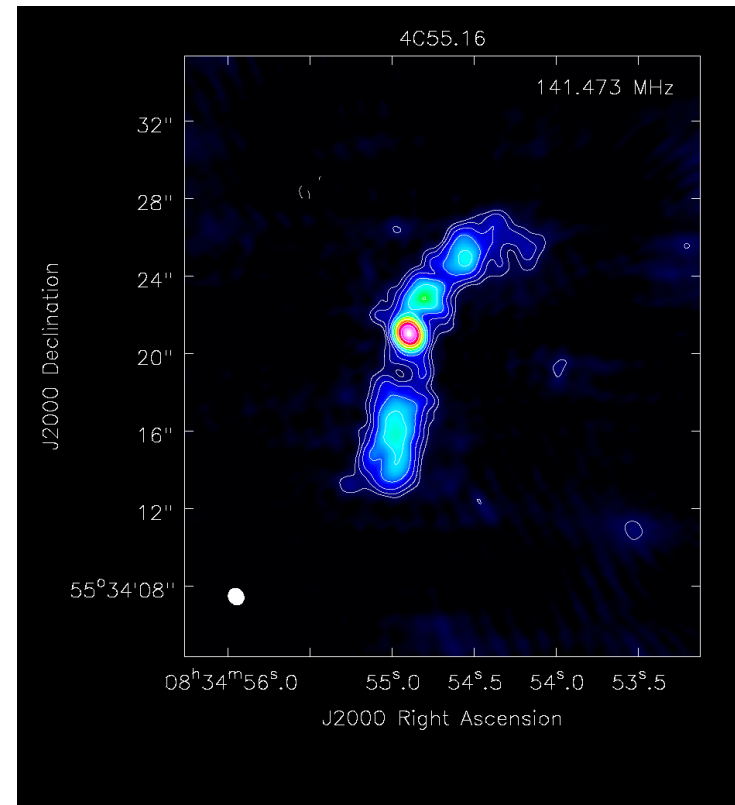


Results from the LOFAR long baseline workshop

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**the Long Baseline
Working Group**

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The long baseline workshop

- 18 participants (plus local “drop-ins”) from Netherlands, Germany, UK, Ireland, France & Sweden

Goals

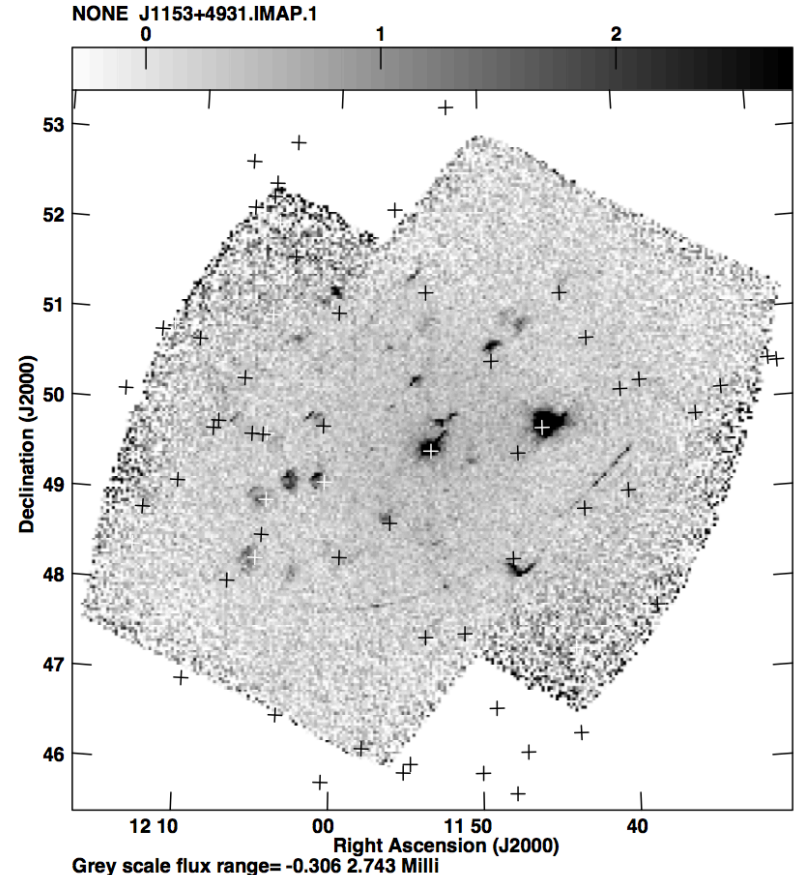
- Make progress on standard data reduction tools for long baseline datasets
- Discuss topics like beam models, wide-field imaging
- Assist new/inexperienced users with existing datasets and/or proposals

locapi

- the LOnG-baseline CAlibration Pipeline
- For nodding or simultaneous calibration, but requires 1:1 subband match
- Assumes pre-processed data (RFI-flagged)
- Handles the following steps:
 - Calibrate Dutch array (+ International stations if primary calibrator is compact enough and modeled)
 - Form tied station from all core, or just superterp
 - Optionally shift and average target pointing
 - Convert to circular, merge subbands, convert to FITS
 - Output is relatively small FITS file, ready to calibrate/ image with standard VLBI techniques in AIPS

FRmap

- Neal Jackson's work: useful for providing a finder map for compact sources that can be targeted at high resolution
- Now capable of handling long tracks, wider bands



