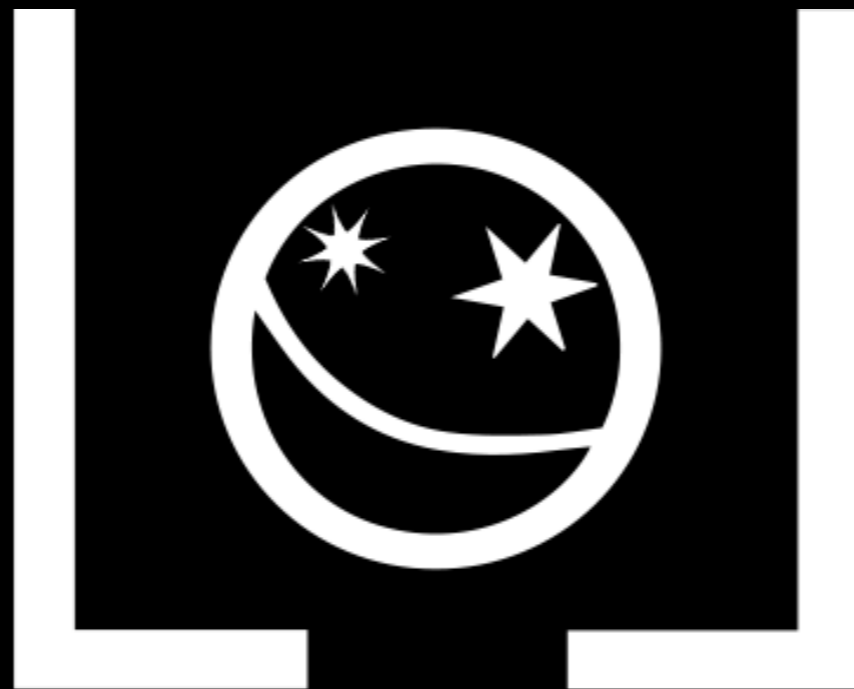


LOFAR LBA



SKY SURVEY

Francesco de Gasperin

*M. Brügger, V. Cuciti, T. J. Dijkema, A. Drabent, A. Jones, M. Mevius, A. Offringa, E. Orrù, D. Rafferty,
H. Röttgering, T. Shimwell, R. van Weeren, and W. Williams and the Survey KSP*



University of Hamburg - UltraLo group

Leiden - 21/05/2019

Much more than a sky survey:

1. Complimentary (necessary) surveys:

- A-team survey
- 3Crr survey

2. LOFAR 1.0 LBA survey (HETDEX and deep fields)

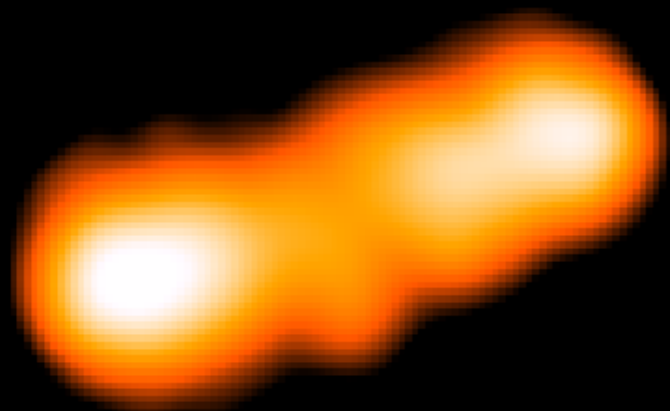
3. Strategy and software development in sight of: LOFAR 2.0 LBA survey

→ much software developed for LBA now used also in HBA
(prefactor 3.0, LoSoTo)

