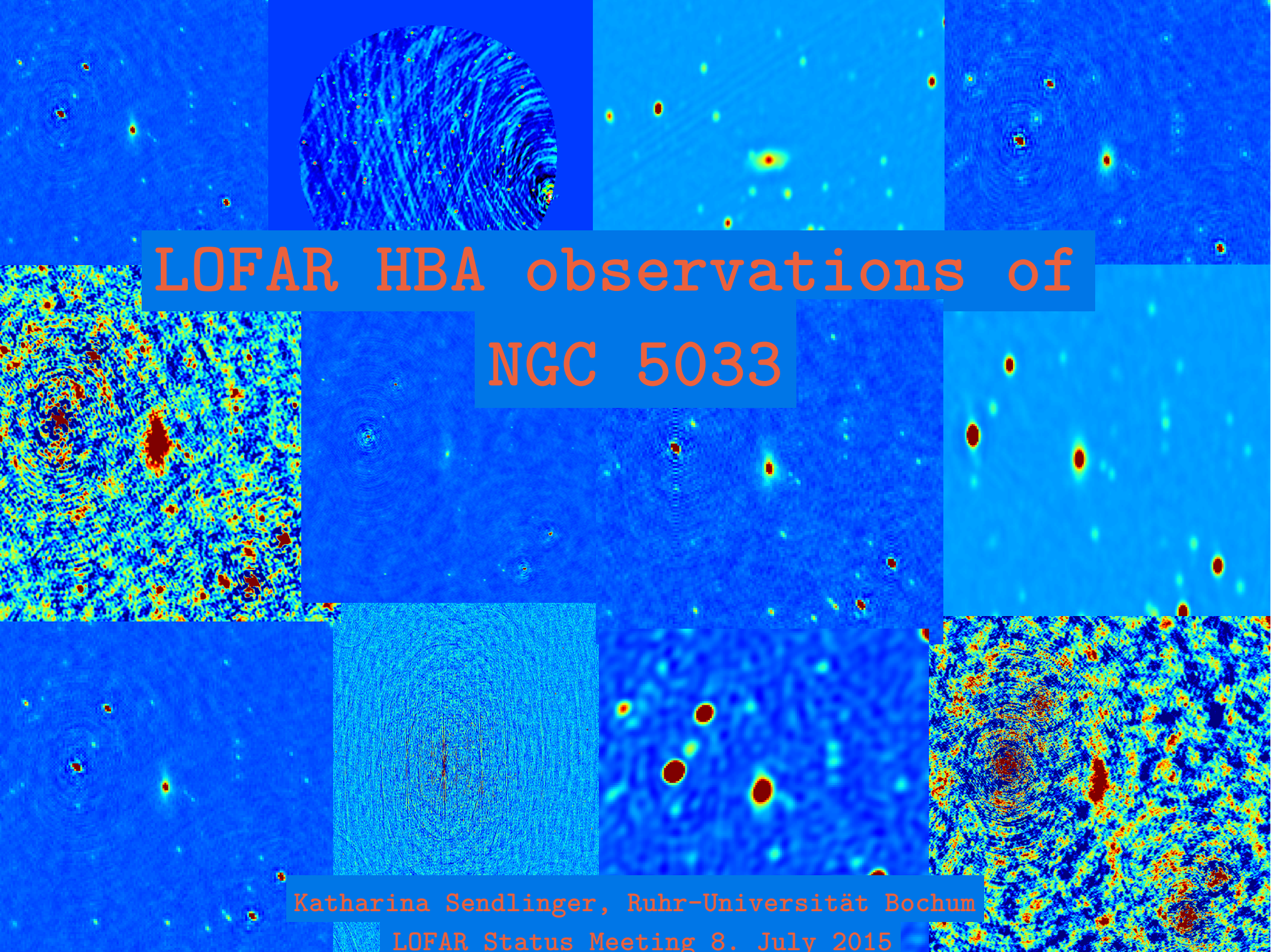


LOFAR HBA observations of NGC 5033

Katharina Sendlinger, Ruhr-Universität Bochum

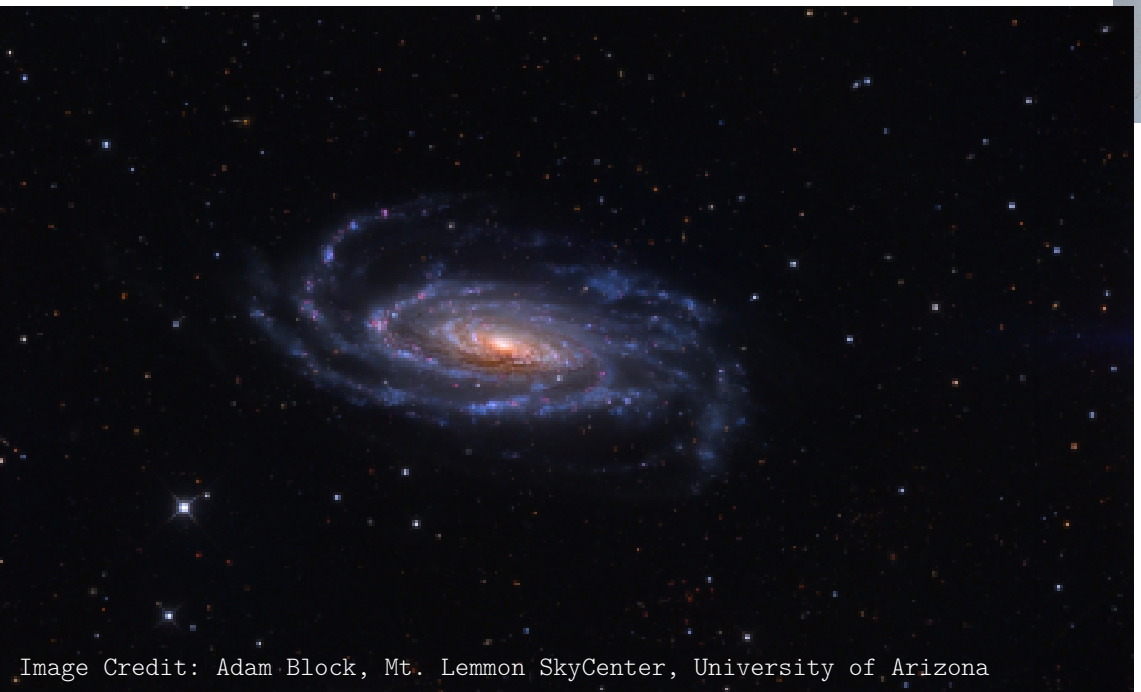
LOFAR Status Meeting 8. July 2015

Data

- Cycle 2 (LC2_009)
