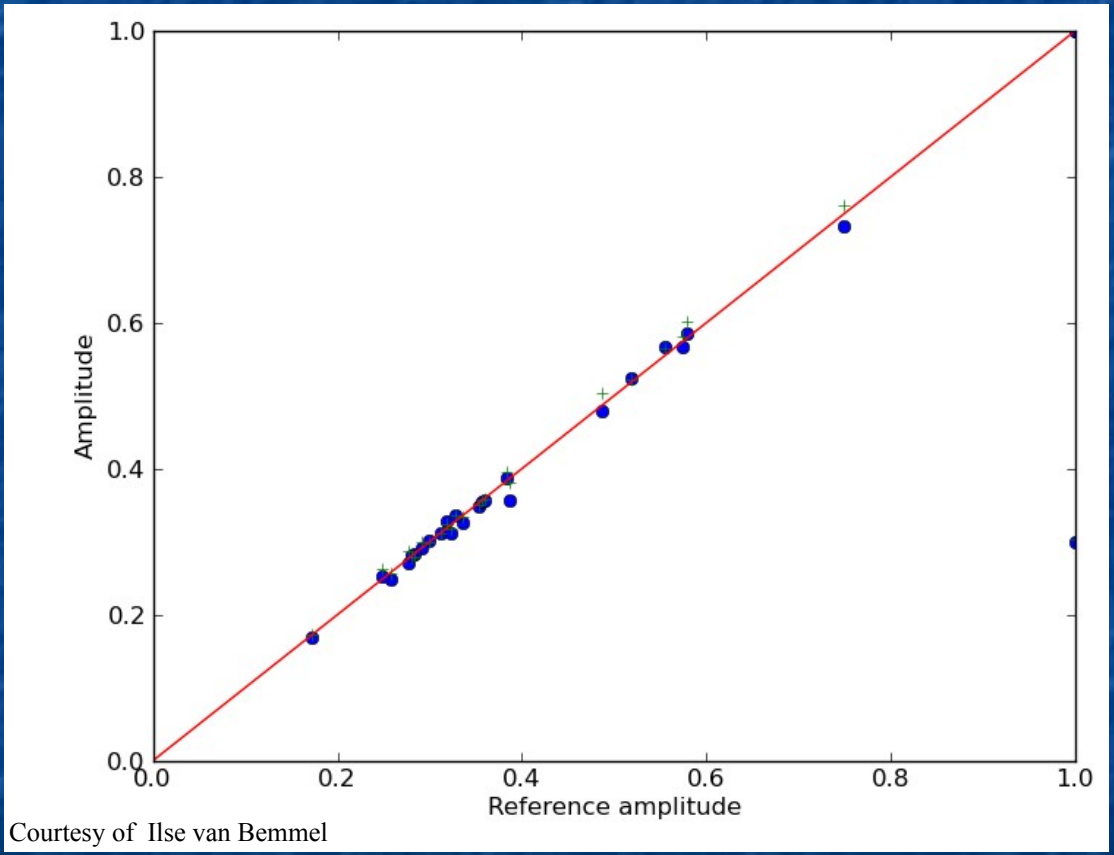


Abell 2256 (10-58 MHz)



- 5 SBs; data seems to be of good quality (i.e. little RFI)
- Data are strongly affected by CasA and CygA, located at distances of 30-40 deg
- Removal of Cas A & Cyg A, and correction for the central field. The subtraction seem to have worked fine

Calibrators (110-190 MHz)