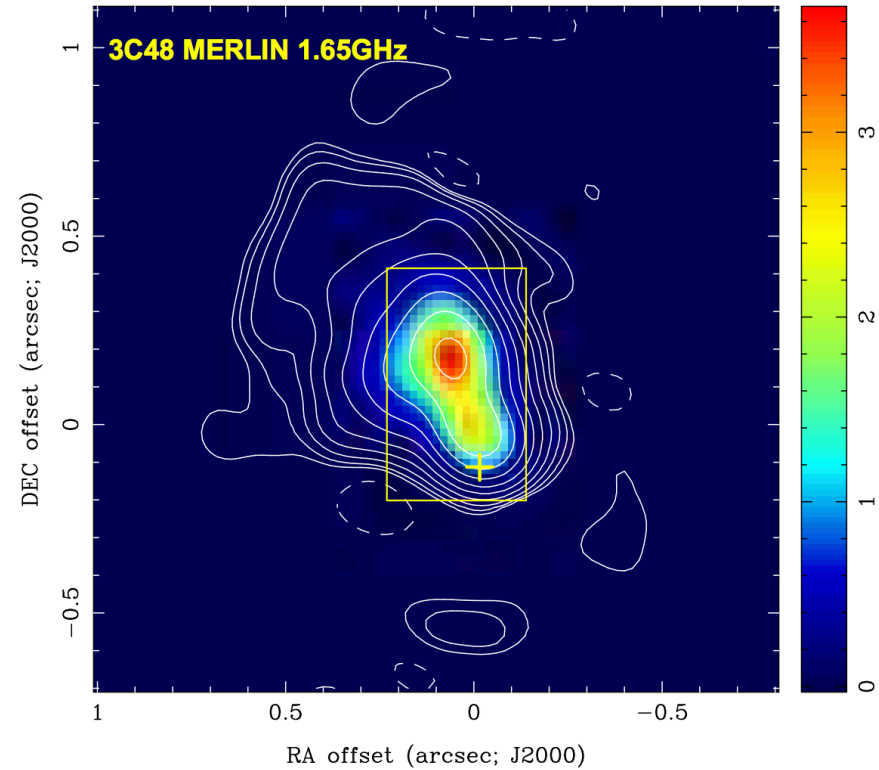
Beam models

- Tobia Carozzi has been analysing the EM beam model: shows better results using spherical vector harmonics than the Taylor expansion used in the current “Hamaker” beam model
 - Plan: package results into the library format used by the Hamaker model, can be easily integrated into NDPPP/BBS