- HBA low (110 - 190 MHz)
- 8 Hour observation

LOFAR HBA

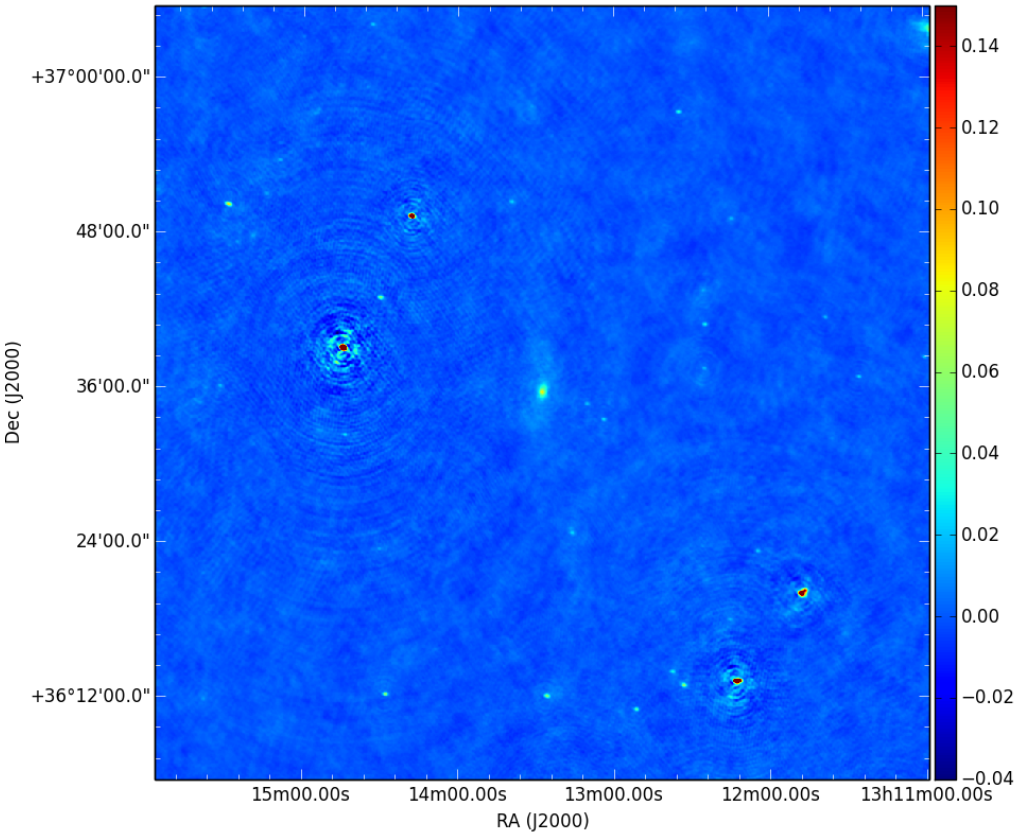
NGC 5033



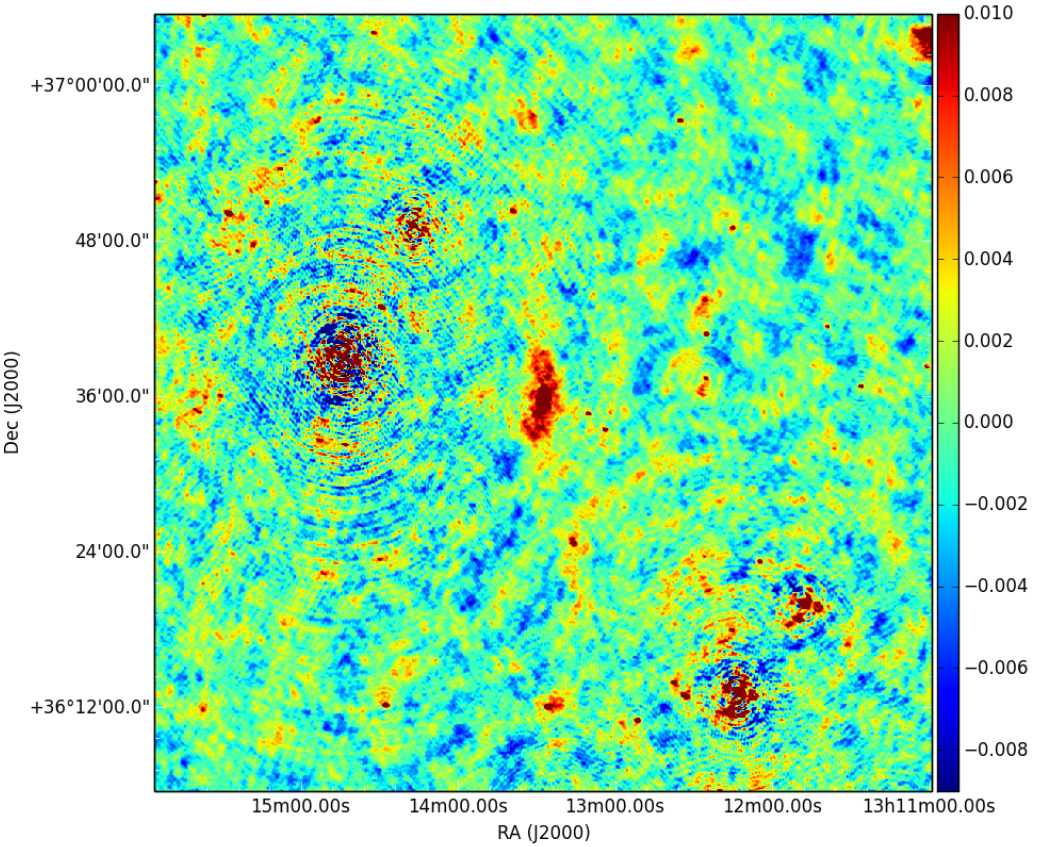
- NGC 5033: nearby galaxy with large angular extend and peculiar features