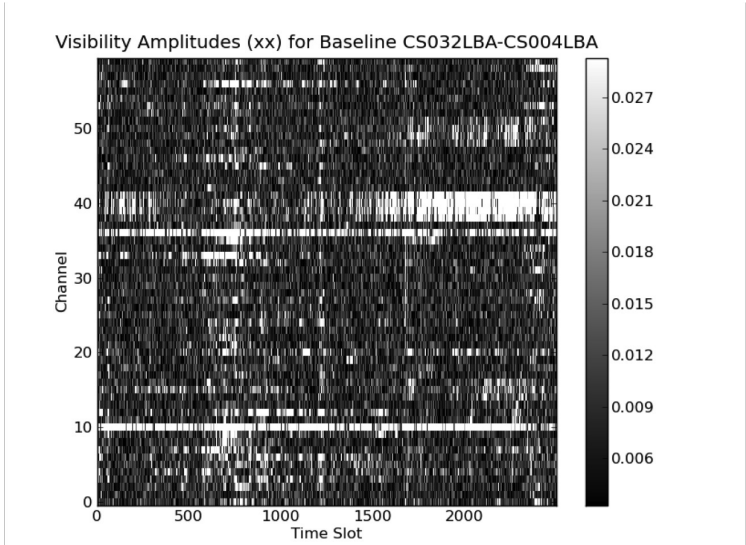


Courtesy of Ilse van Bemmel

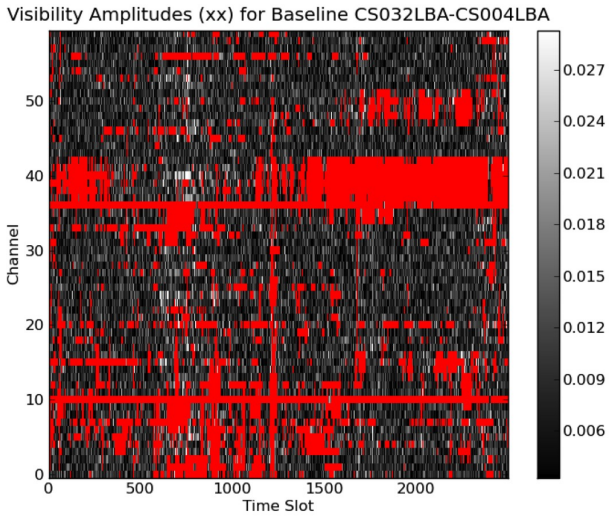
- 3C196 observed 3 times at interval of 30 minutes
- BBS, no directional gains and using the Yatawatta HBA beam model.
- The solutions of 2 observations are plotted against the amplitudes found for third one
- The amplitude stability is quite good
- Next step: compare the amplitude solutions of 3C196 with other calibrators

