source subtraction SAGECAL/demixing

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About SAGECAL

- Works on single SBs separatly
- Data need to be calibrated, spikes flagged, data averaged down to 1 channel

- Searchs for minimum norm solutions:

$$\mathbf{Ax} = \mathbf{b} \Leftrightarrow \min \left\| \mathbf{Ax} - \mathbf{b} \right\|^2$$

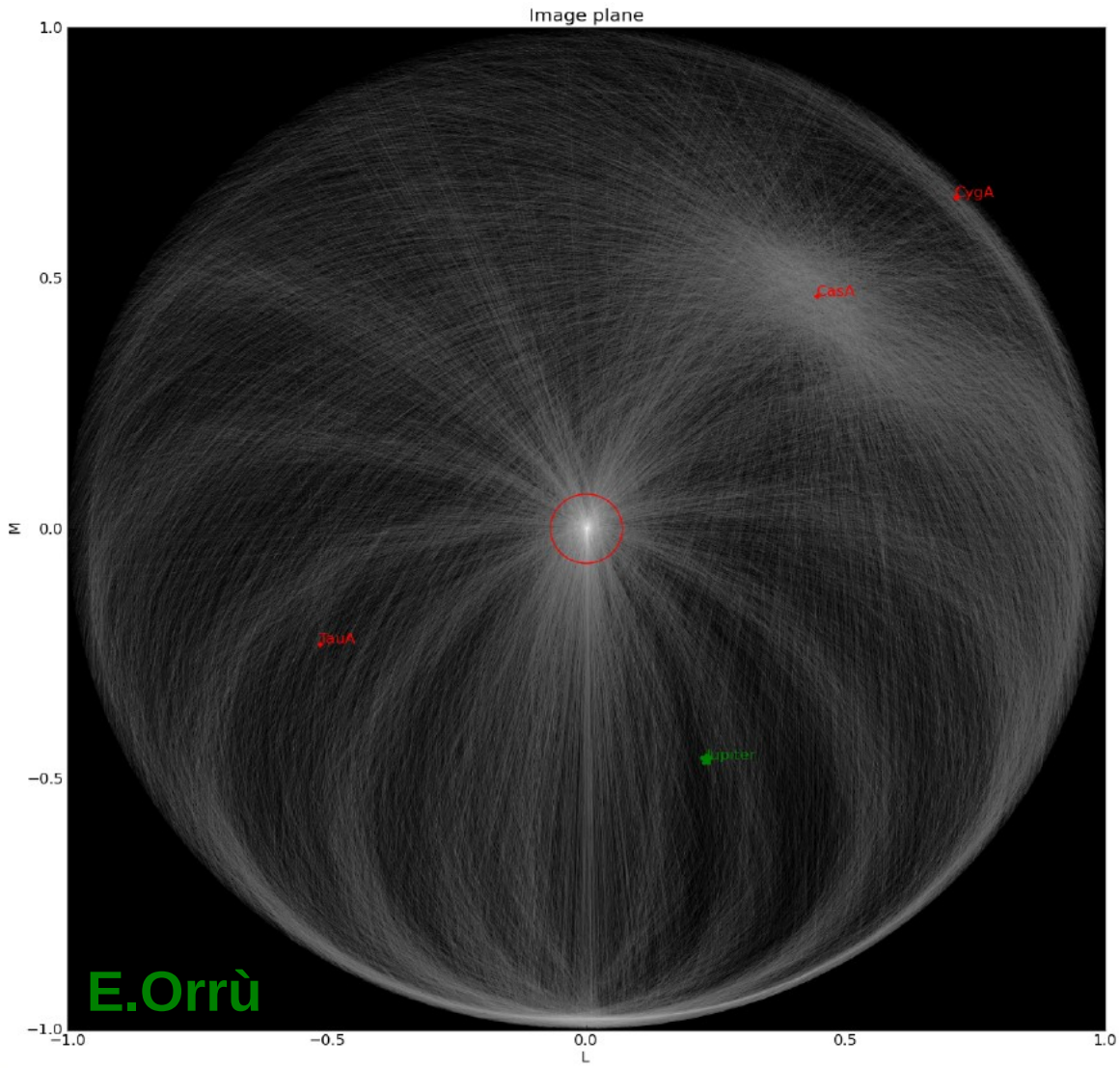
- Can handle banwidth smearing (option -f)

Subraction of off axis sources: demixing/SAGECAL/dir gains in BBS …?