ASTRON's selfcal.py script

ASTRON's selfcal script



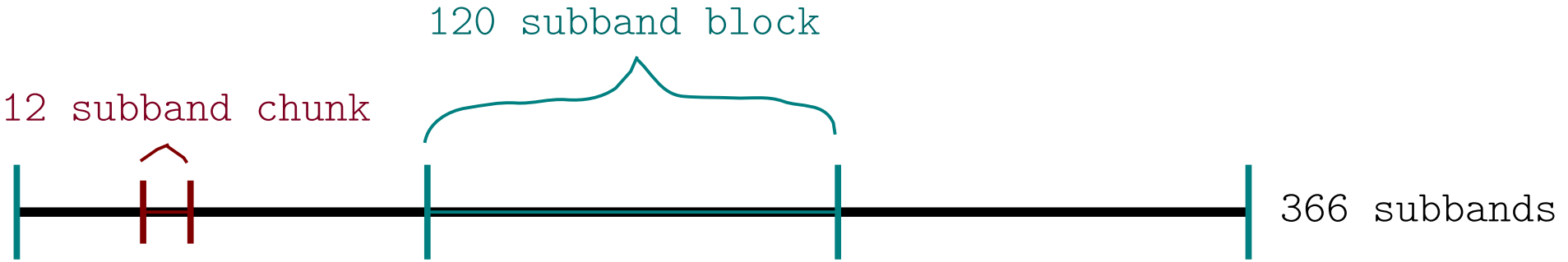
ASTRON's selfcal script, scale changed



- Beam size: 19" x 15"
- Integrated flux: 1.2 Jy
- Noise: 0.002 Jy

Calibration and Imaging strategy

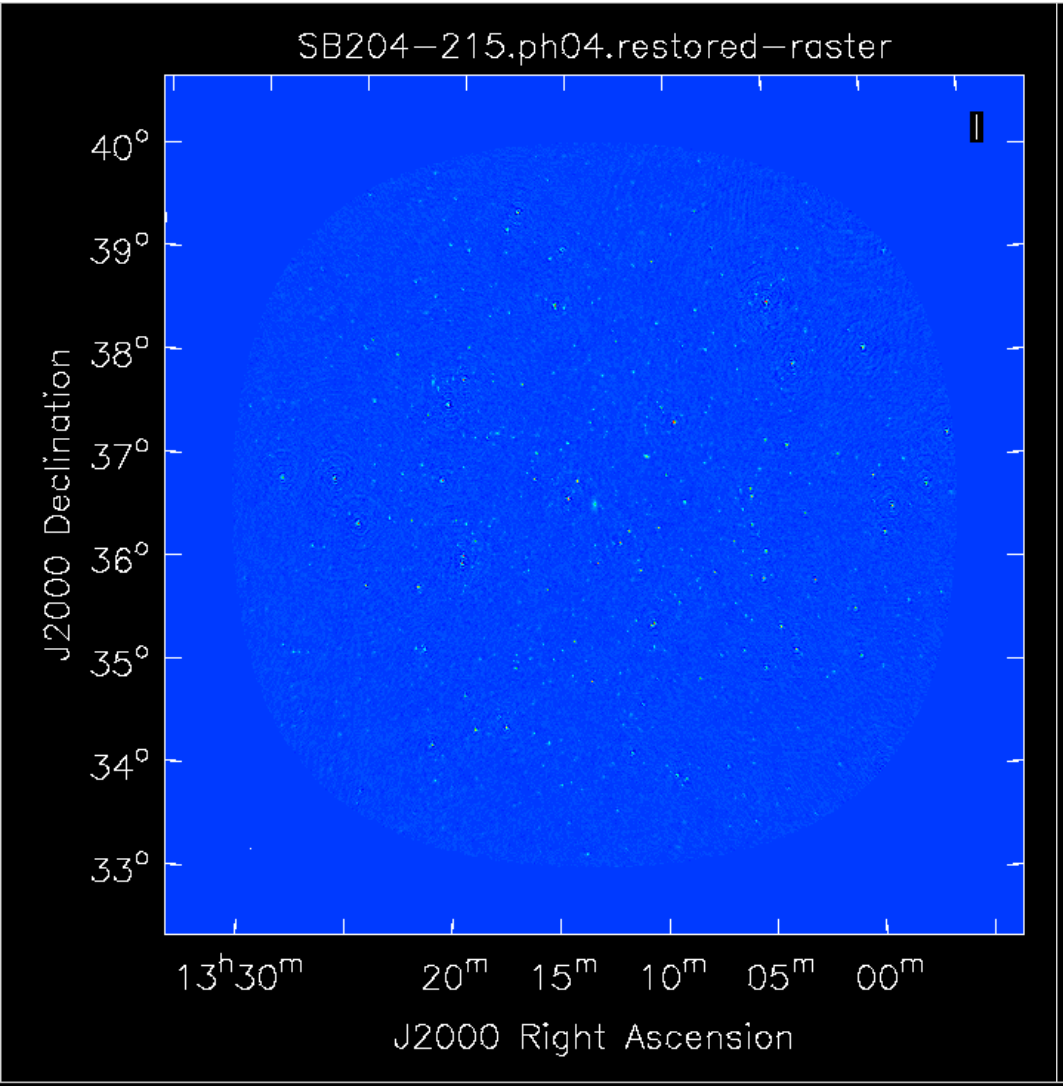
- Pre-processing and demixing of target by ASTRON Imaging Pipeline
- Demixing of Calibrator
- Amplitude-Calibration
- Phase-Calibration:



