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Netherlands Institute for Radio Astronomy

Cranking up the resolution of MSSS

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on behalf of the MSSS commissioning team

MSSS Update (up to 9 April)

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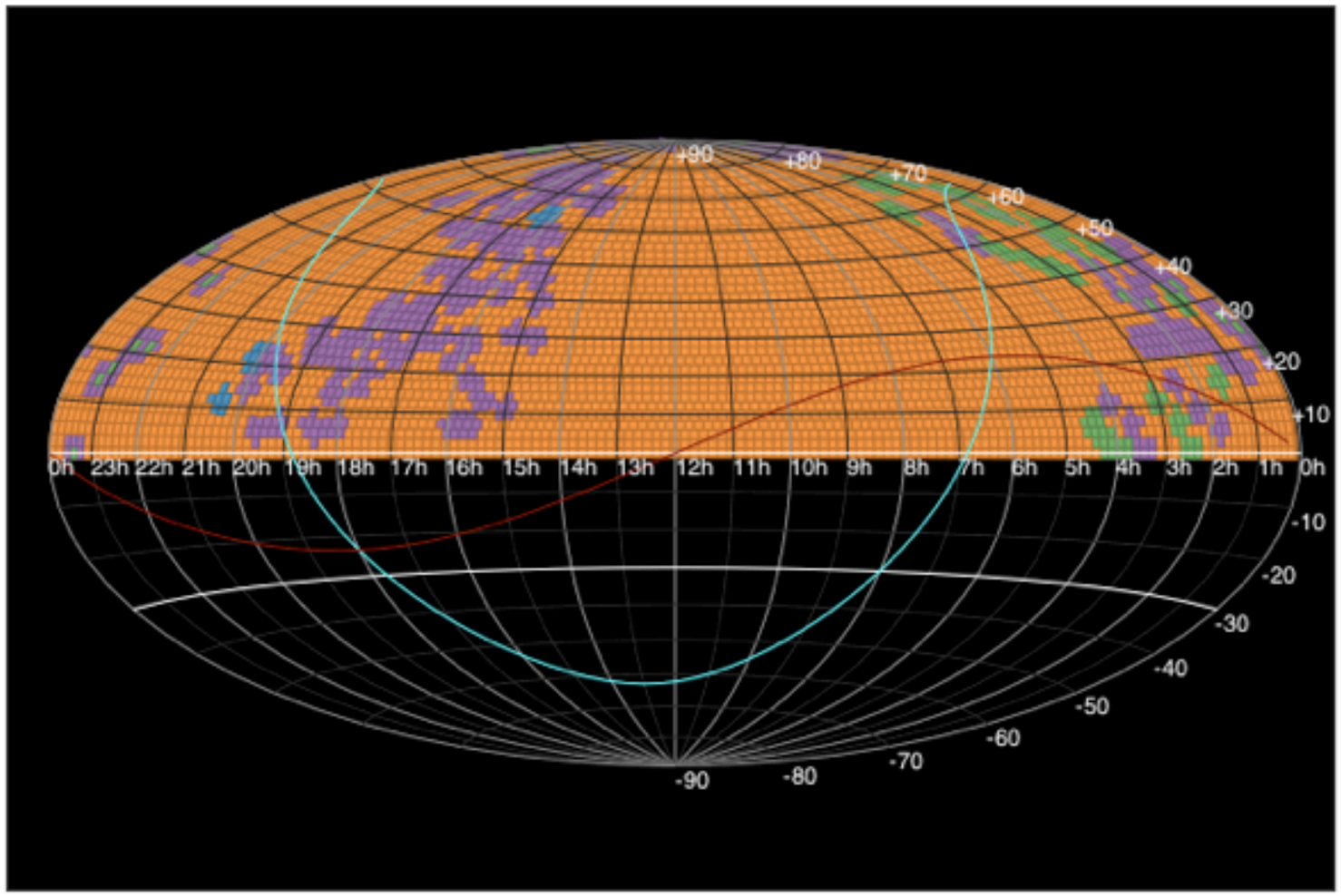
LOFAR Observation Database

MSSS HBA

Number of Targets	3616
Number of Calibrators	8
Start Date	8 Feb. 2013
Stop Date	6 April 2013
Completed Fields	710 (19.6%)
Information collected	9 April 2013

Show me the data »



Hammer Projection

Map based on code from this project.

Data available on CEP (3.6%)
Data archived (15.6%)
Partial data available (0.5%)
Data missing (0%)
Not yet observed (80.3%)

~2.5 % of sky area recently observed.

A field is regarded as complete if all the subbands of at least 2 observations of the field are available on CEP and/or in the archive. Otherwise, it is marked as "partially available".

For those fields where a complete data set is available both in CEP and in the archive, the above map gives priority to the former.