From Sarod presentation BW13

Perseus LBA data

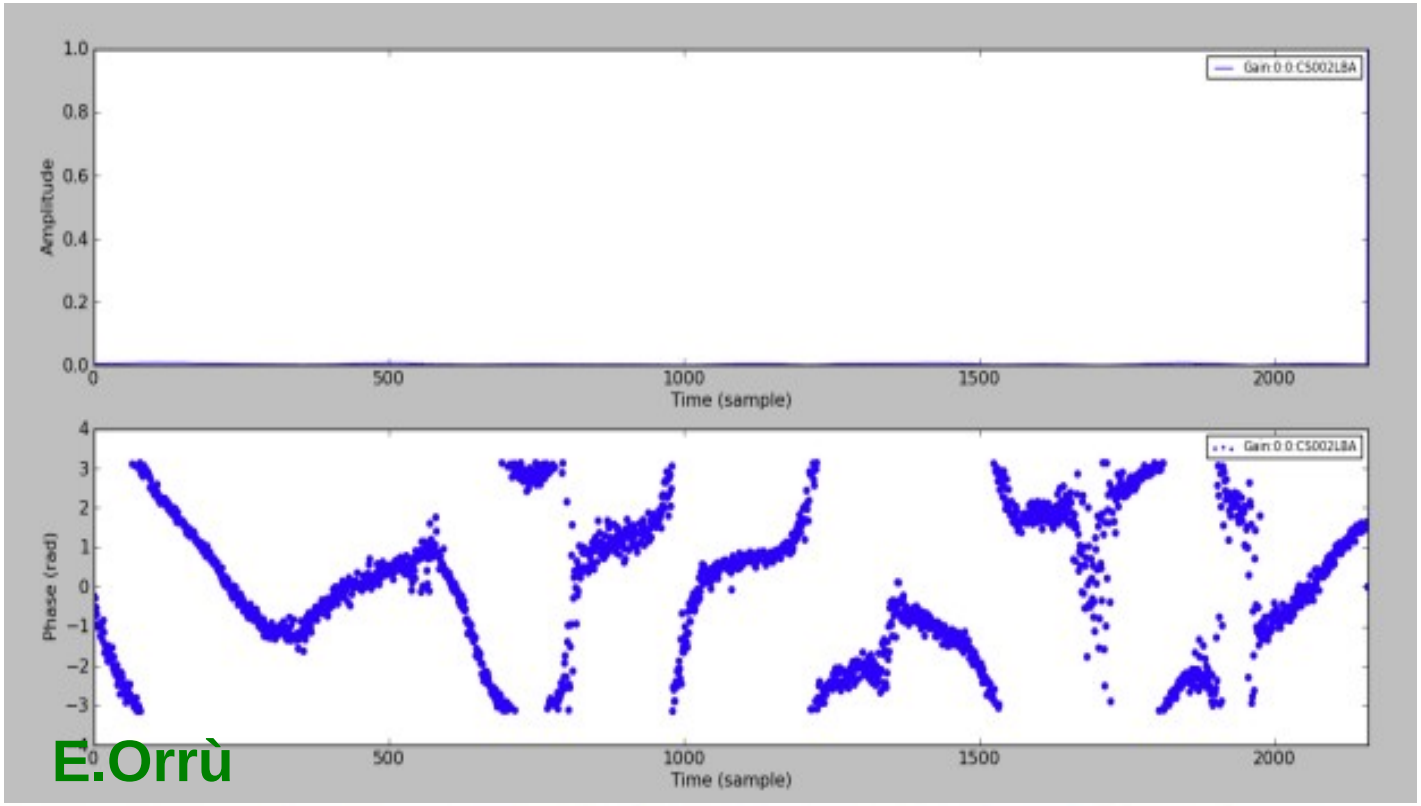
- CygA @ 76 degrees
- CasA @ 39 degrees
- TauA @ 34 degrees