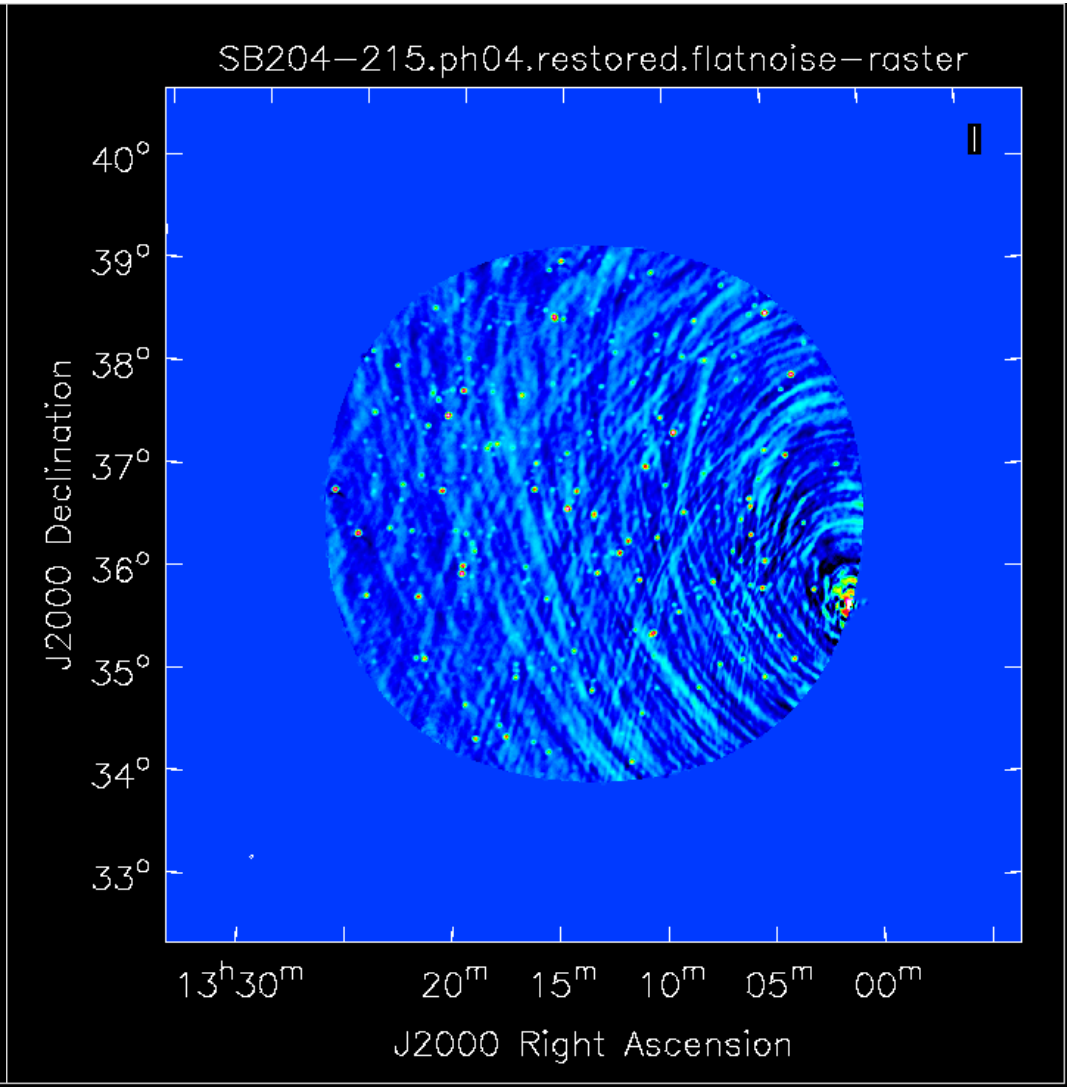
- Phase-calibration on one chunk of 12 subbands → phase-selfcalibration → find a good skymodel → use the skymodel for the whole block of 120 subbands
- Make one final image in CASA