LOFAR sky at ~2 arcmin resolution

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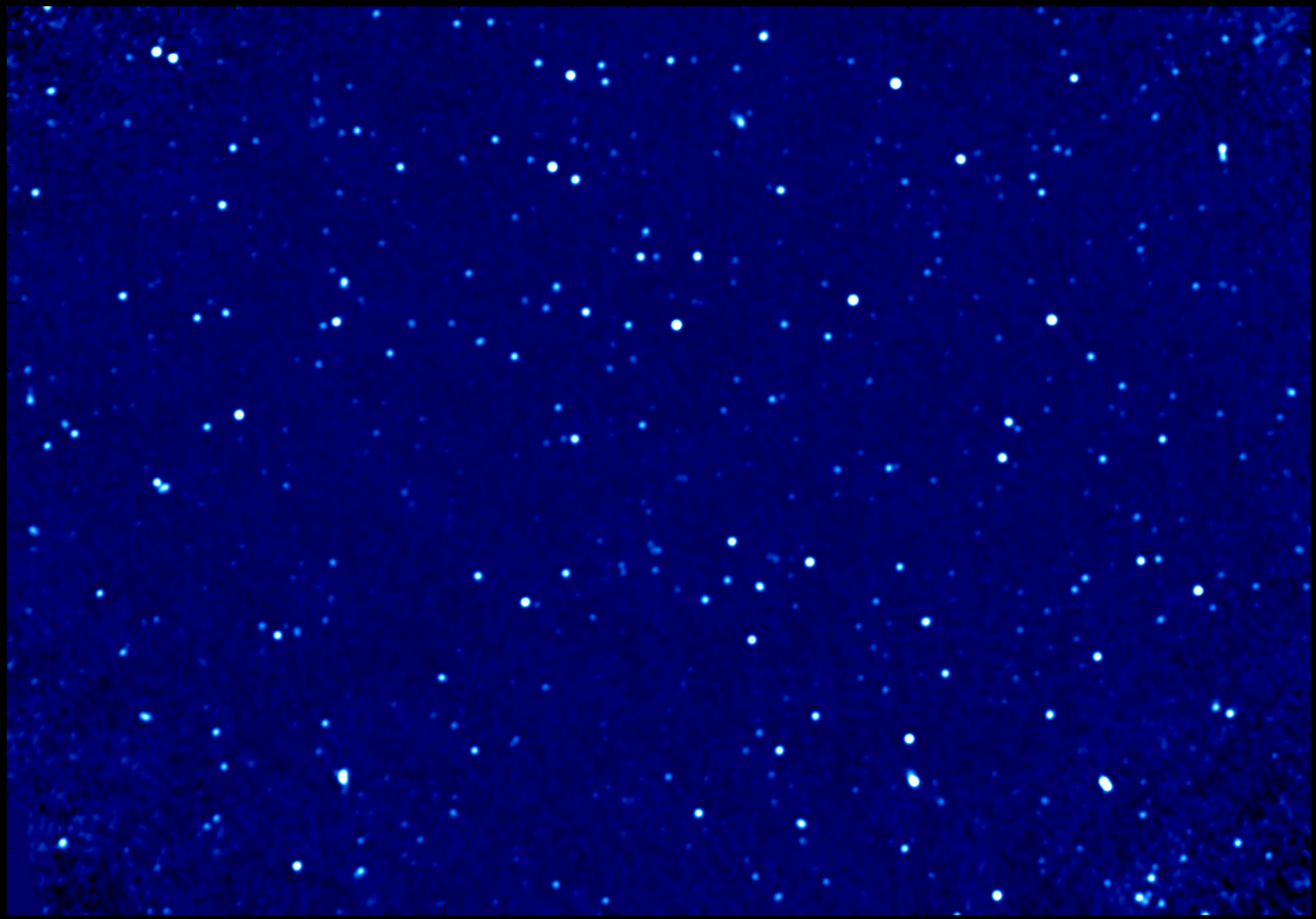
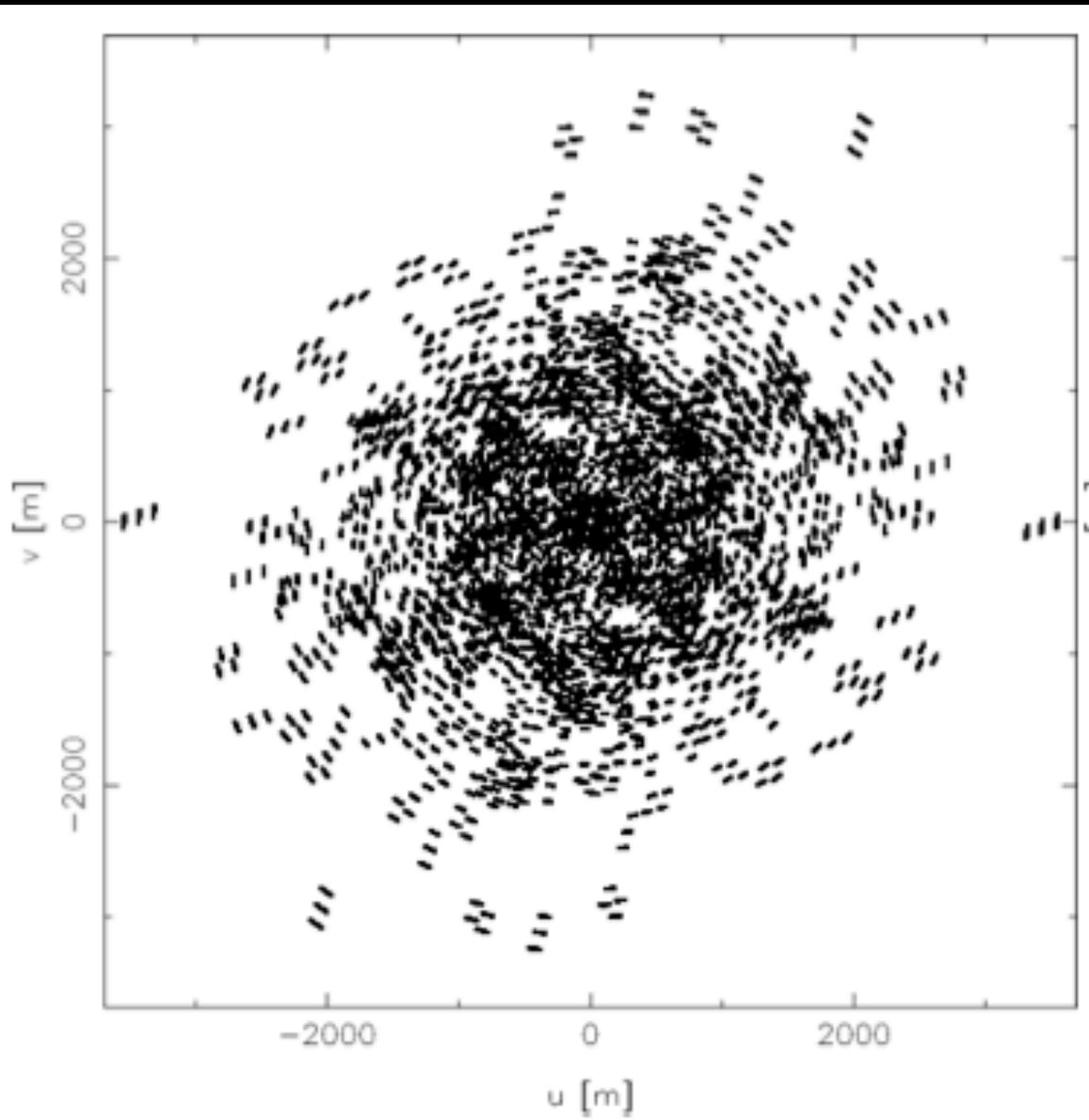
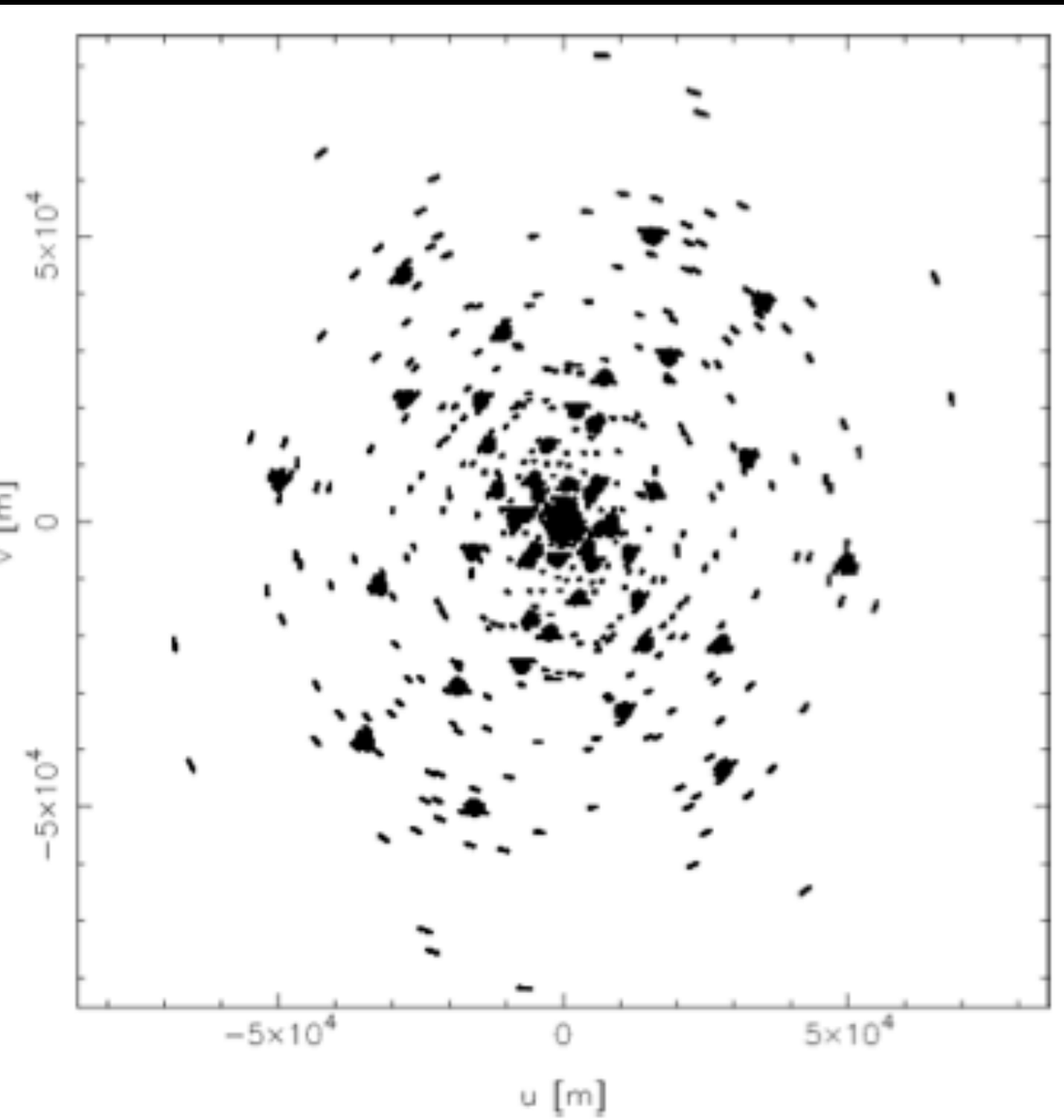