Perseus LBA data: DEMIXING

- CygA @ 76 degrees Good demixing solutions
- CasA @ 39 degrees Good demixing solutions
- TauA @ 34 degrees **NOISY**

CygA solutions



E.Orrù

Perseus LBA data: DEMIXING

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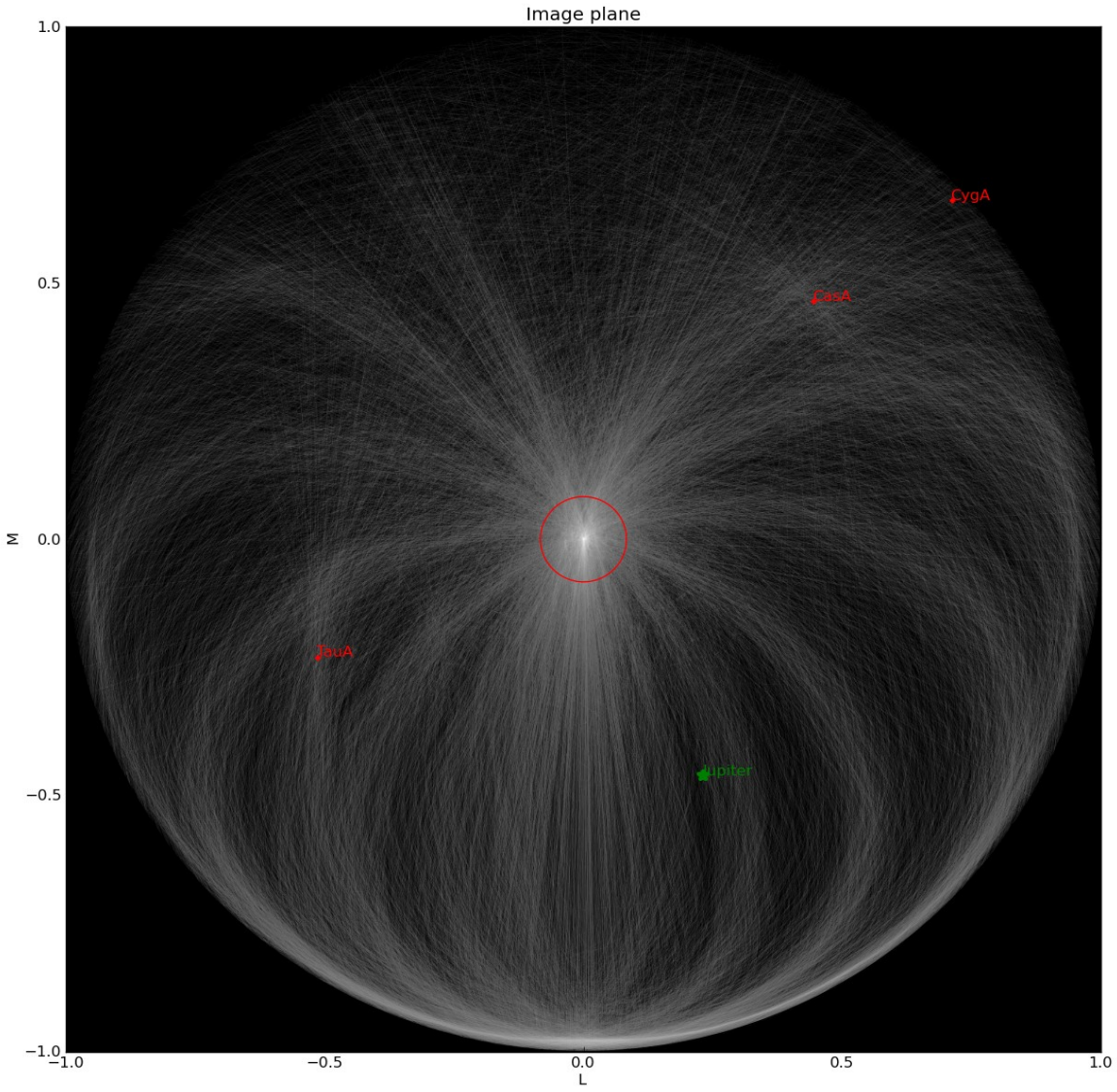