AWImager 1.0 vs AWImager 2.0

AWImager 1.0

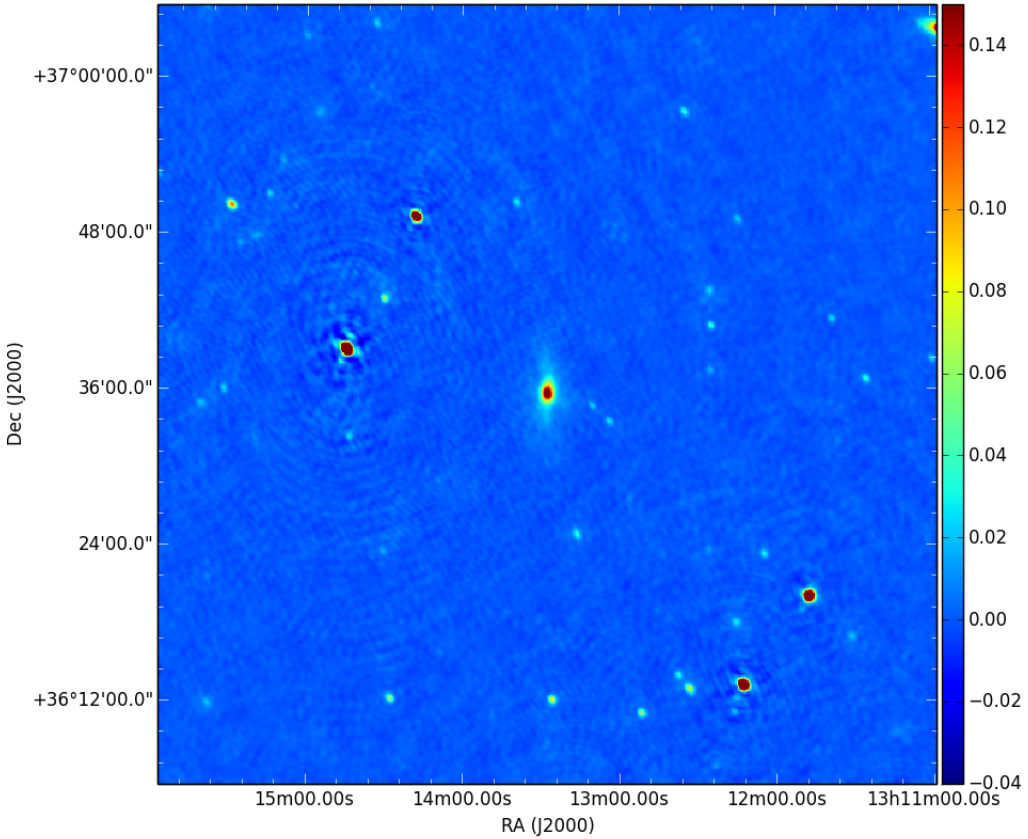


AWImager 2.0



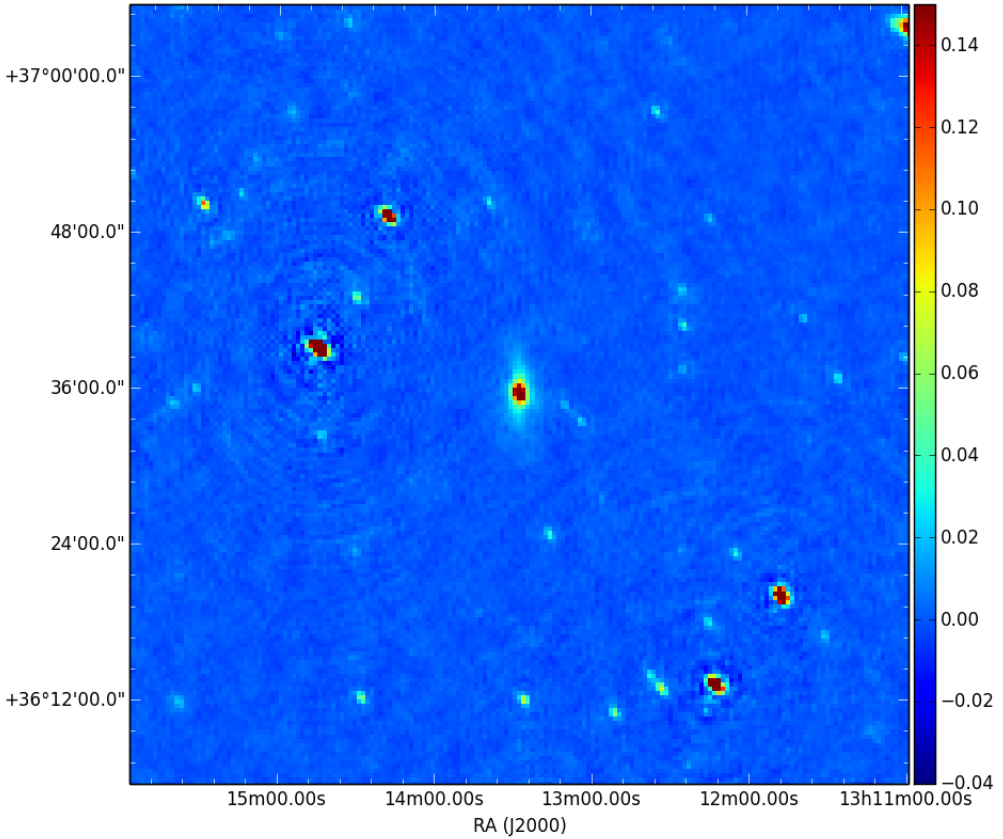
CASA CLEAN vs AWImager 1.0

CASA CLEAN image after 2 self-cals



- Beam size: 34" x 26"
- Integrated flux: 1.2 Jy
- Noise: 0.1 Jy

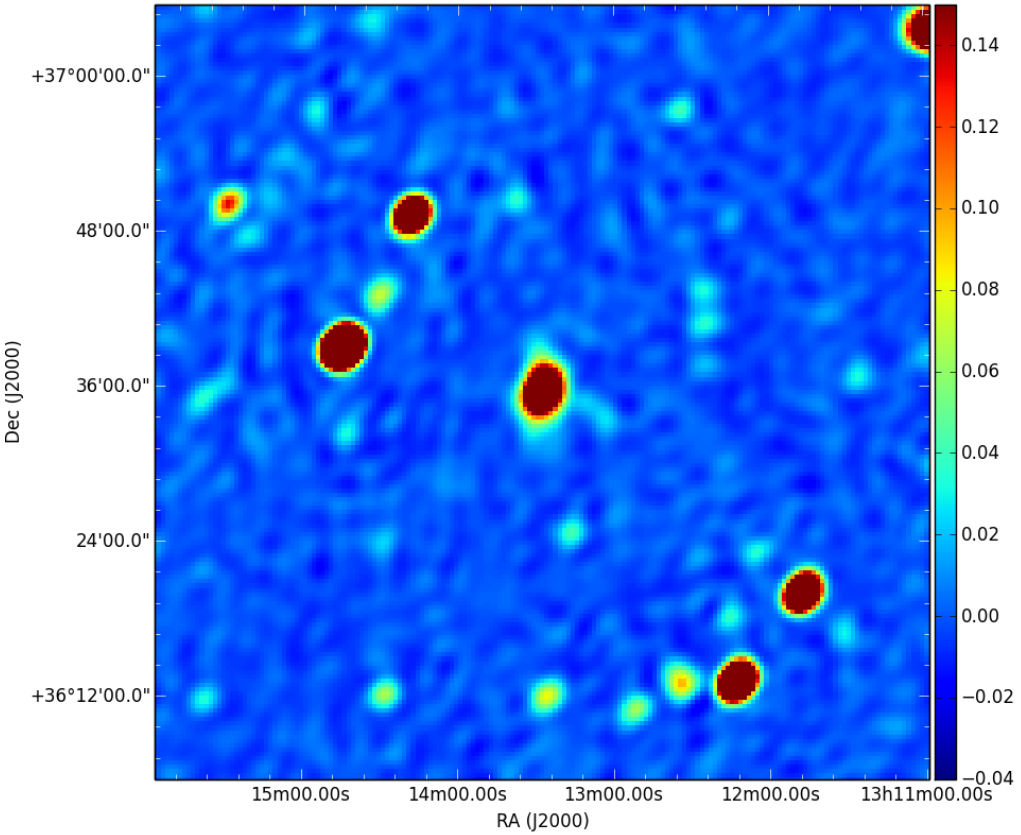
AWImager image after 2 self-cals; (u,v) cut-off