MSSS *uv*-coverage

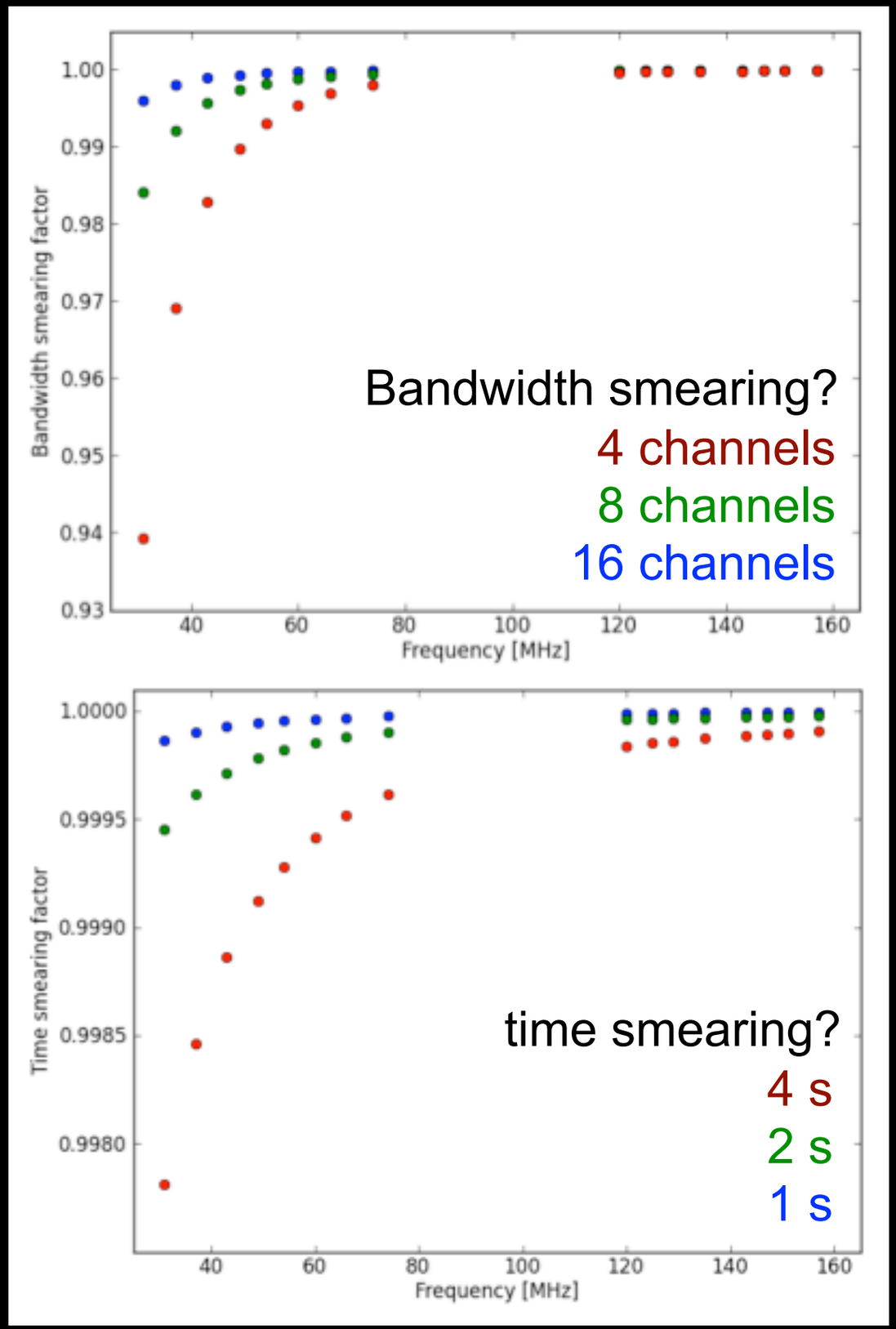
MSSS observations carried out in snapshot mode.