NDPPP with ‘rficonsole’ option

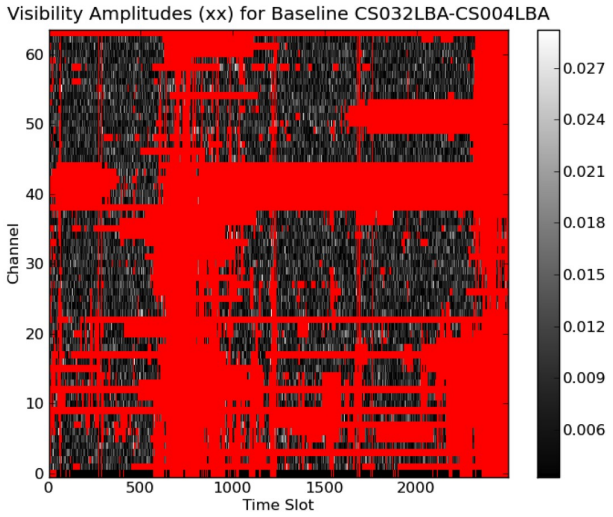
Courtesy of David Rafferty



Unflagged data



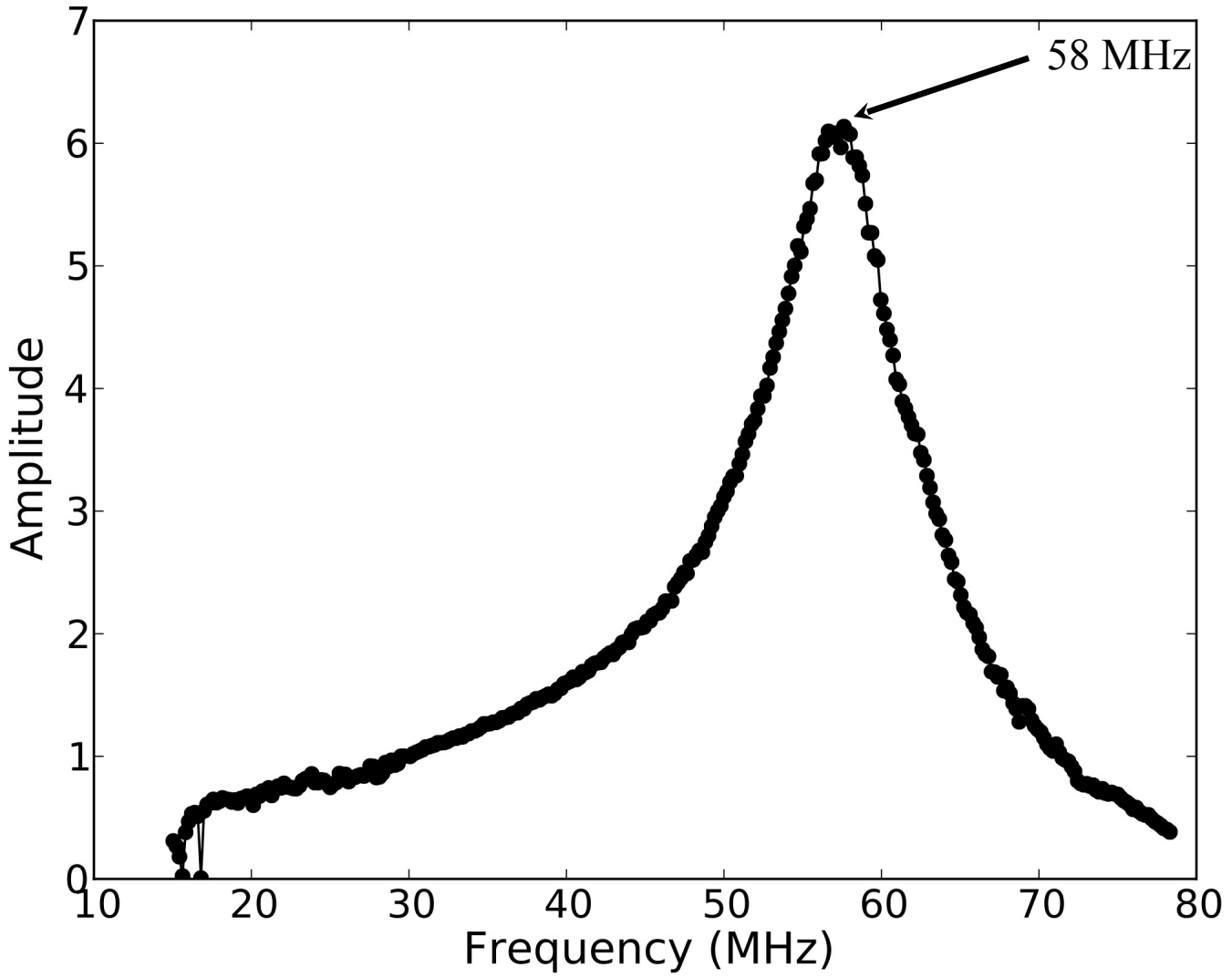
NDPPP with timewindow=100



rficonsole

LBA Global Bandpass (10-90 MHz)

Courtesy of D. Rafferty & L. Birzan



The Roadmap Document

Roadmap for progress with LOFAR imaging in the next 3-4 months
==========

v.1 Neal Jackson 11.01.22 (after imaging BW9 and a meeting with John Conway, George Heald, Neal Jackson, Ronald Nijboer, Roberto Pizzo, Antonis Polatidis, Bas vd Tol, Reinout van Weeren).

Top priority: removal of the A-team from the data

a) Directional gains in BBS (time-intensive procedure: 1 hour observation, SB with 16 channels, 1 hour on 1 lce to solve in 2 directions);

b) As method a), but on compressed data -> access to D-factors in BBS (Joris vZ.);

c) Observing the A-Team sources in multiple beams and then cross-subtract (needs to know D-factors and beam models) (Cyril, George, G. vD.);

d) The observed visibility is written as sum of source visibilities in different directions, each having the appropriate beam/smearing corruptions. The corrected visibilities are recovered by matrix inversion (Bas vd Tol).