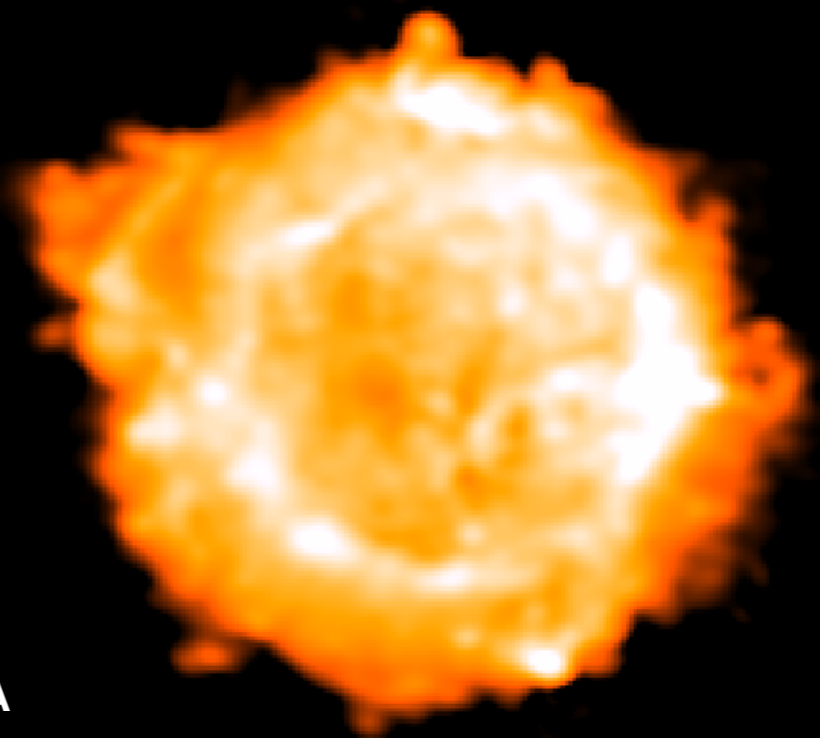
4. Forming expertise: Ultra-low Frequency Group



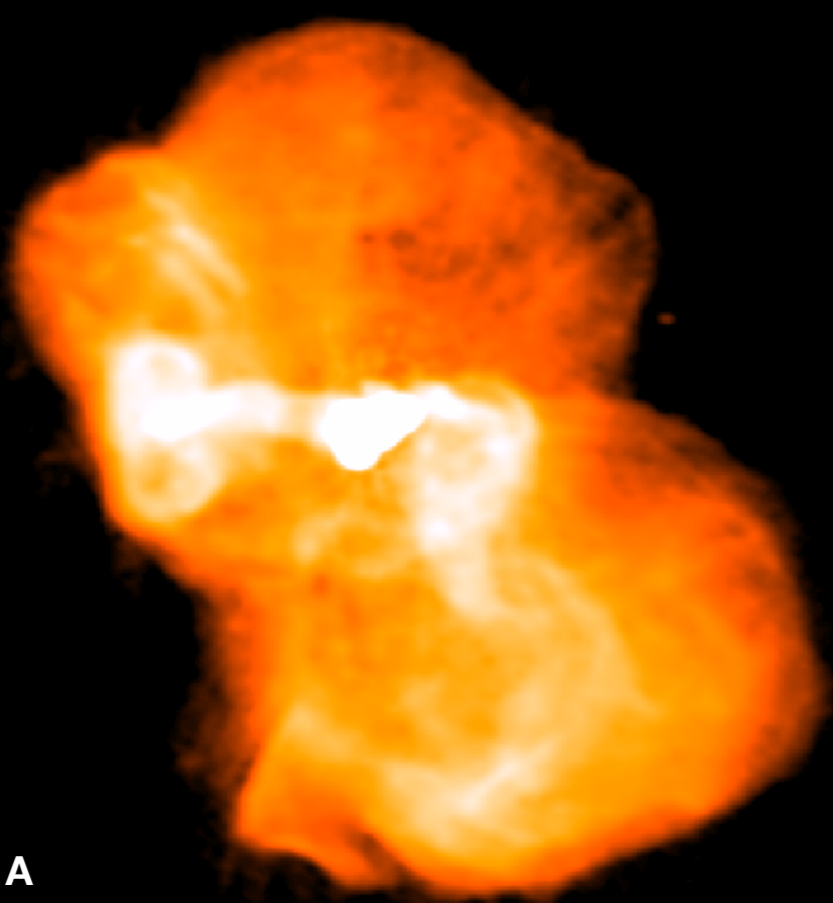
LOFAR LBA A-Team survey:
AIM: 5" resolution model
of the 4 brightest sources
in the northern sky