- Also improved on the SE607 (Onsala) station calibration (holography may improve further)
- Bad international station leakage is likely a combination of these two effects

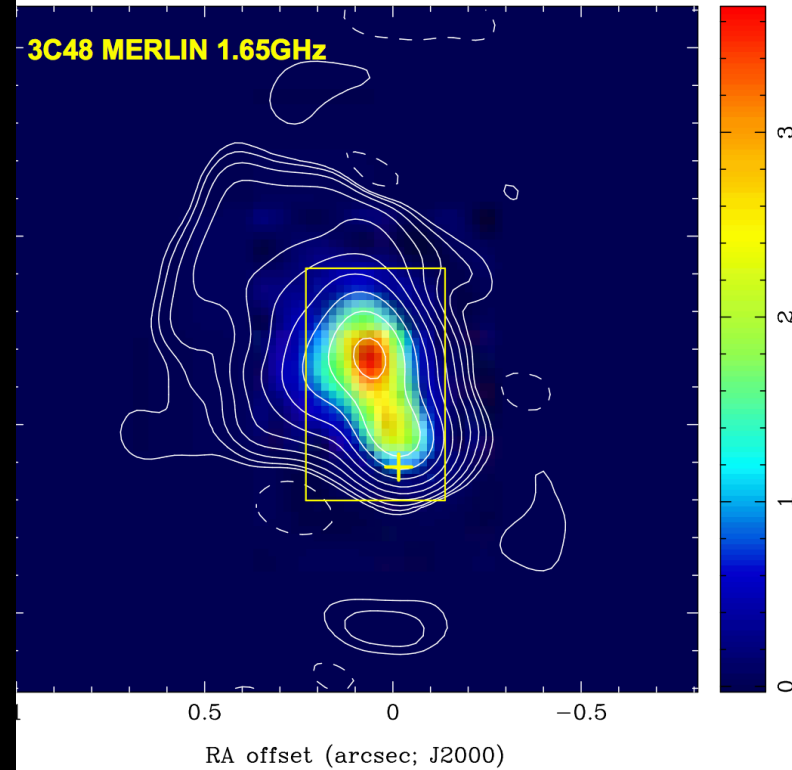
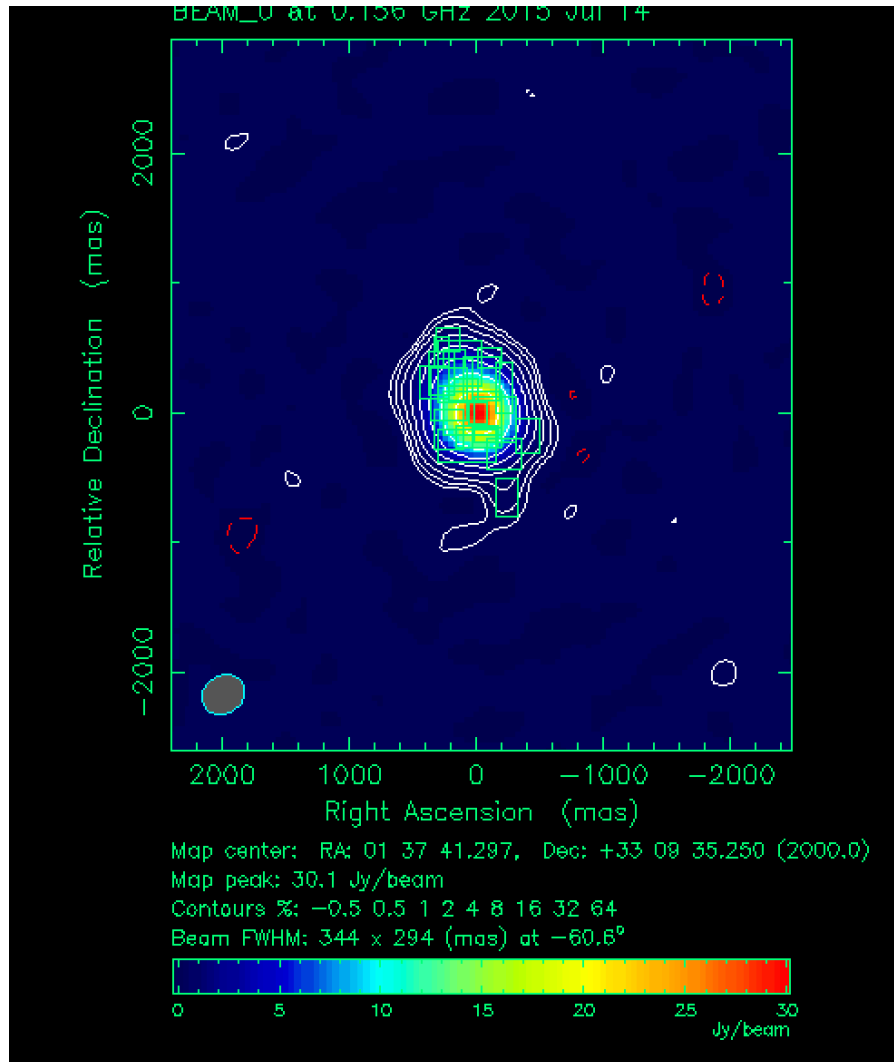
RO Long Baseline Pipeline