ANNOUNCEMENTS

- Models location (/globaldata/gsm)
  - incoming
  - validated

When submitting your models, please inform G. Heald and R. Pizzo:

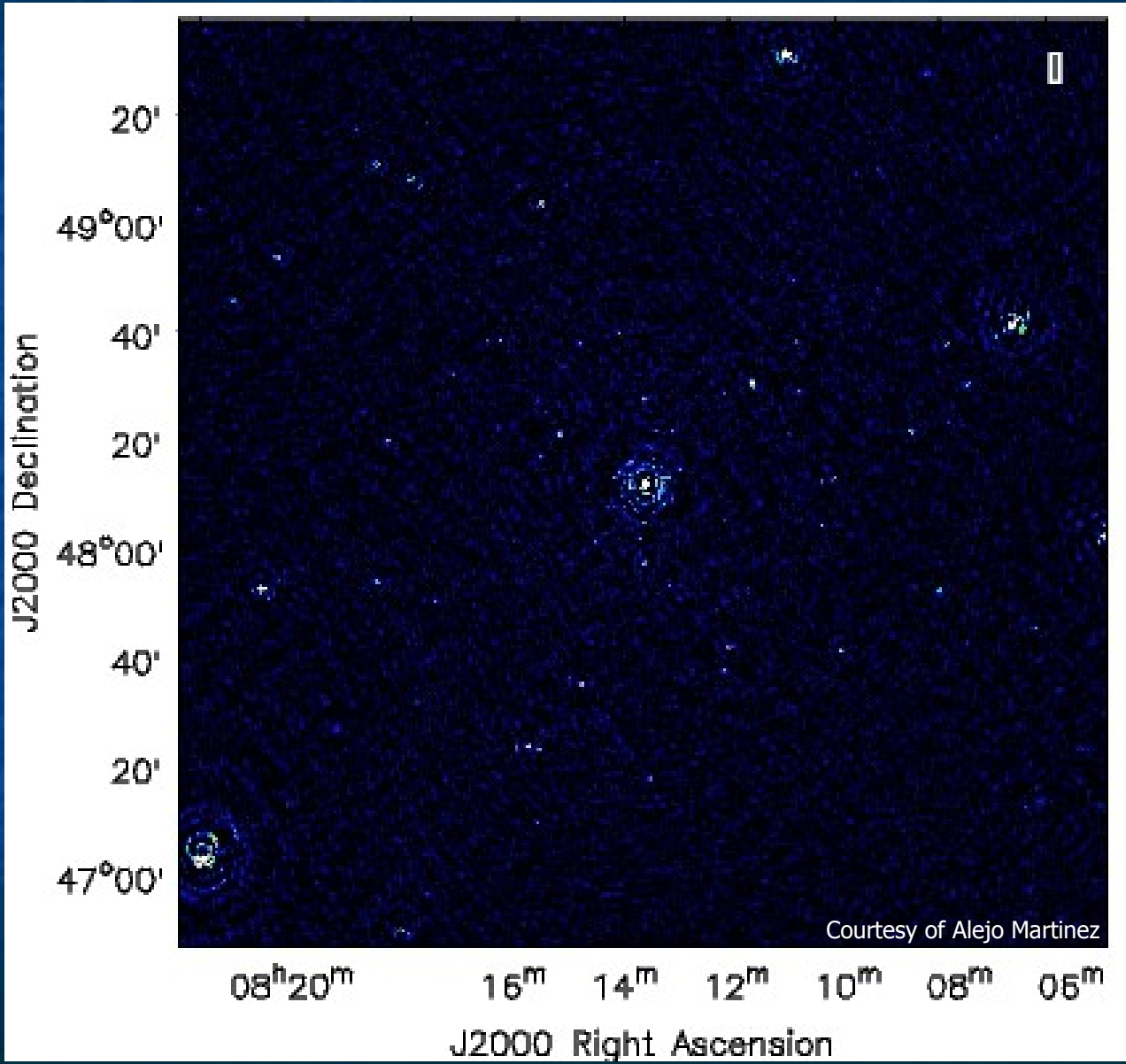
1. Quality control
2. Disk space control