Perseus LBA data: SAGECAL

- CygA @ 76 degrees
- CasA @ 39 degrees
- TauA @ 34 degrees

Data previously calibrated with BBS
And averaged down to 1 channel

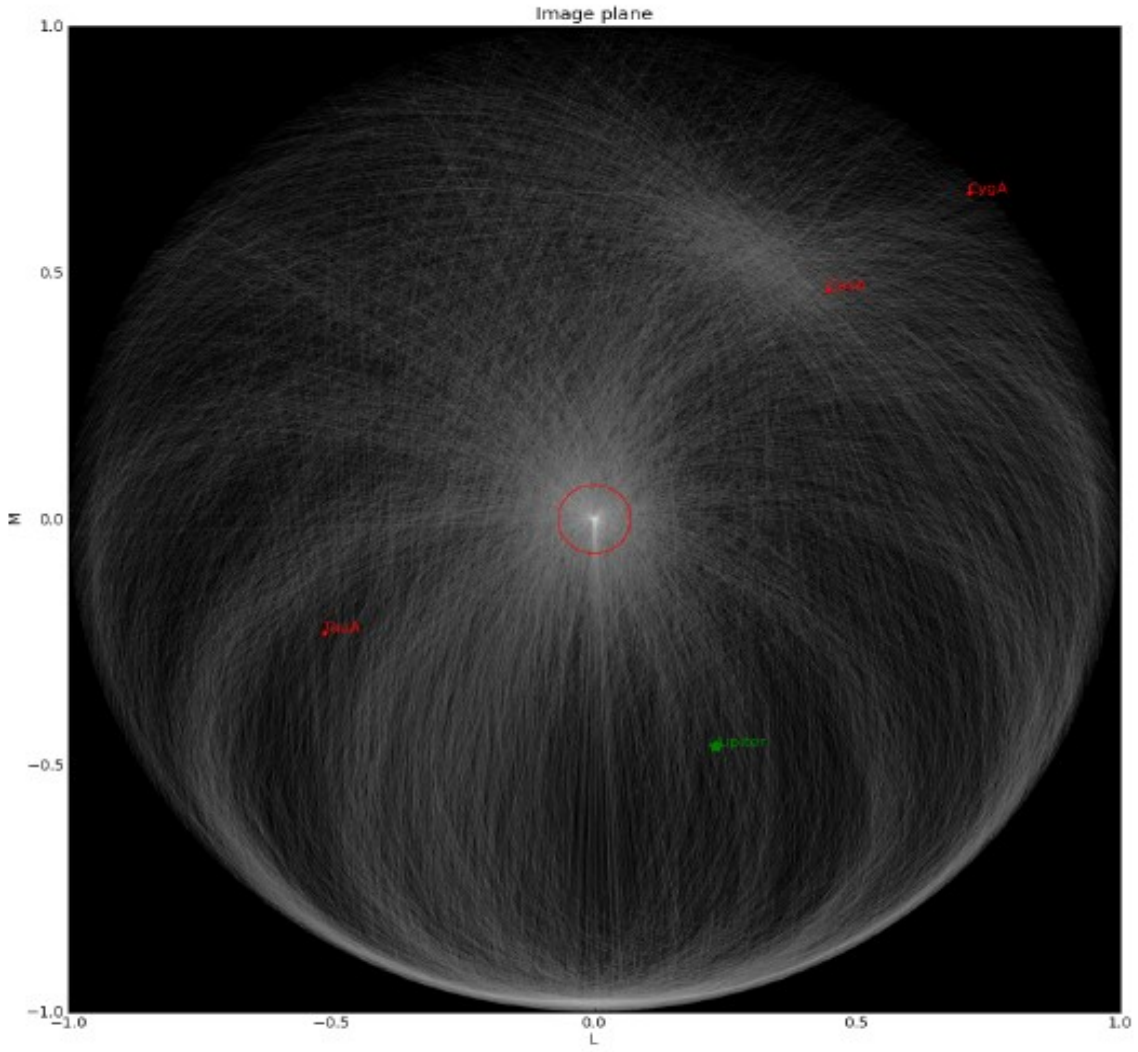
Models for CygA and CasA taken from 74MHz VLA images through shapelets