- Issues with the StationAdder step of the long baseline pipeline characterised and corrected (thanks Leah!)
 - The casacore issues really slowed this process down, unfortunately
- Lack of pipeline developer time means that the much-awaited step of adding target shifts to the long baseline pipeline is not going to be implemented anytime

Imaging results I: 3C48

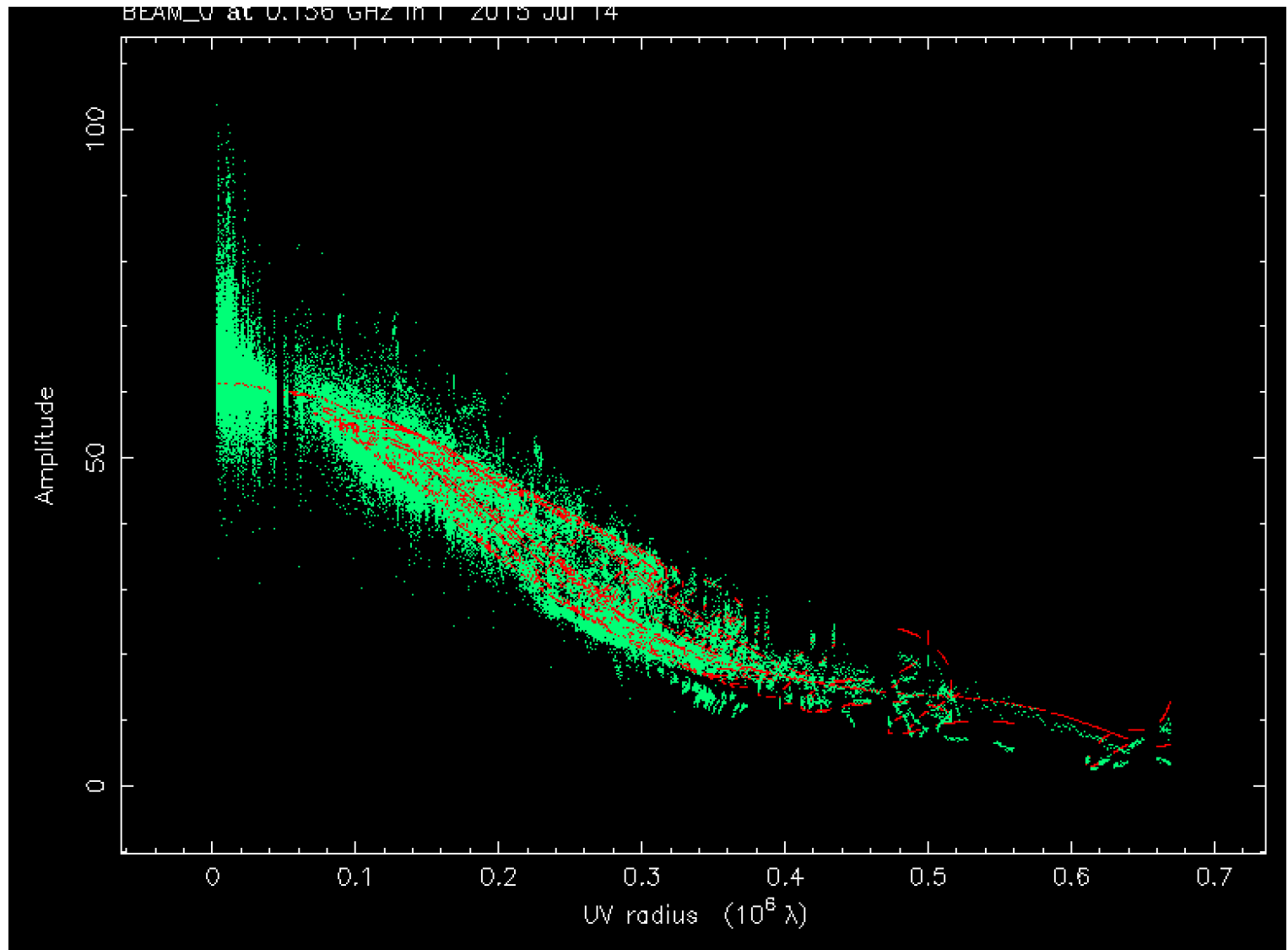


Imaging results I: 3C48



6 hours, 3 MHz, 600:1 dynamic range

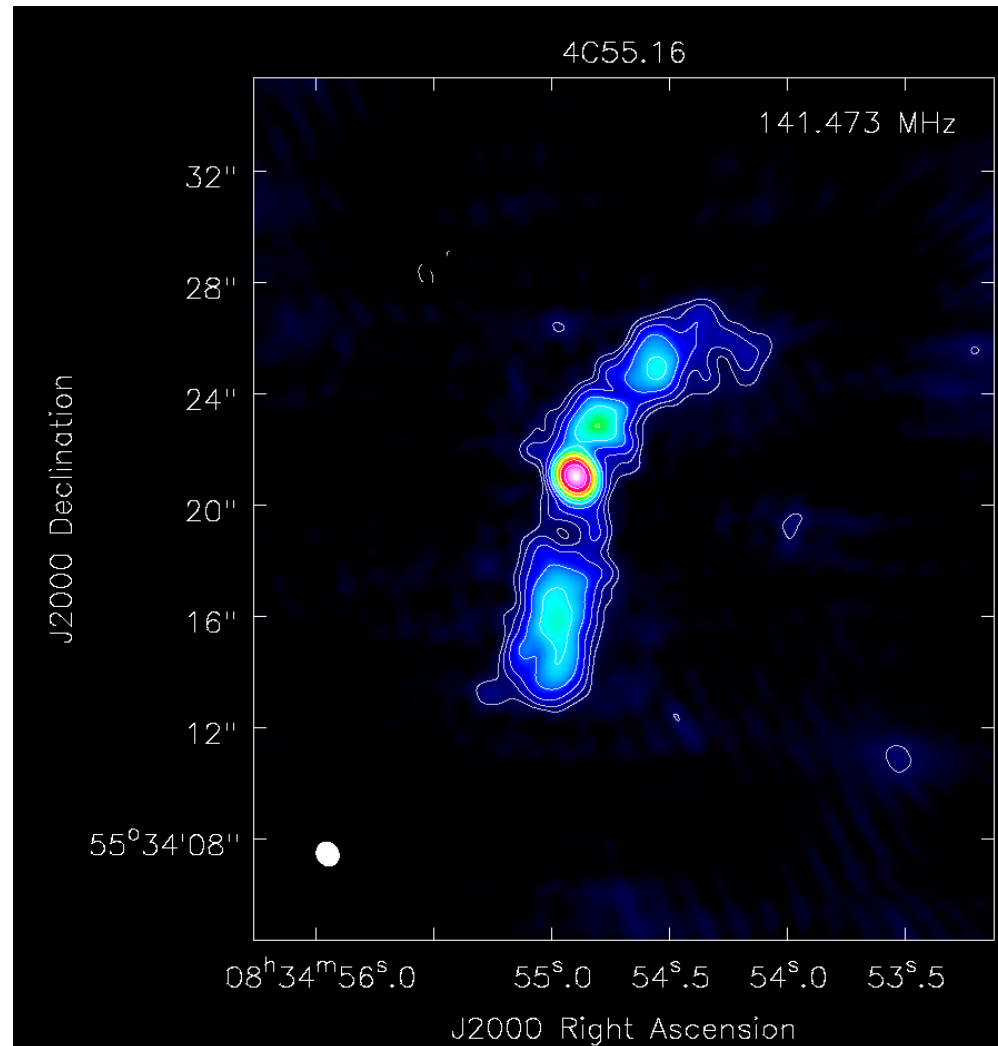
Imaging results I: 3C48



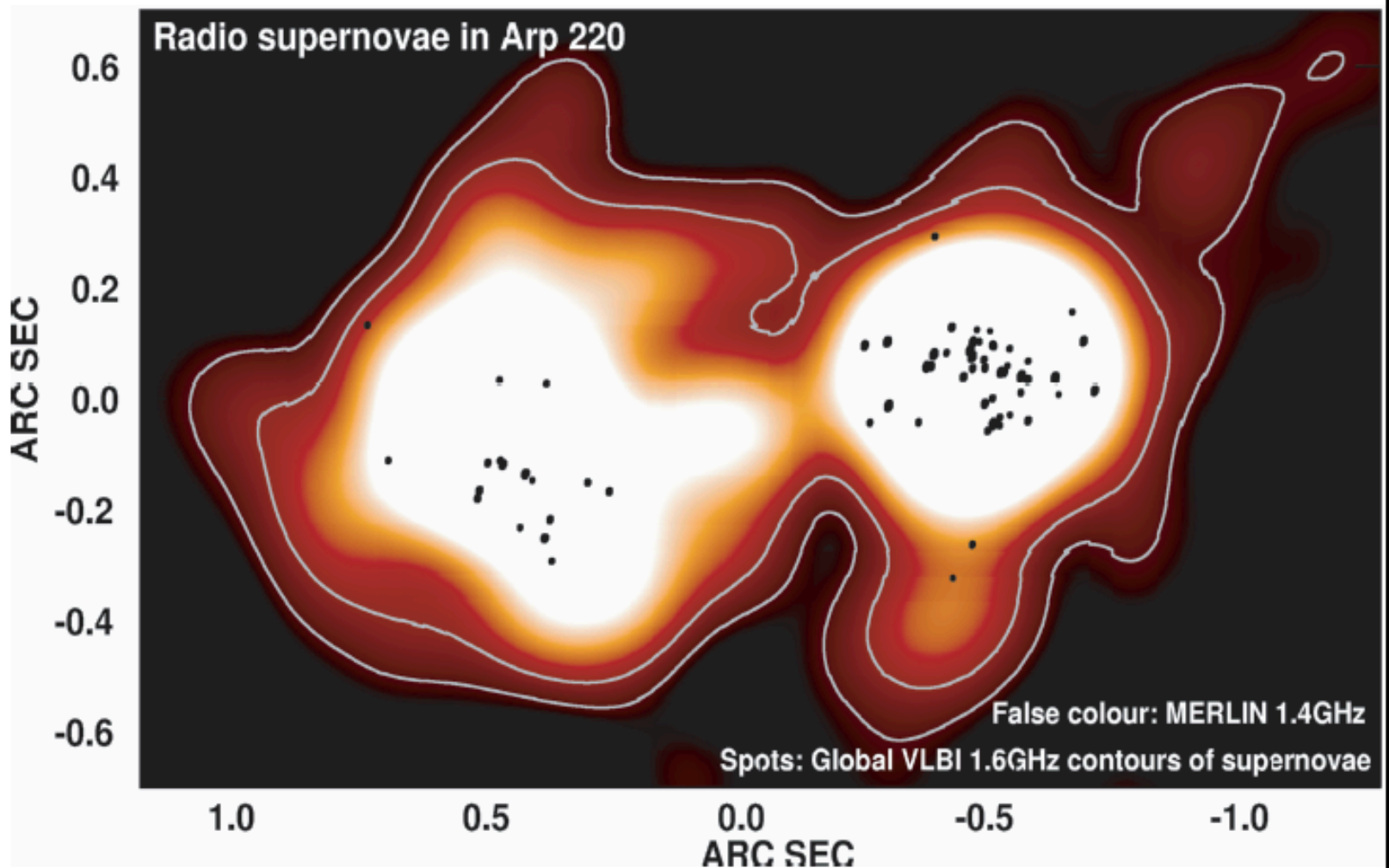
Imaging results II: 4C55.16

- Cavity-excavating AGN in a cluster
- Just locapi, FRING, image (tens of minutes of compute + few minutes actual work)