Processing (imaging) only done on the data out to UV_{max} = 2 klambda





Bandwidth and time smearing



The MSSS datasets have:

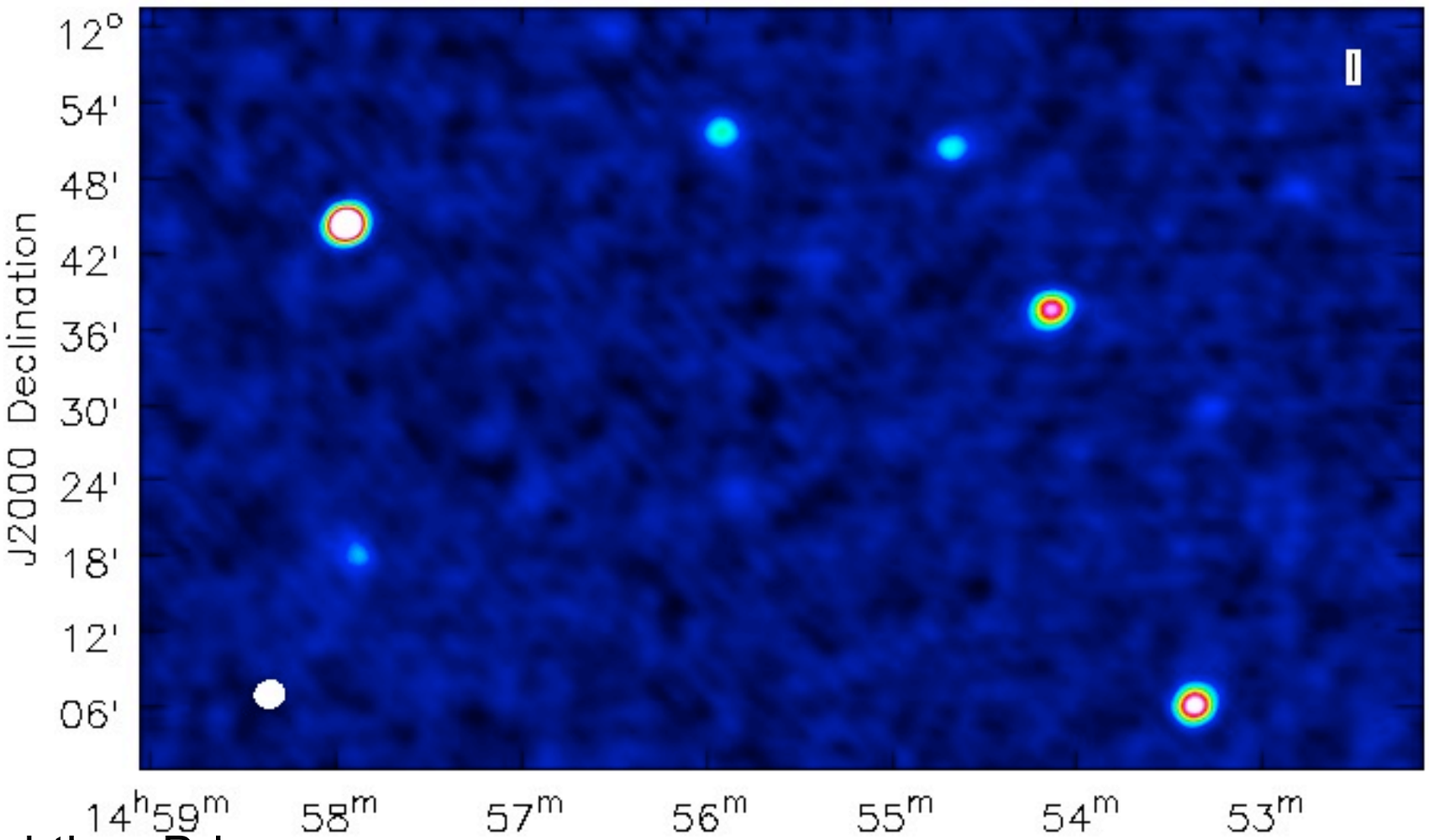
Each band has 40 channels of 0.05 MHz
Averaging time of 4 seconds

Bandwidth and time smearing not an issue (high res 15 arcsec / low res 2 arcmin).