Cygnus A



Cassiopeia A

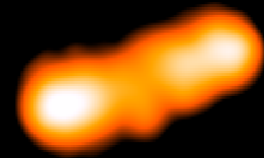


Virgo A

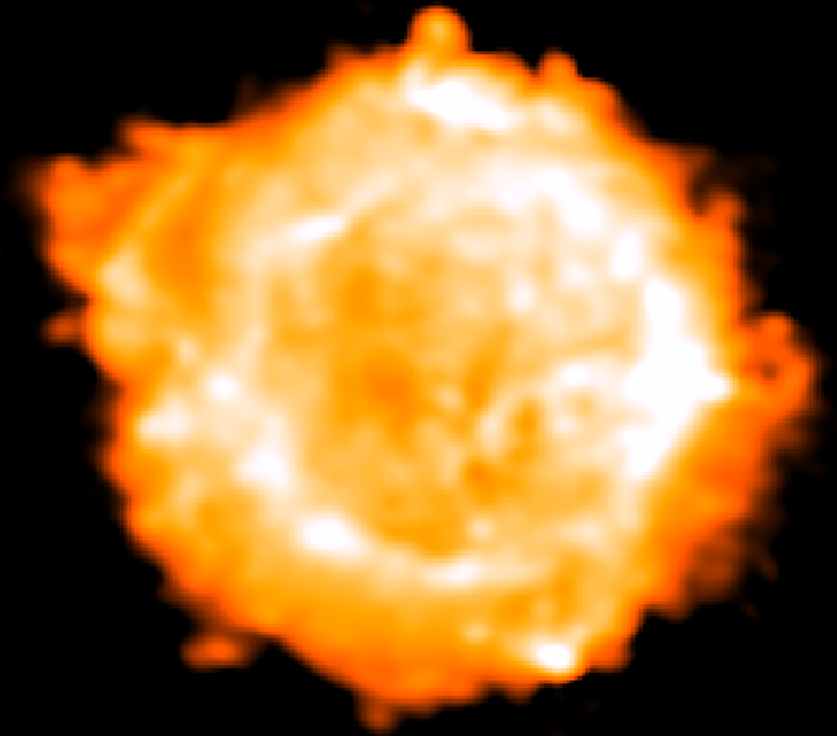


Taurus A

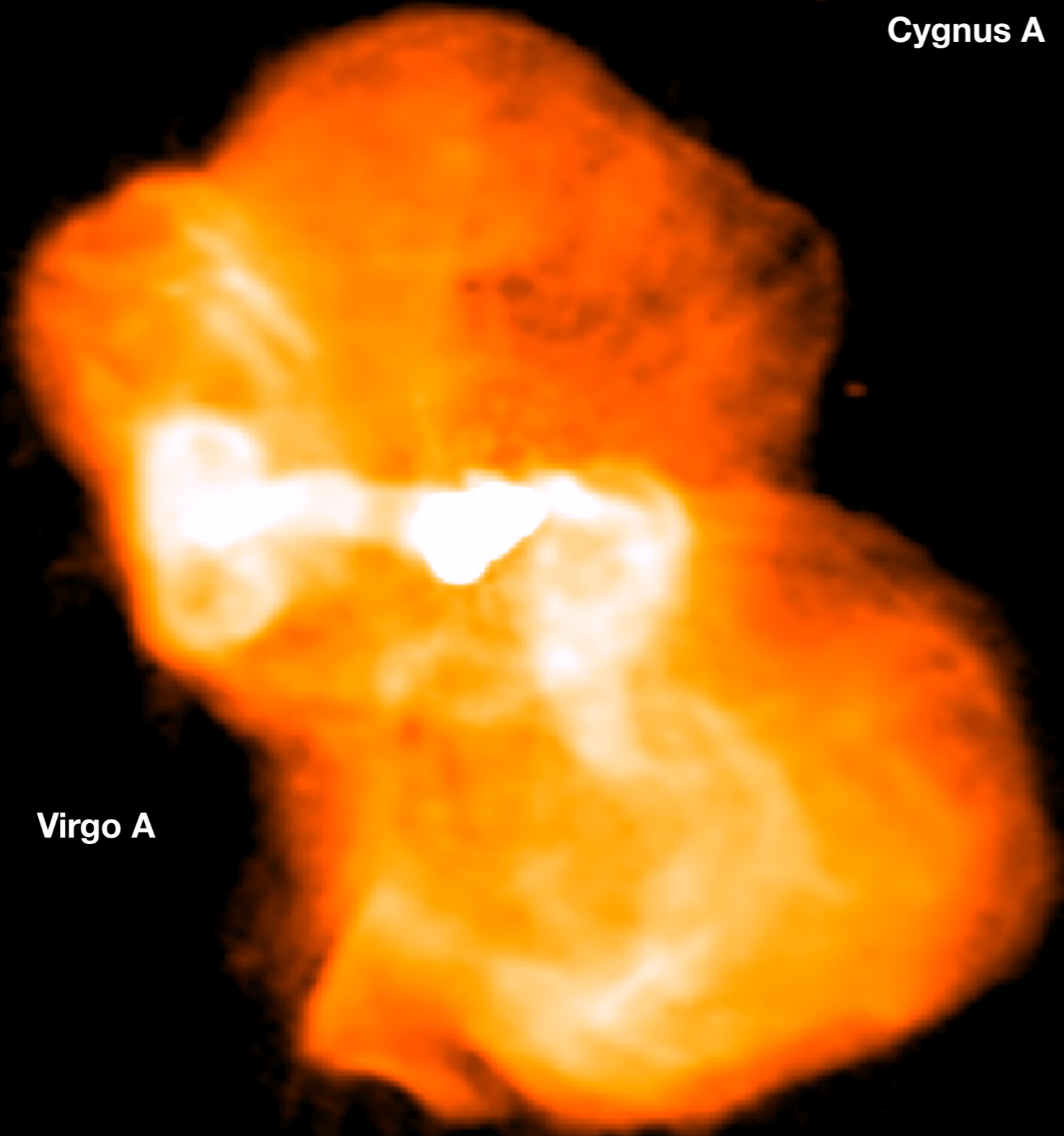