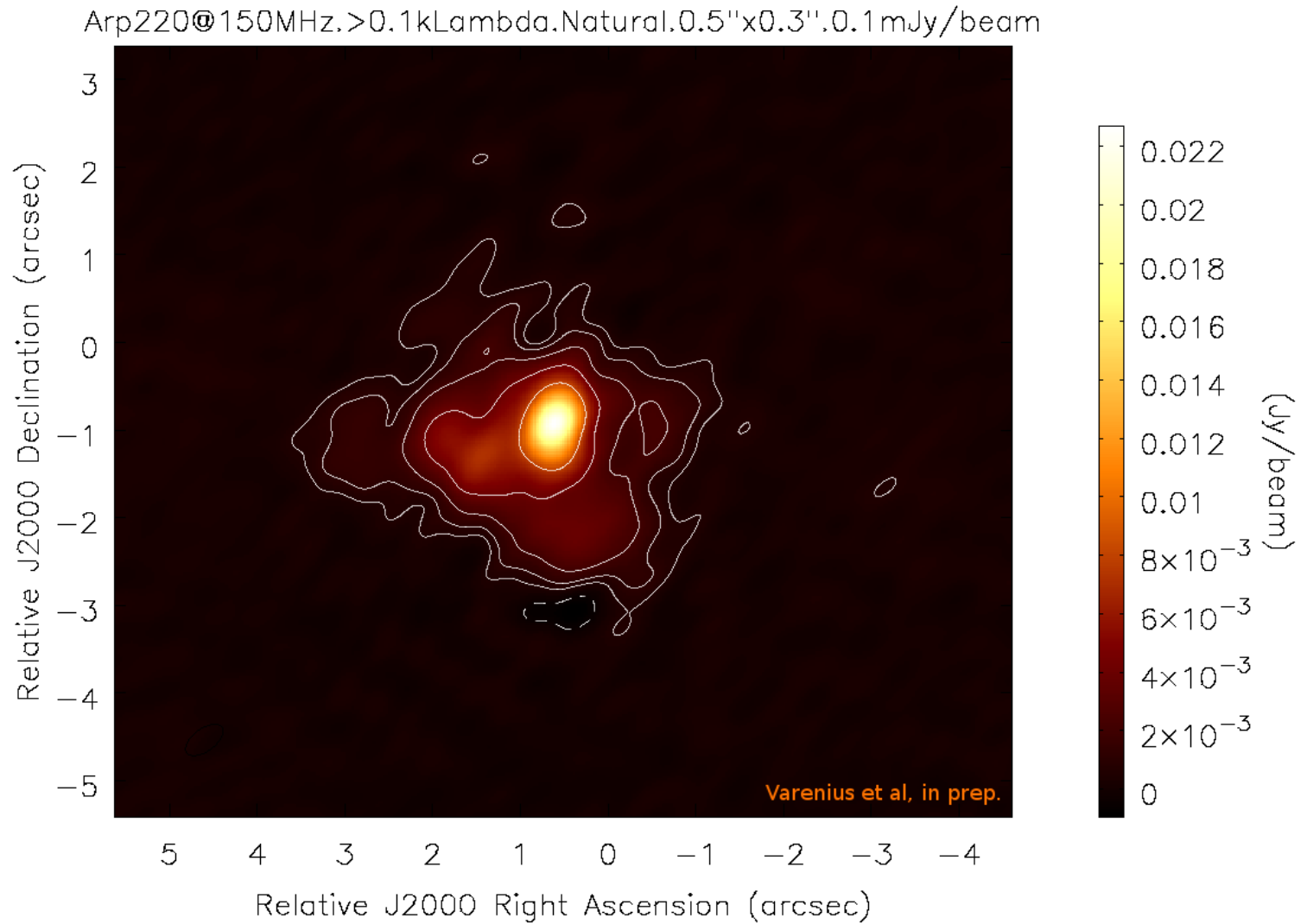
J. Moldon



Imaging results III: Arp 220

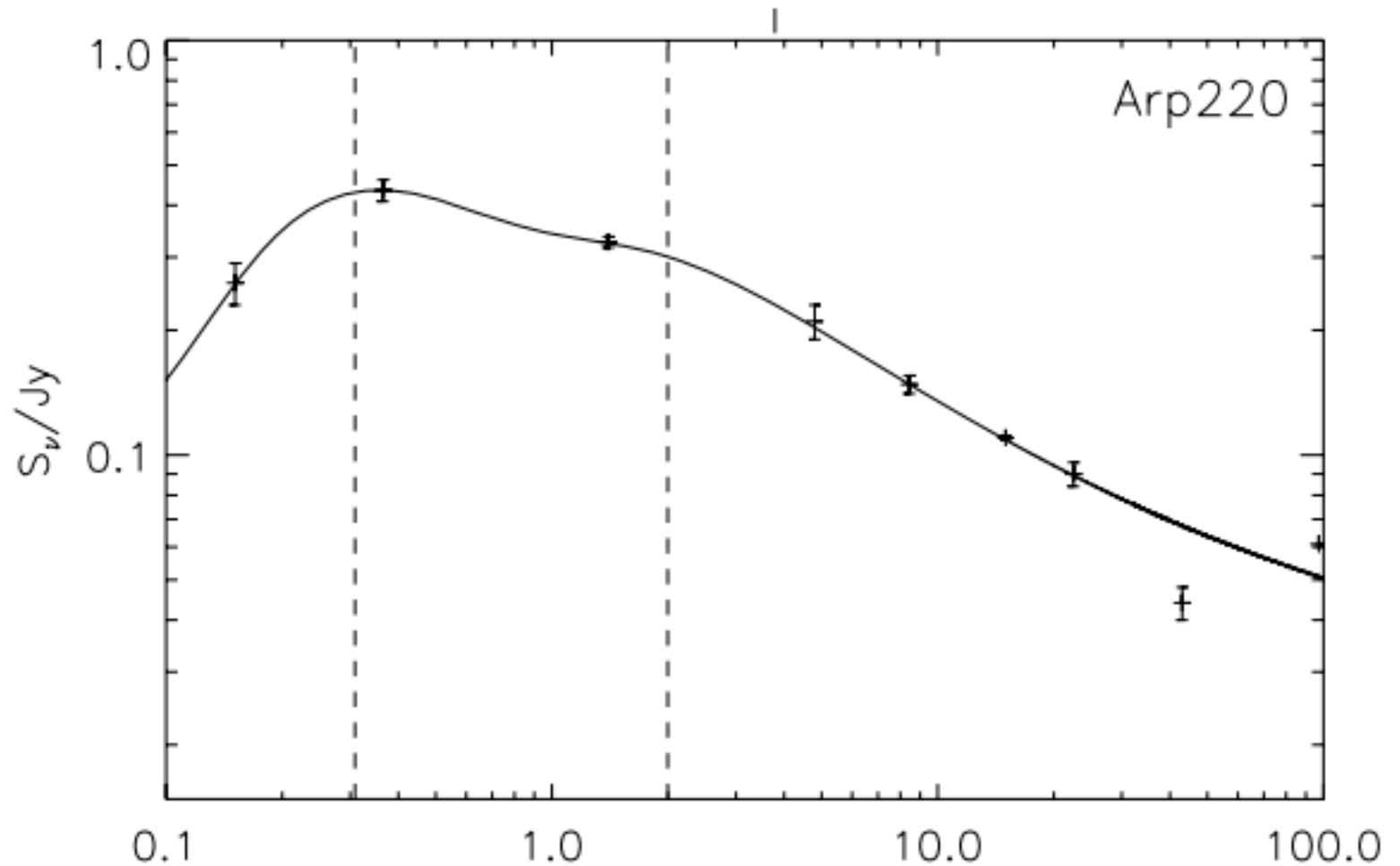


Imaging results III: Arp 220



E.Varenius et al., in prep

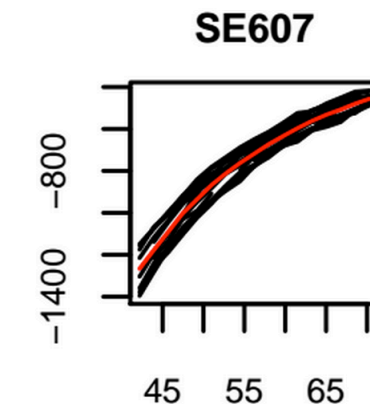