Should be able to map out to ~3 deg from the phase centre for a 5 arcsec synthesised beam

Wide field imaging

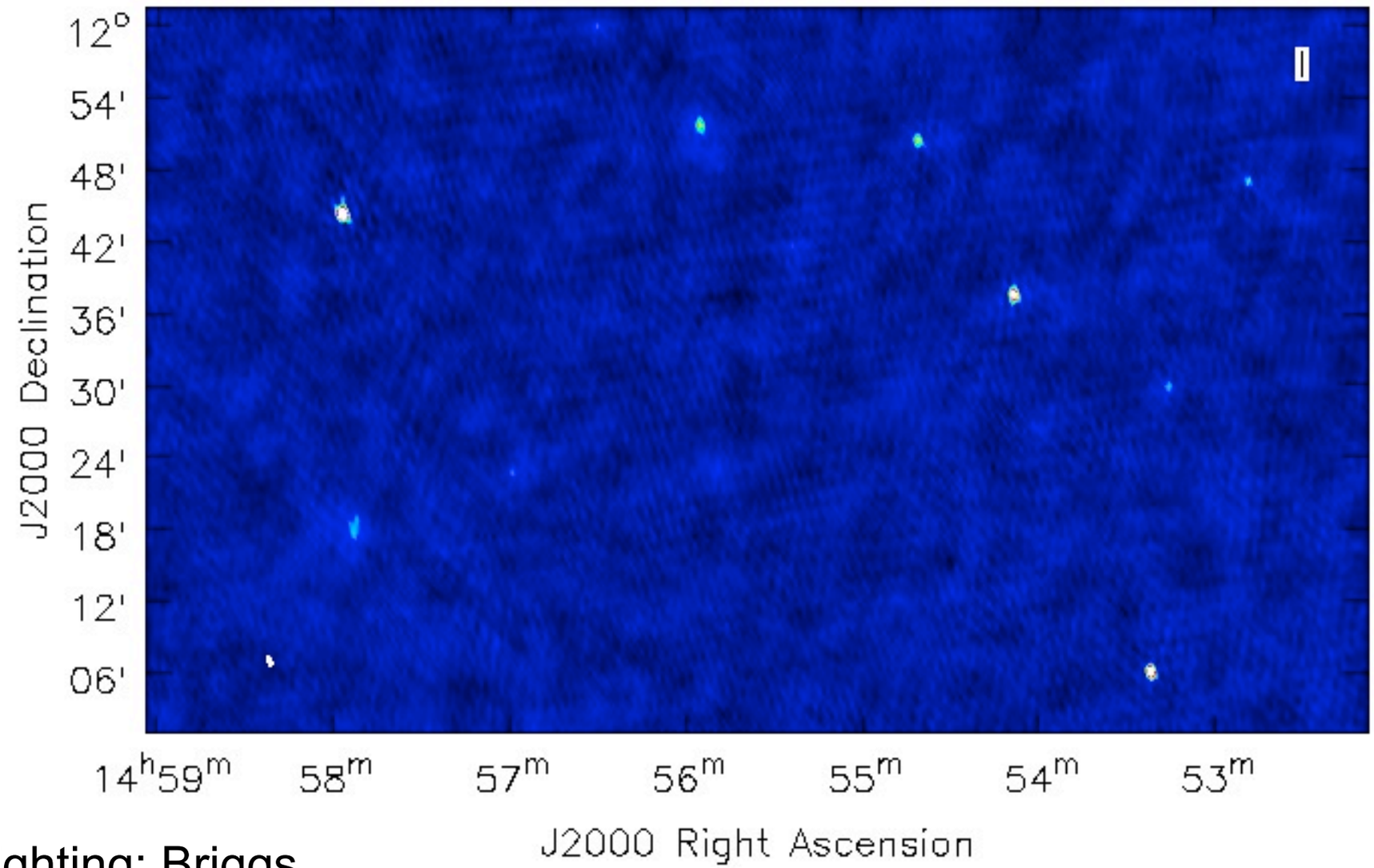
H224+10



Weighting: Briggs
Robust=0
UVmax = 2
Beam size: 2.2 x 2.4 arcmin
Processing time: 8 min rms: 37 mJy / beam