1 arcmin



Cygnus A



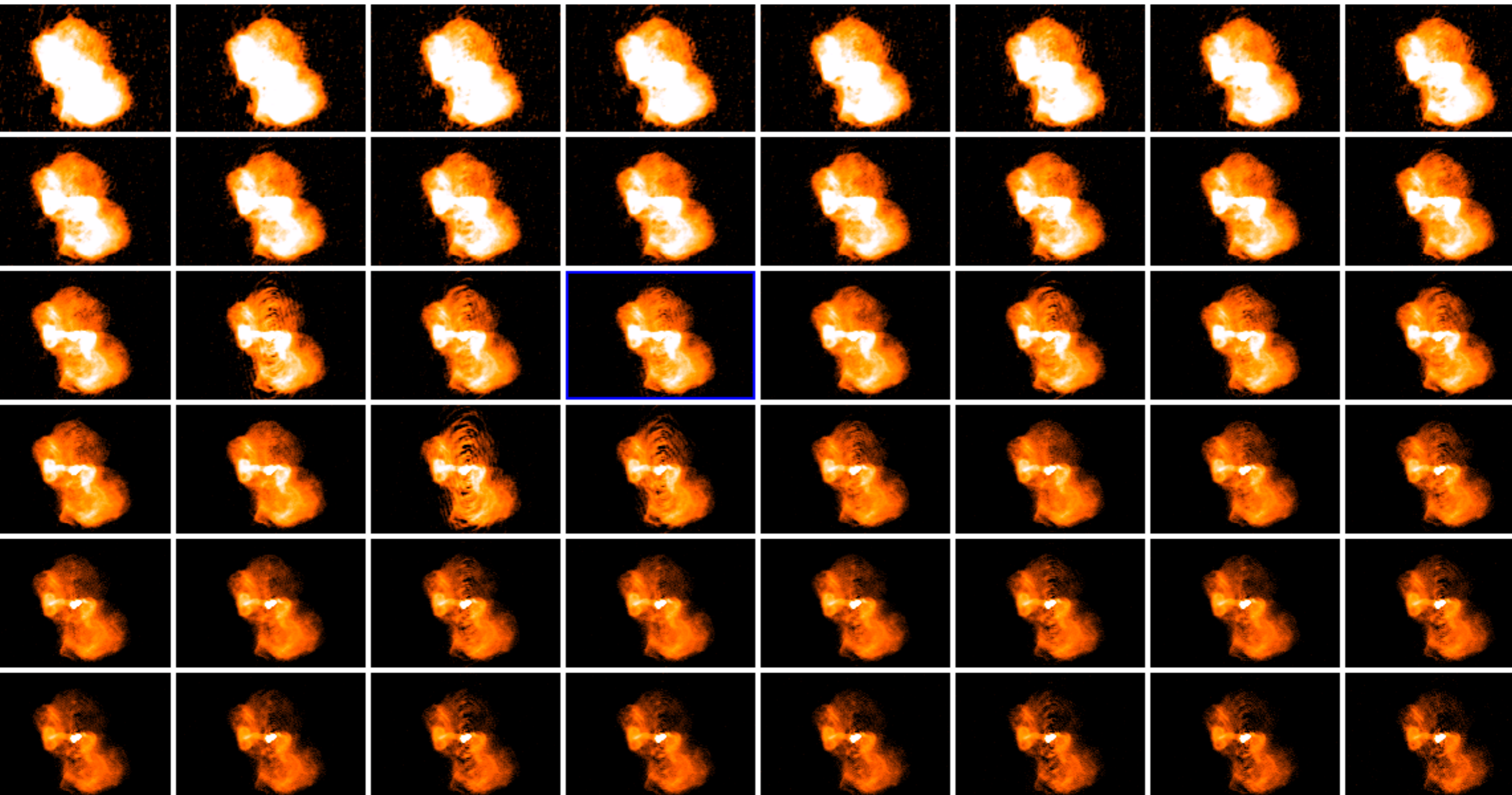
Cassiopeia A



Virgo A

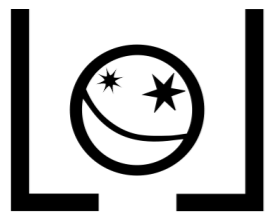


Taurus A



61 models between 31 and 70 MHz