Number of clusters (directions) = 12
Time-slot used = 20 min (6h observation)

Perseus LBA data: SAGECAL

- CygA @ 76 degrees
- CasA @ 39 degrees
- TauA @ 34 degrees

Data previously calibrated with BBS
And averaged down to 1 channel



Perseus LBA data: conclusions

Demixing: CygA succesfully subtracted

Cas A succesfully subtracted (though tiny residuals still present)

TauA demixing fails

Computing time: > 10 hours for 2 sources

SAGECAL :

CygA and TauA succesfully subtracted

Cas A some residuals still present

Computing time: ~ 20 min

MACSJ0717 LBA data

- CygA @ 100 degrees
- CasA @ 74 degrees
- TauA @ 27 degrees

MACSJ0717 LBA data

- ~~CygA @ 100 degrees~~
- CasA @ 74 degrees successfully demixed
- TauA @ 27 degrees NOISY

Attempts for calibration:

- Demixing CasA and calibration(A&P) against VLSS model

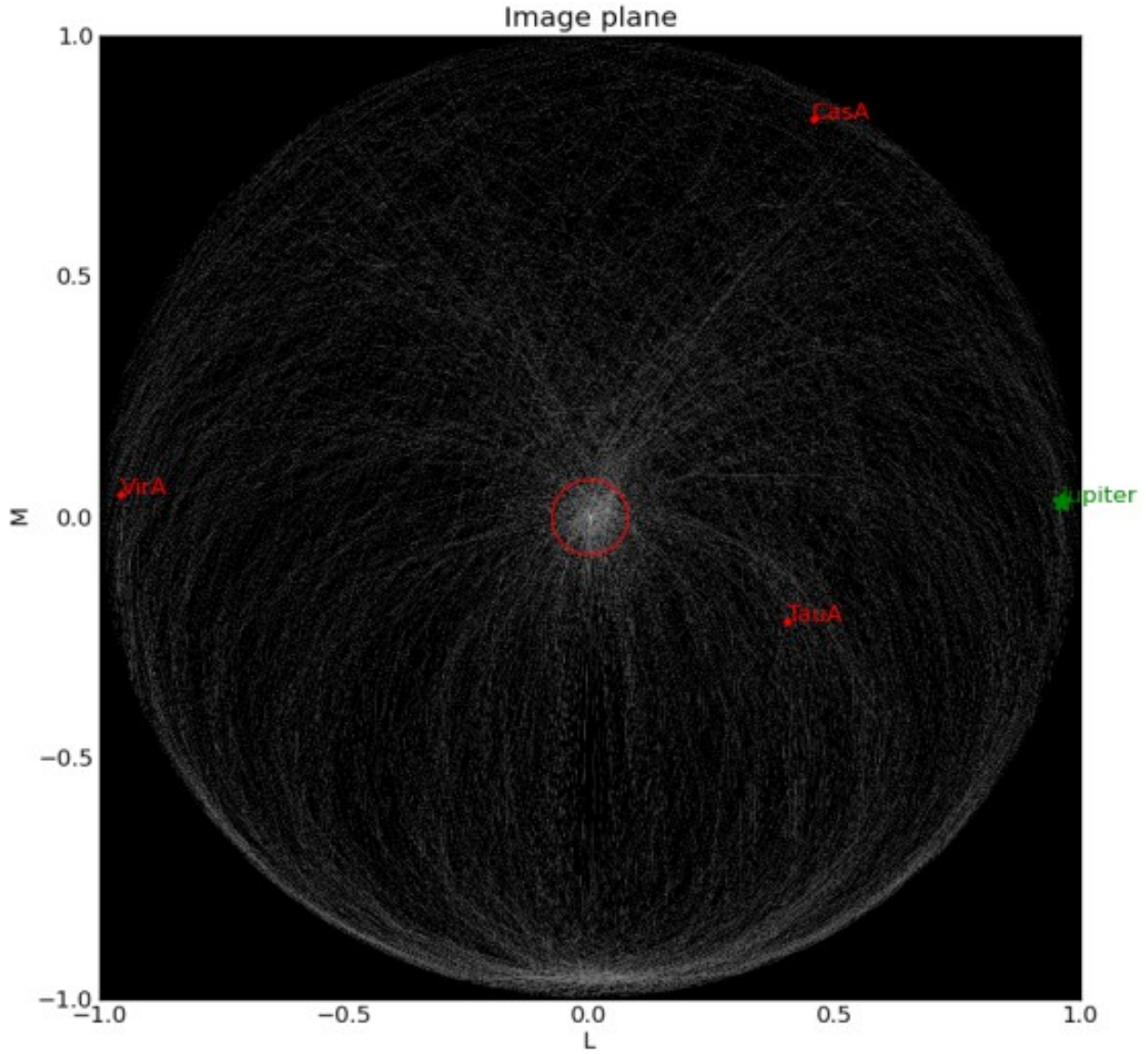
  → low S/N solutions

- Directional dipendent calibration for MACS (VLSS model) and Tau A (74MHz VLA model) in BBS