Wide field imaging

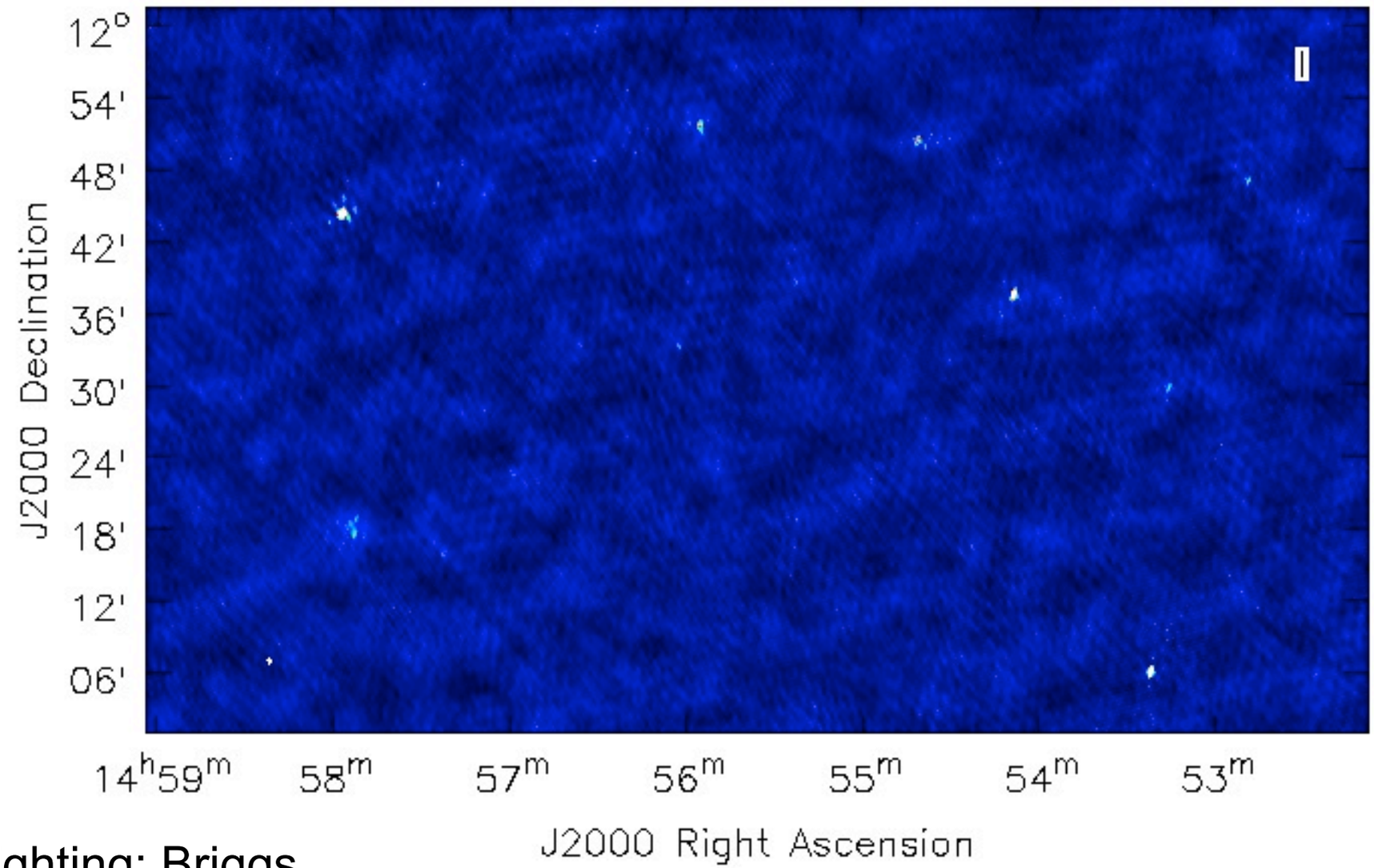
H224+10



Weighting: Briggs
Robust=0
Beam size: 49 x 27 arcsec
Processing time: 68 min rms: 23 mJy / beam

Wide field imaging

H224+10



Weighting: Briggs
Robust=−2
Beam size: 28 x 17 arcsec
Processing time: 54 min rms: 28 mJy / beam