- Beam size: 53" x 30"
- Integrated flux: 1.1 Jy
- Noise: 0.1 Jy

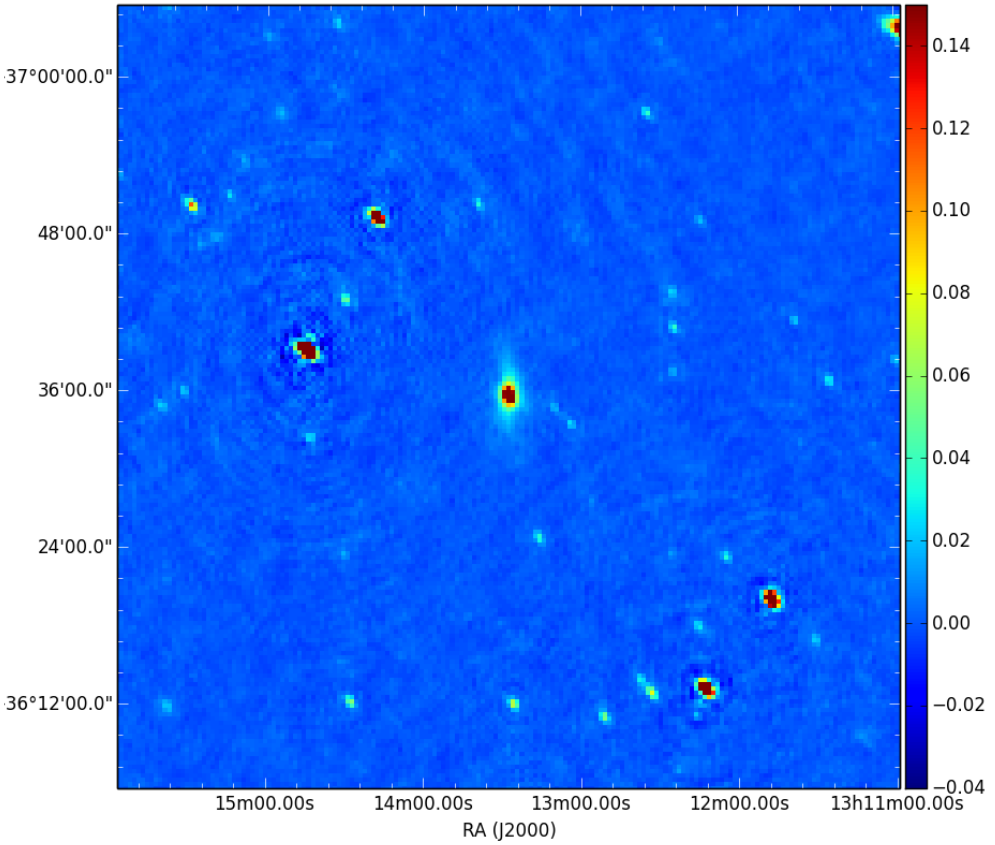
Including Remote Stations

AWImager,
phase-calibrated



- Beam size: 128" x 106"
- Integrated flux: 0.9 Jy
- Noise: 0.005 Jy

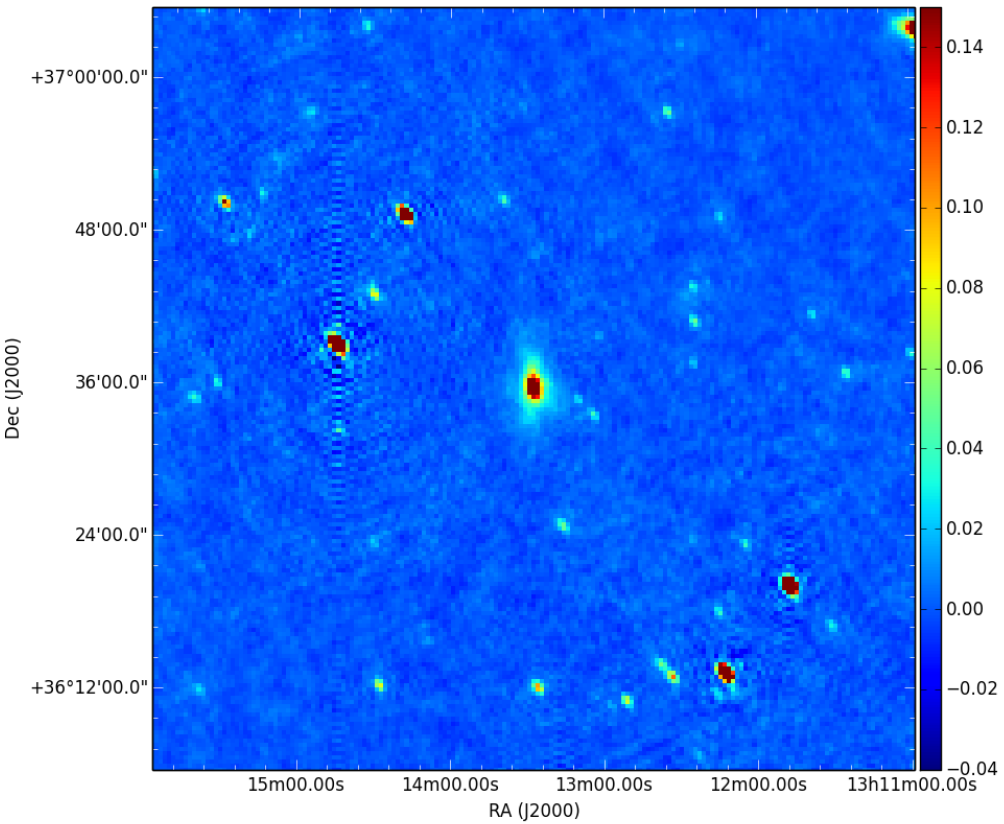
AWImager,
2 self-calibrations



- Beam size: 53" x 30"
- Integrated flux: 1.0 Jy
- Noise: 0.003 Jy

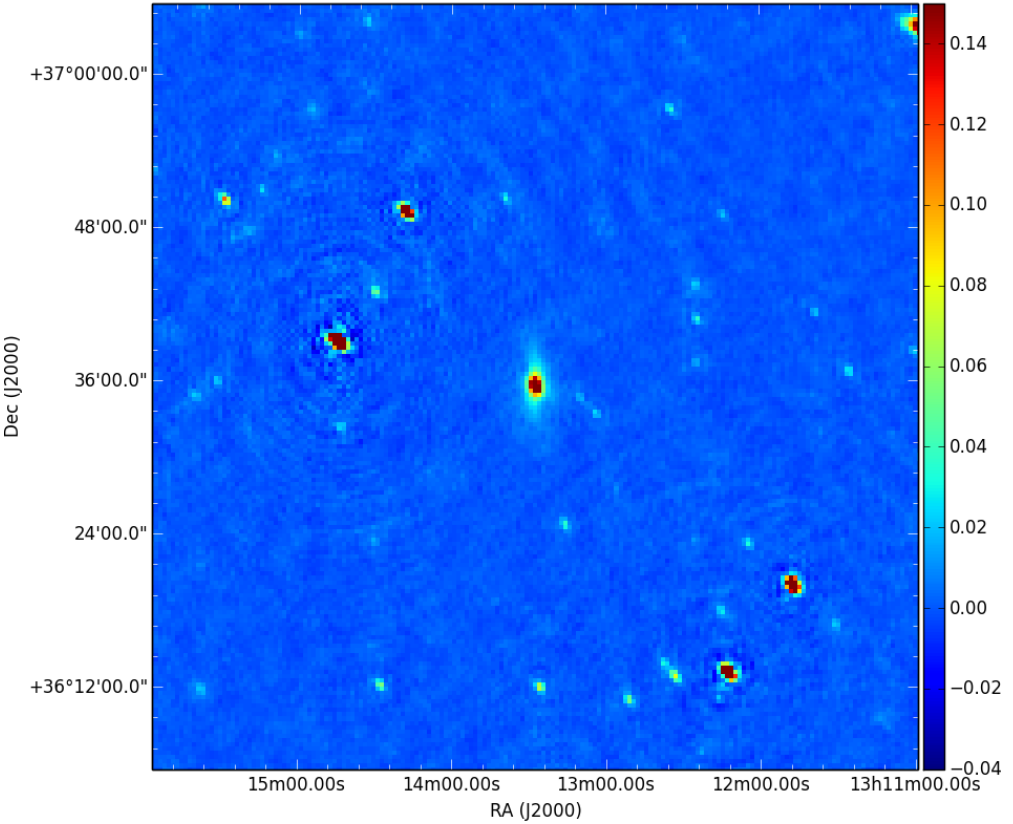
120 MHz vs 150 MHz

AWImager, 120 MHz,
2 self-calibrations