  → took more that 24 h for 6h observation, 1 SB

MACSJ0717 LBA data

- CygA @ 100 degrees
- CasA @ 74 degrees
- TauA @ 27 degrees



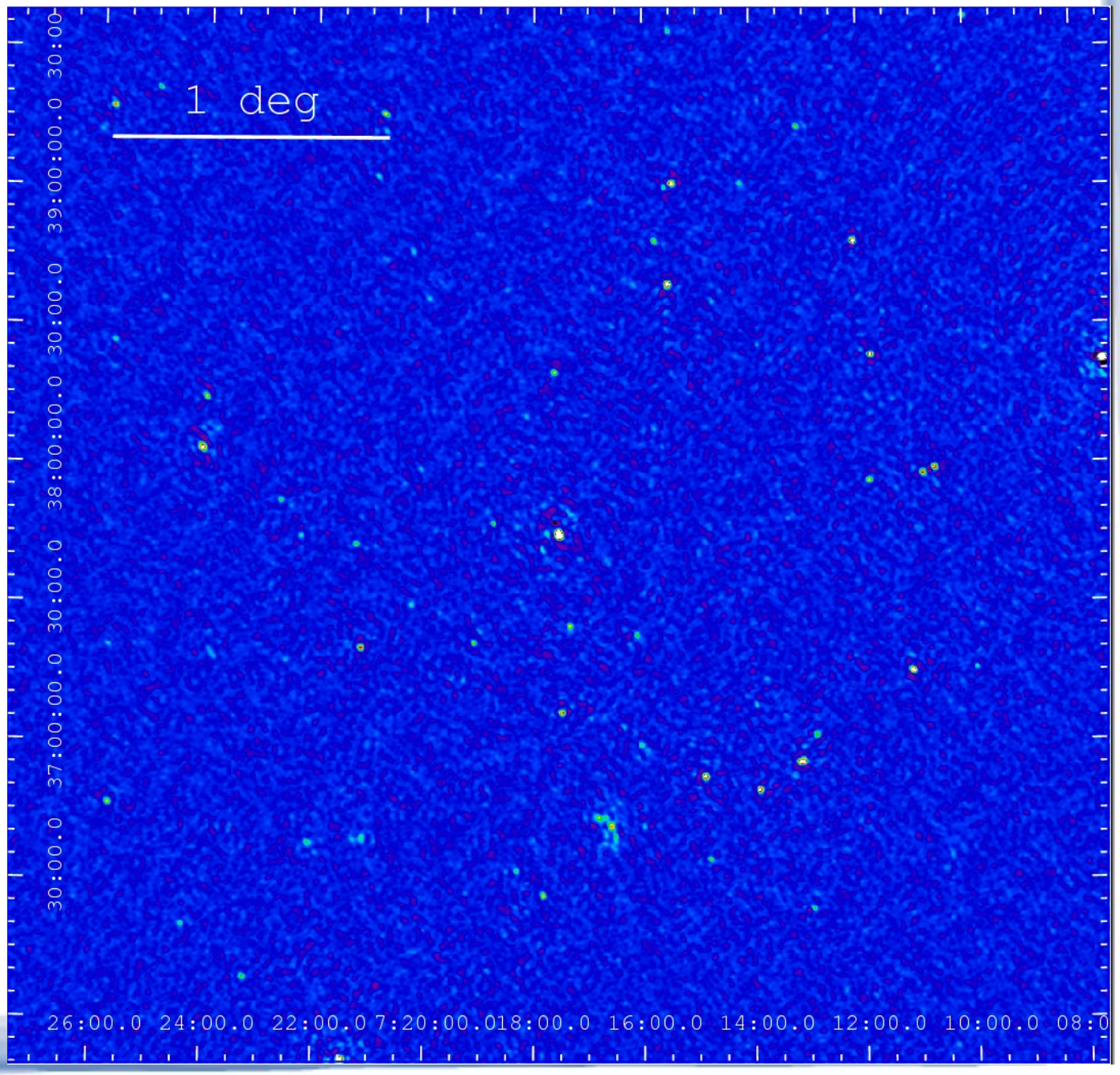
MACSJ0717 LBA data - demixing

MACS field
Demixing of CasA,
Tau A still in

Global solver on 4 SBs
around 55 MHZ

HPBW =
43" x 32"

Rms noise
~30
mJy/beam



MACS LBA data: demixing + SAGECAL

- CasA @ 72 degrees – demixed
- TauA @ 27 degrees – subtracted with SAGECAL

Models for TauA from 74MHz VLA images through shapelets

Number of clusters (directions) = 21
Time-slot used = 20 min

After Sagecal
noise improved from 35 mJy/beam to 25 mJy/beam

LBA MACSJ0717

Demixing:

Cas A succesfully subtracted

TauA demixing fails

Computing time: > 10 hours

Peeling with BBS:

Directional gain calibration in BBS (TauA + MACSJ0717)

Computing time: > 24 hours – not good S/N solutions

SAGECAL :

CasA demixed

TauA subtracted with sagecal

Computing time: ~ 2h (observation time 6h)

Conclusions: demixing /peeling with BBS / SAGECAL for source subtraction

- Demixing: *if* works

  the source is gone once for good, NOW it is slow

- SAGECAL

  works whatever the distance/brightness of the source is

  much faster than BBS

  absolute flux scale (?)