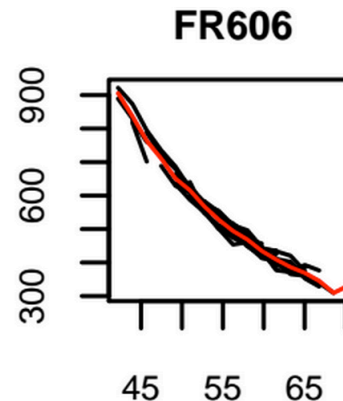
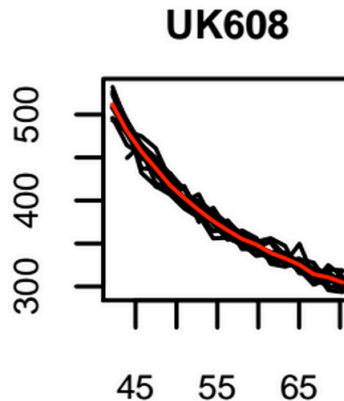
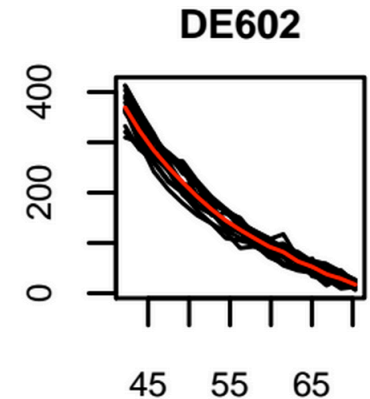
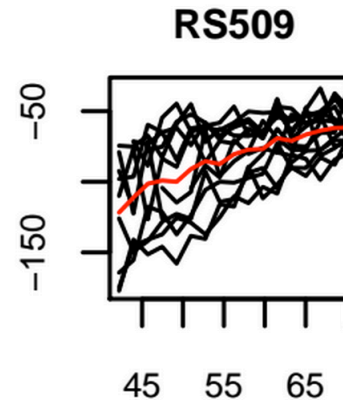
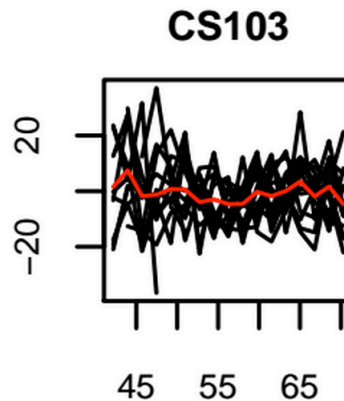
Imaging results II: Arp 220