Wide-band model



sky survey

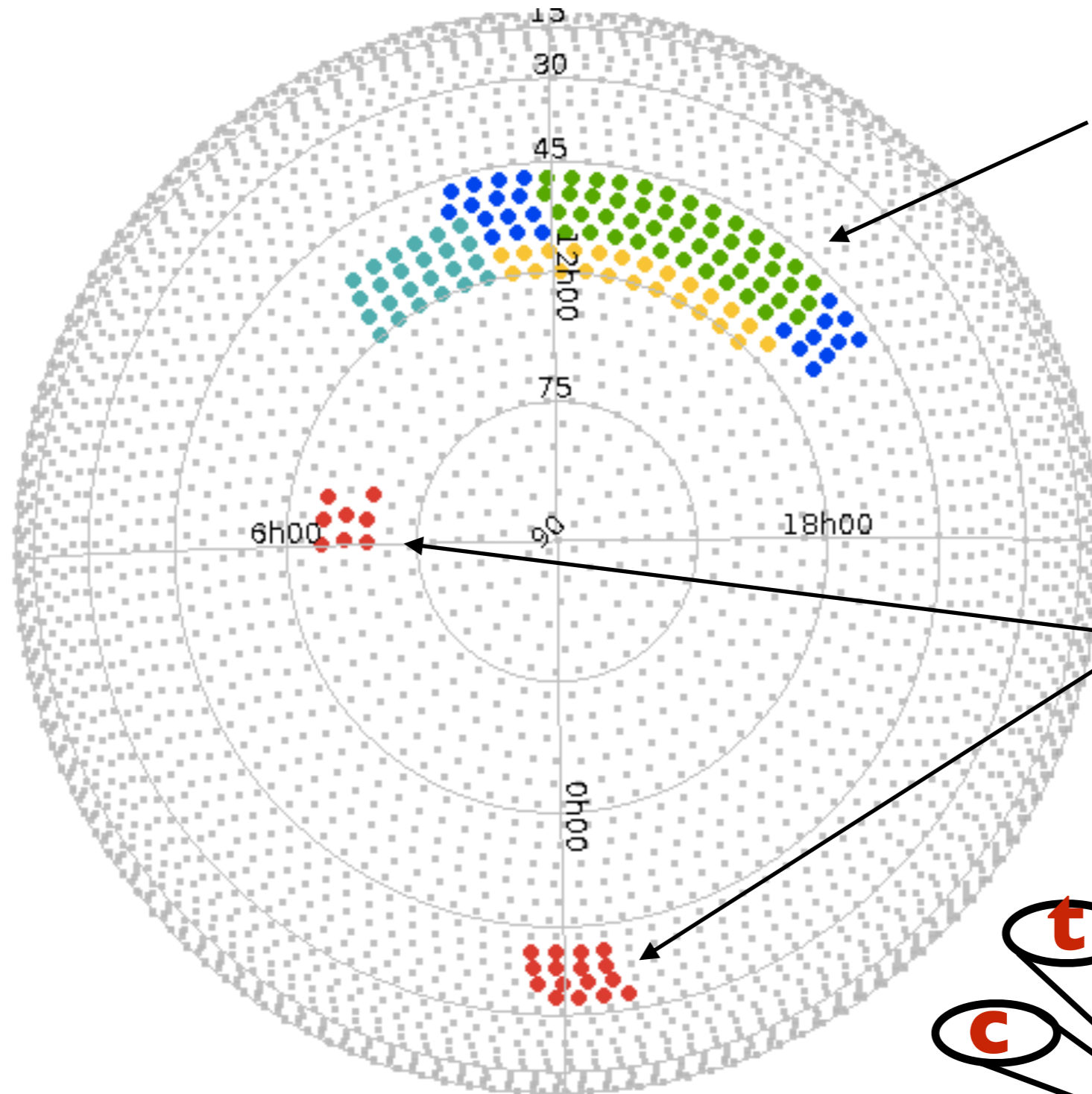
Frequency:
42-66 MHz

8h/pointing
(3 beams)

Coverage:
50% (North)

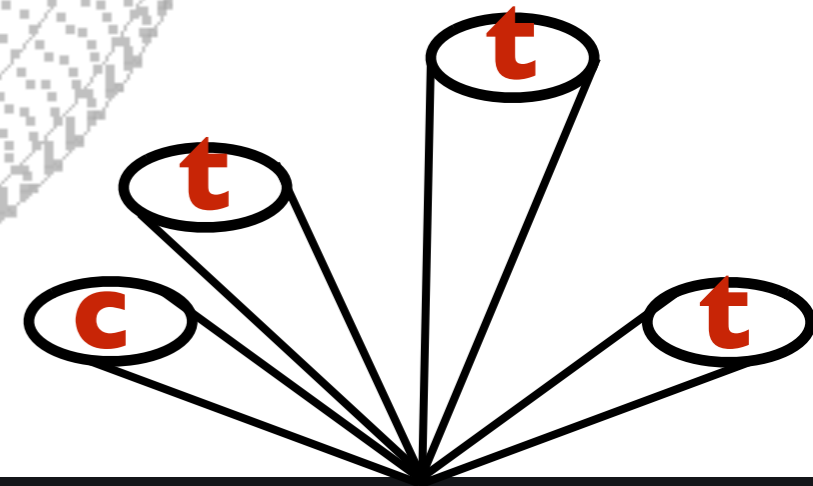