4C +08.43

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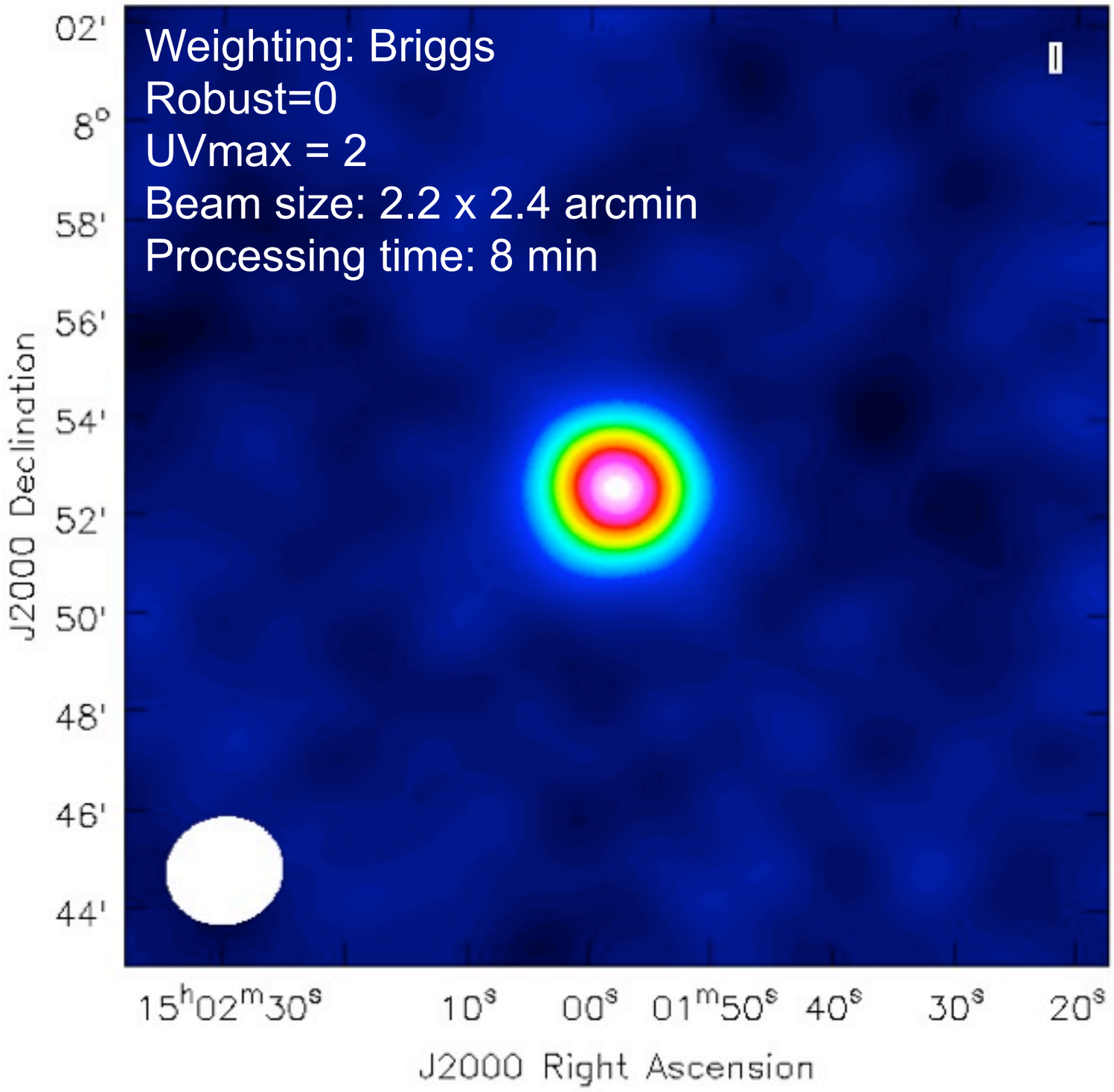
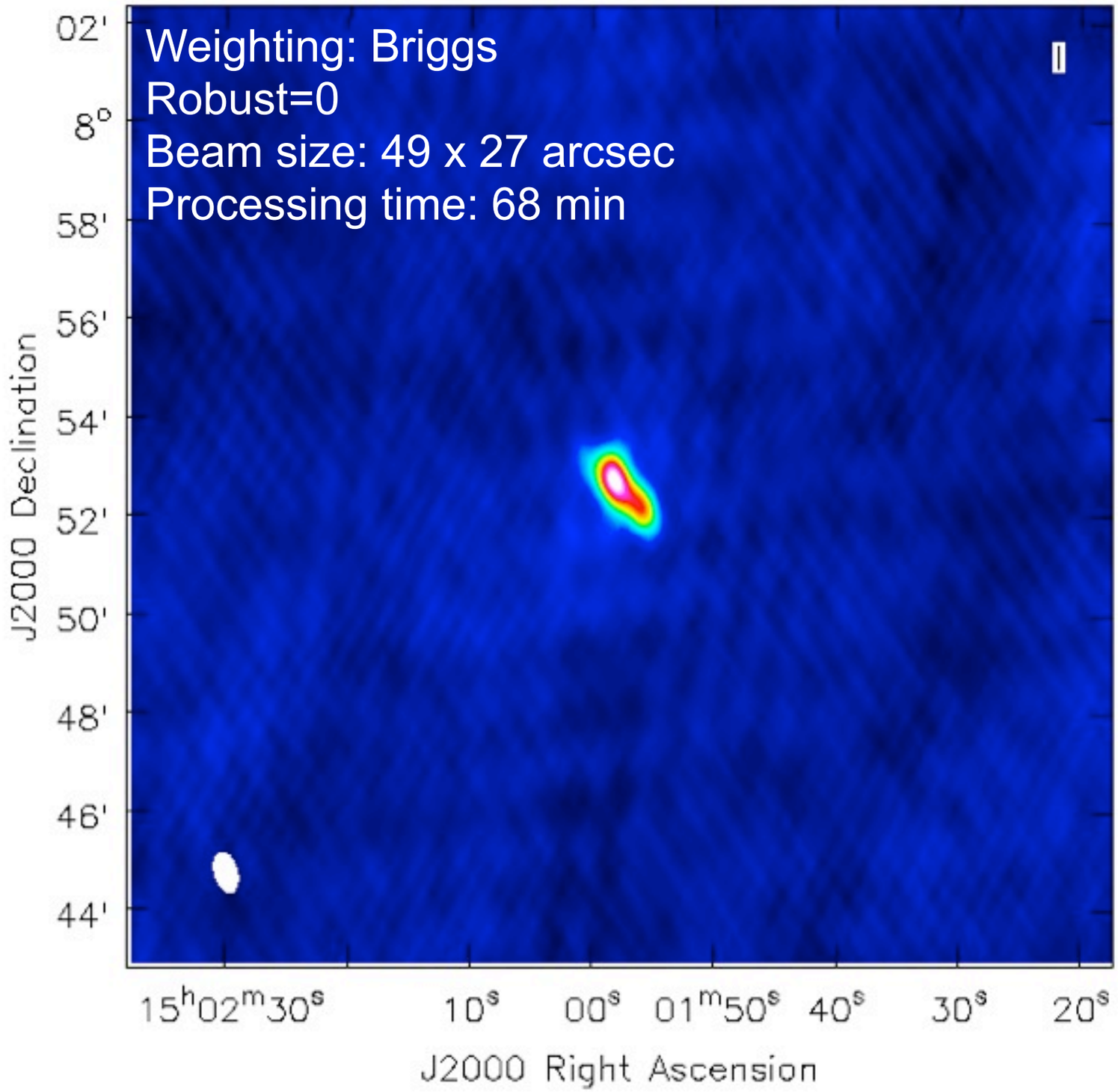
H224+10



4C +08.43

H224+10



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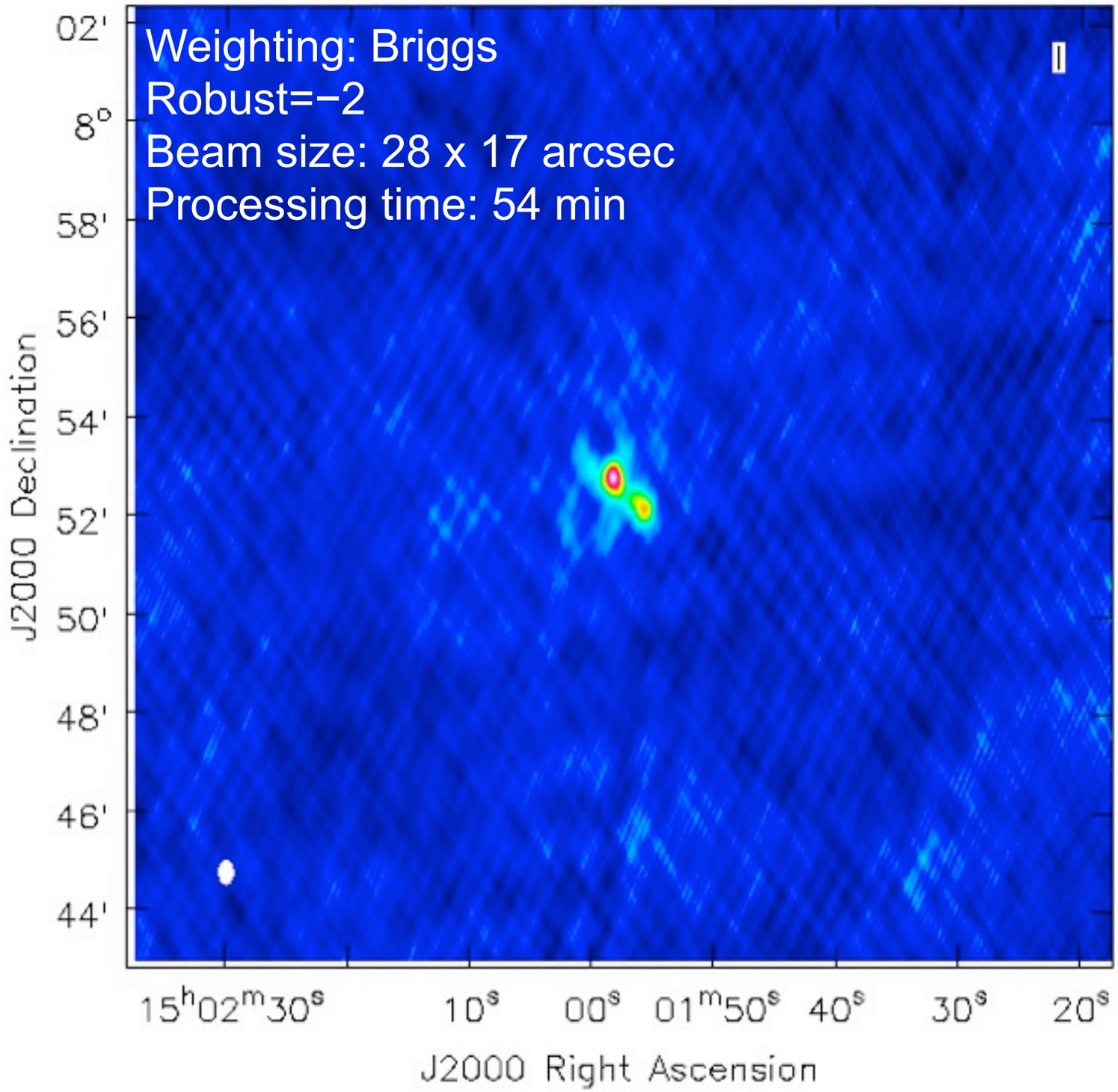