Clemens et al., 2010

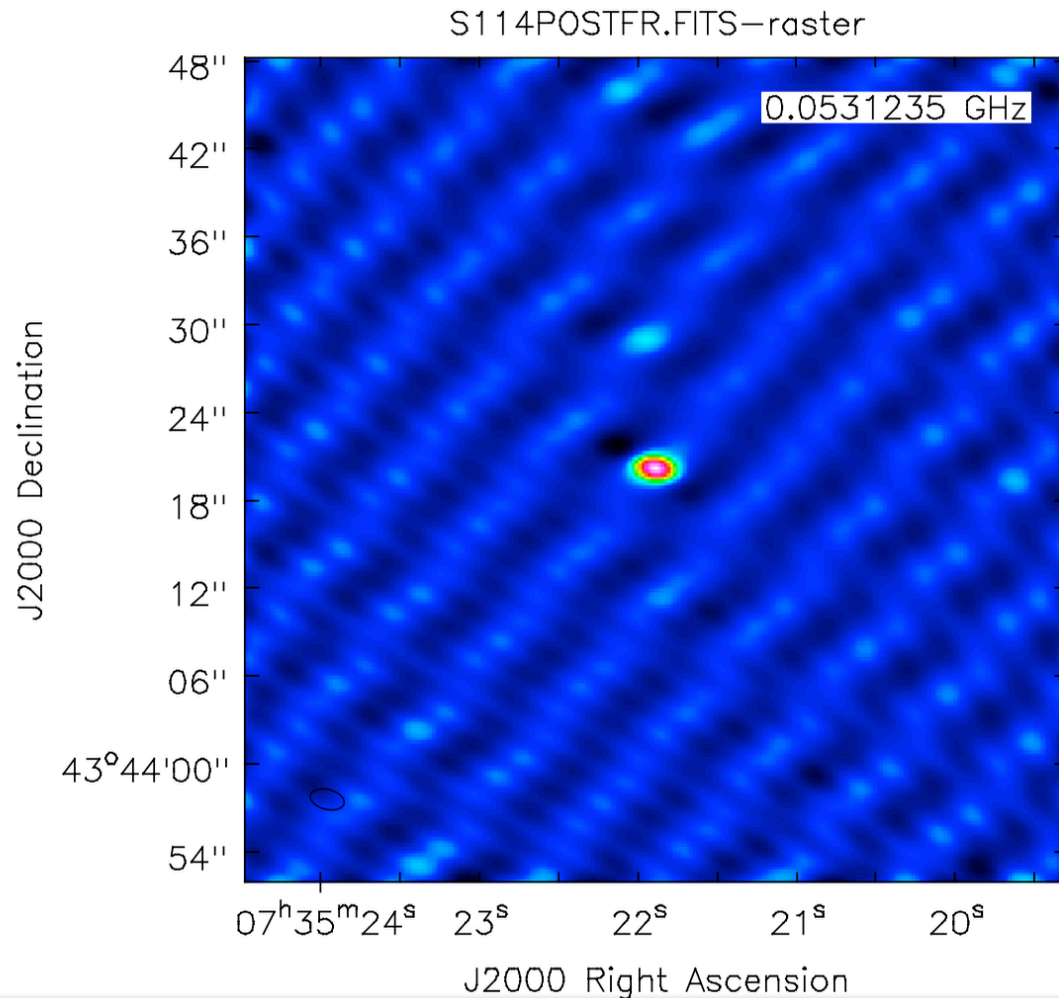
Imaging results IV: LBA

- Differential ionospheric delays become extreme:



L. Morabito,
3CI47

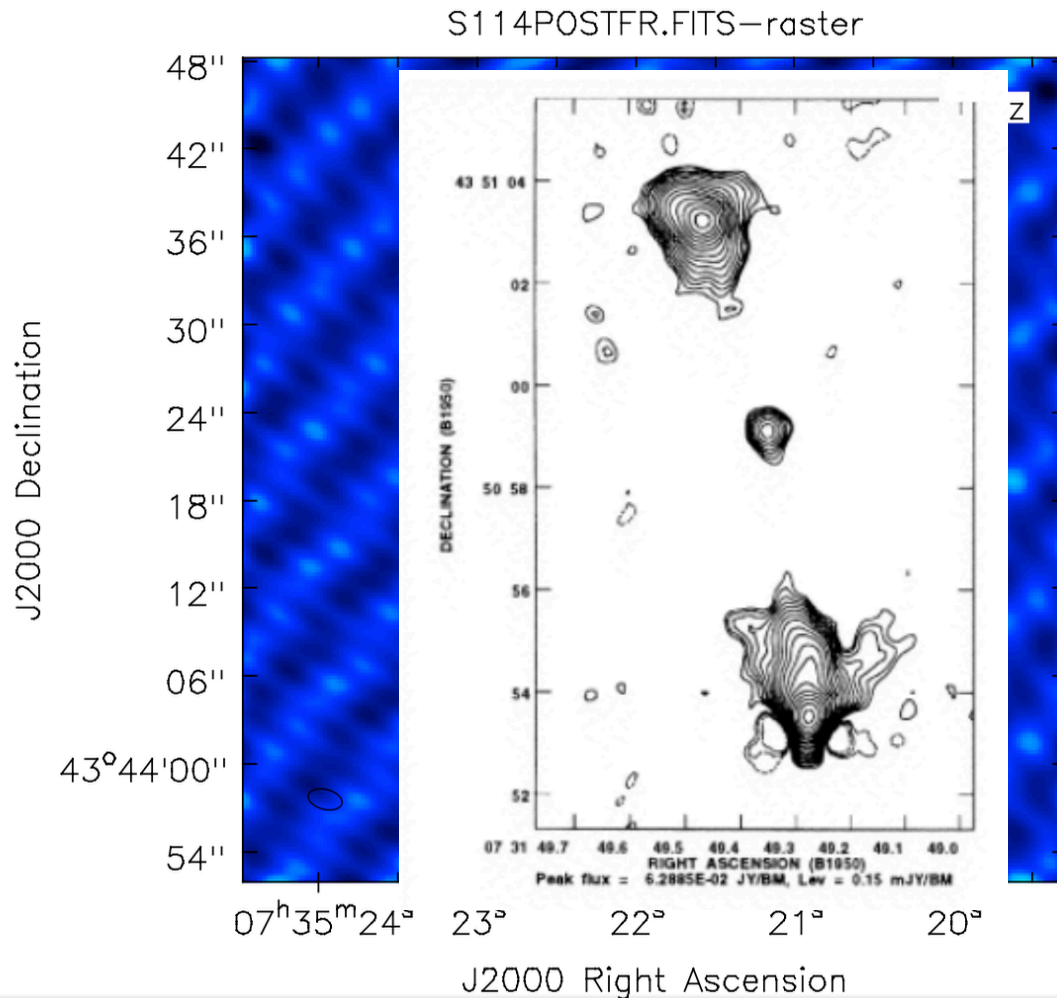
Imaging results IV: LBA



Point source model in, no selfcal, single time-independent amplitude correction for the international stations: still recovers double-lobed structure!

L. Morabito

Imaging results IV: LBA



Point source model in, no selfcal, single time-independent amplitude correction for the international stations: still recovers double-lobed structure!

L. Morabito

Other results

- Rachel & Colm from Dublin generated good images of an off-center source from their Cycle 2 data

Summary, long baseline views

- If you set your observations up correctly, then reducing long baseline data is relatively straightforward
- New users (just like everyone) struggles mightily with Northstar
- Software rollouts are problematic.
 - Single points of failure (e.g., 1 person on holidays...)
 - External users not notified