- Beam size: 53" x 30"
- Integrated flux: 1.6 Jy
- Noise: 0.003 Jy

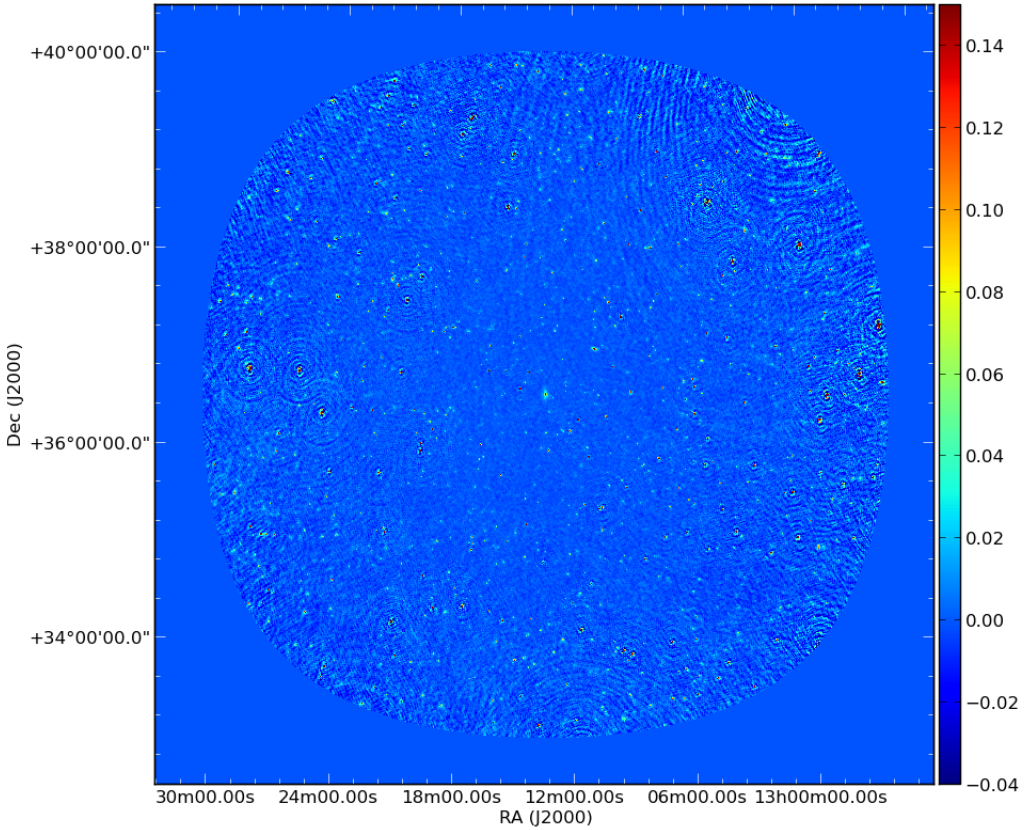
AWImager, 150 MHz,
2 self-calibrations



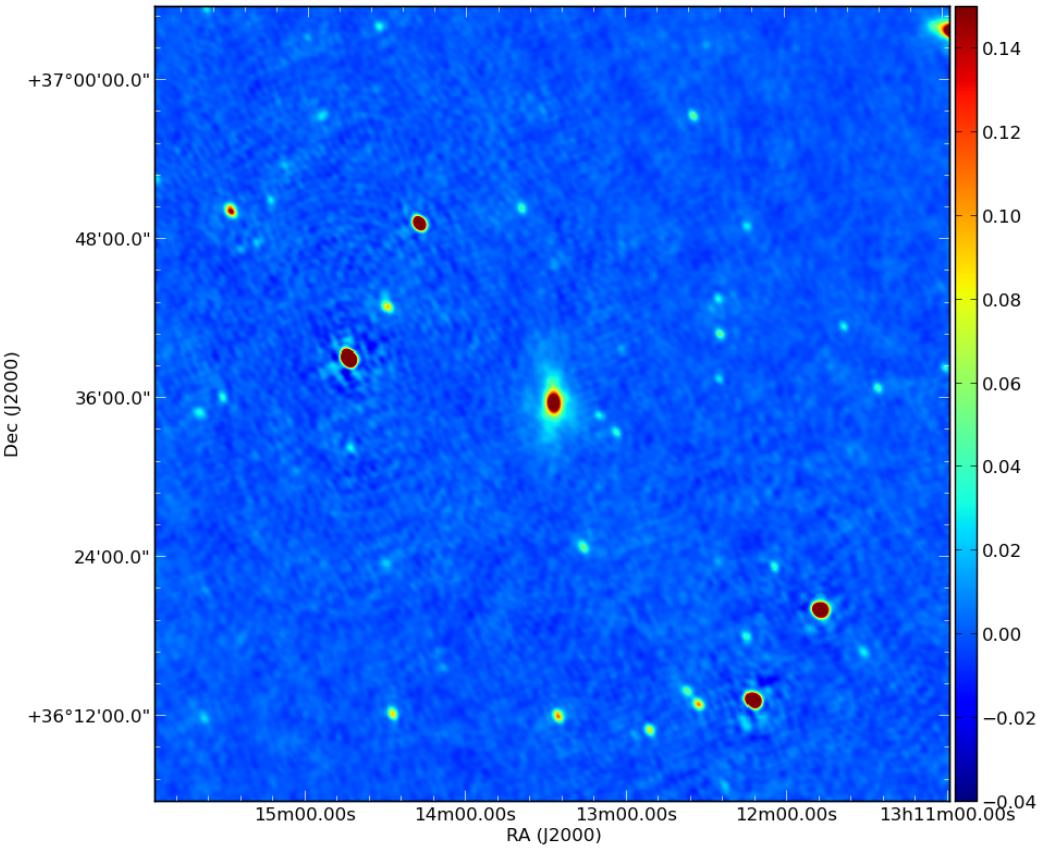
- Beam size: 53" x 30"
- Integrated flux: 1.0 Jy
- Noise: 0.003 Jy

Current status of data reduction

AWImager, 120 MHz,
5 degree field



AWImager, 120 MHz,
zoom-in



- Beam size: 42" x 32"
- Integrated flux: 1.7 Jy
- Noise: 0.003 Jy

Summary and Outlook

- Be very careful during the data reduction, a lot of things can go wrong!
- Fluxes agree with former measurements
- NGC 5033 is already more extended at 120 MHz than at 150 MHz

- Continue calibration of LOFAR data of NGC 5033, possibly direction dependent calibration
- NGC 5055 has now been observed with LOFAR → start calibration
- LBA observations of both galaxies due in Cycle 4
- Analyse the data towards science aims: transport of cosmic rays, synchrotron intensity, spectral indices, far-infrared - radio correlation