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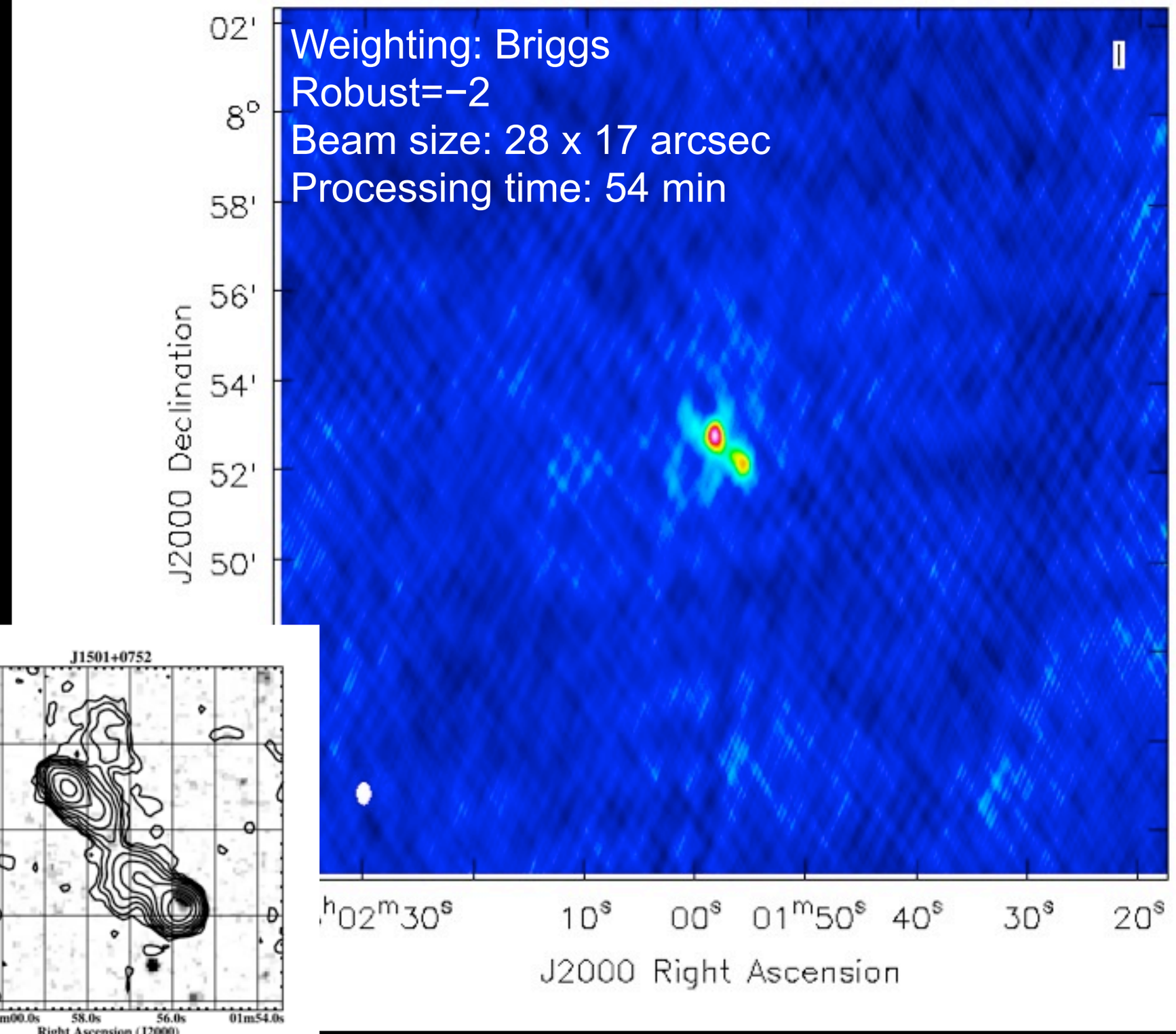

Summary

- **Started to investigate imaging MSSS data at full resolution.**

- Increased science capability.
- Potentially a better initial GSM.
- Potentially going beyond the confusion noise.

- **Findings / Issues:**

- Bandwidth and time averaging should not be a problem.
- The full datasets take ~7 to 8 times longer to image than standard MSSS data.
- Not achieving the expected ~5 arcsec beam size.

- Need to check flux recovery and further imaging quality checks needed.

- Initial results are promising.