- Parset library

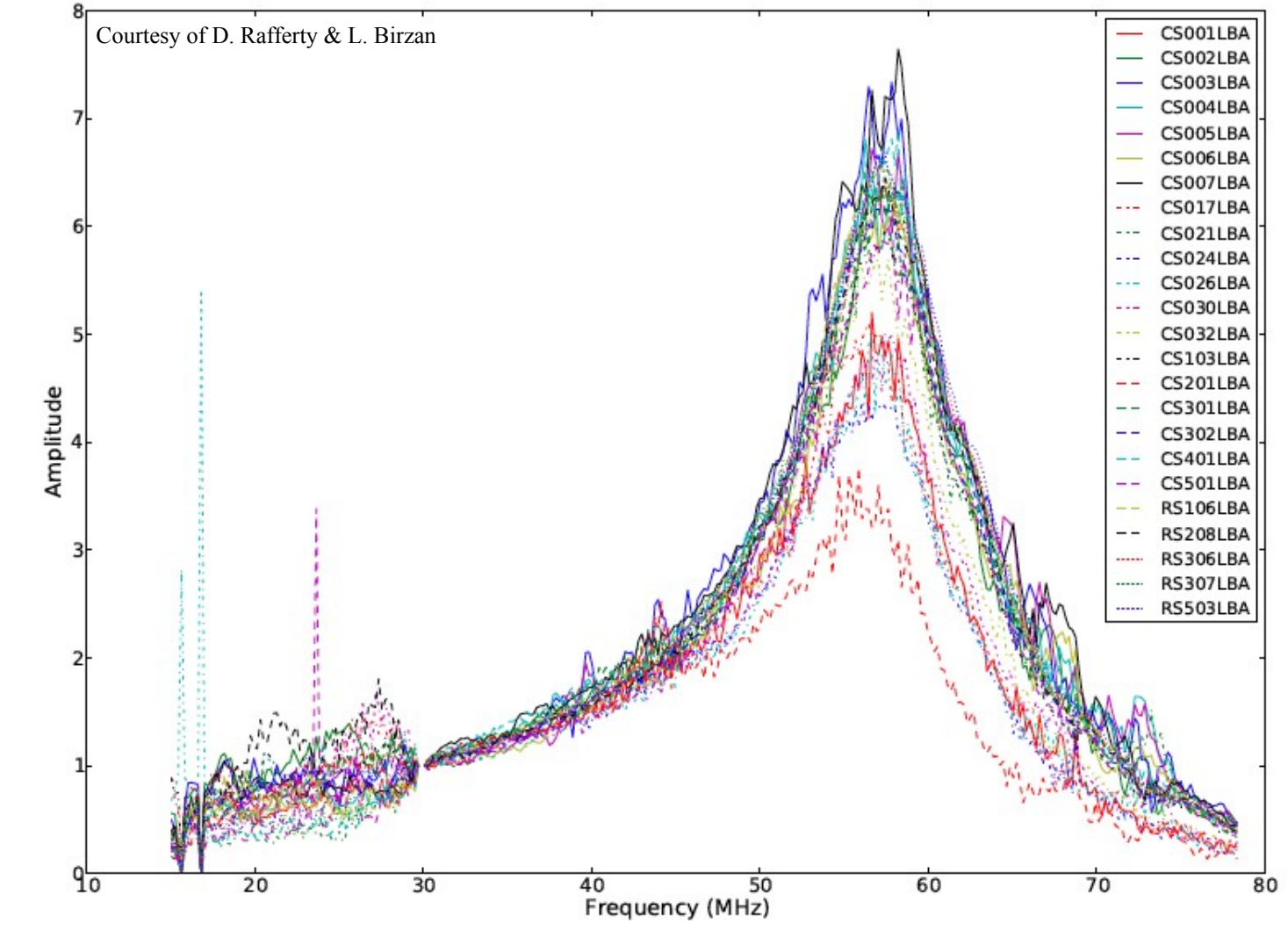
Commissioning section on the Wiki

Lofar Imaging BW 9

3C196 field (30-90 MHz)



LBA Global Bandpass (10-90 MHz)



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	L2010_22121					
	L2010_22122					
	L2010_22123					AOF
	L2010_22124					
A2256	L2011_22663	LBA	10-58	6 h	NO	AOF + NDP3
Calibrators (3C147, 3C196, 3C286, 3C295, 3C298, 3C380)	L2010_21732	LBA	30-90	1 m	YES	AOF
	L2010_21738					
	L2010_21739					
	L2010_21740					
	L2010_21741					
	L2010_21742					

3C196 field (30-90 MHz)