Rms noise:
1 mJy/b

Resolution:
15"

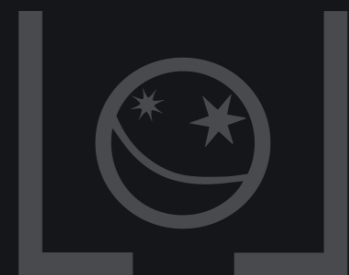


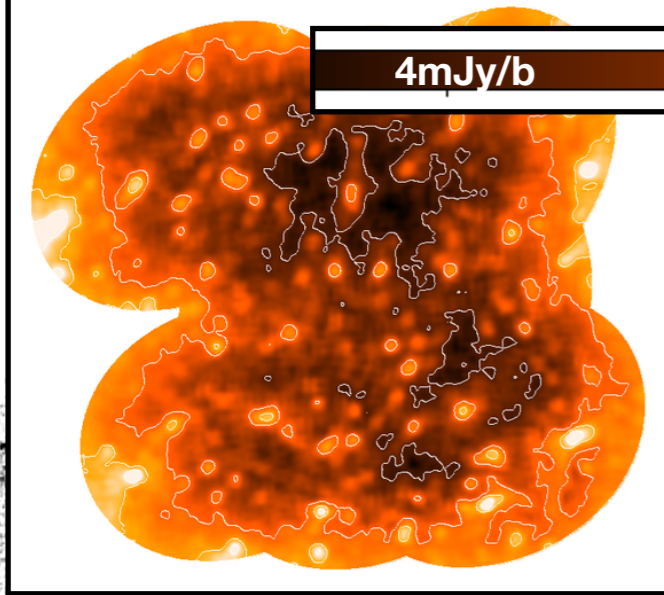
LOFAR LBA HETDEX Survey

Exploratory Surveys

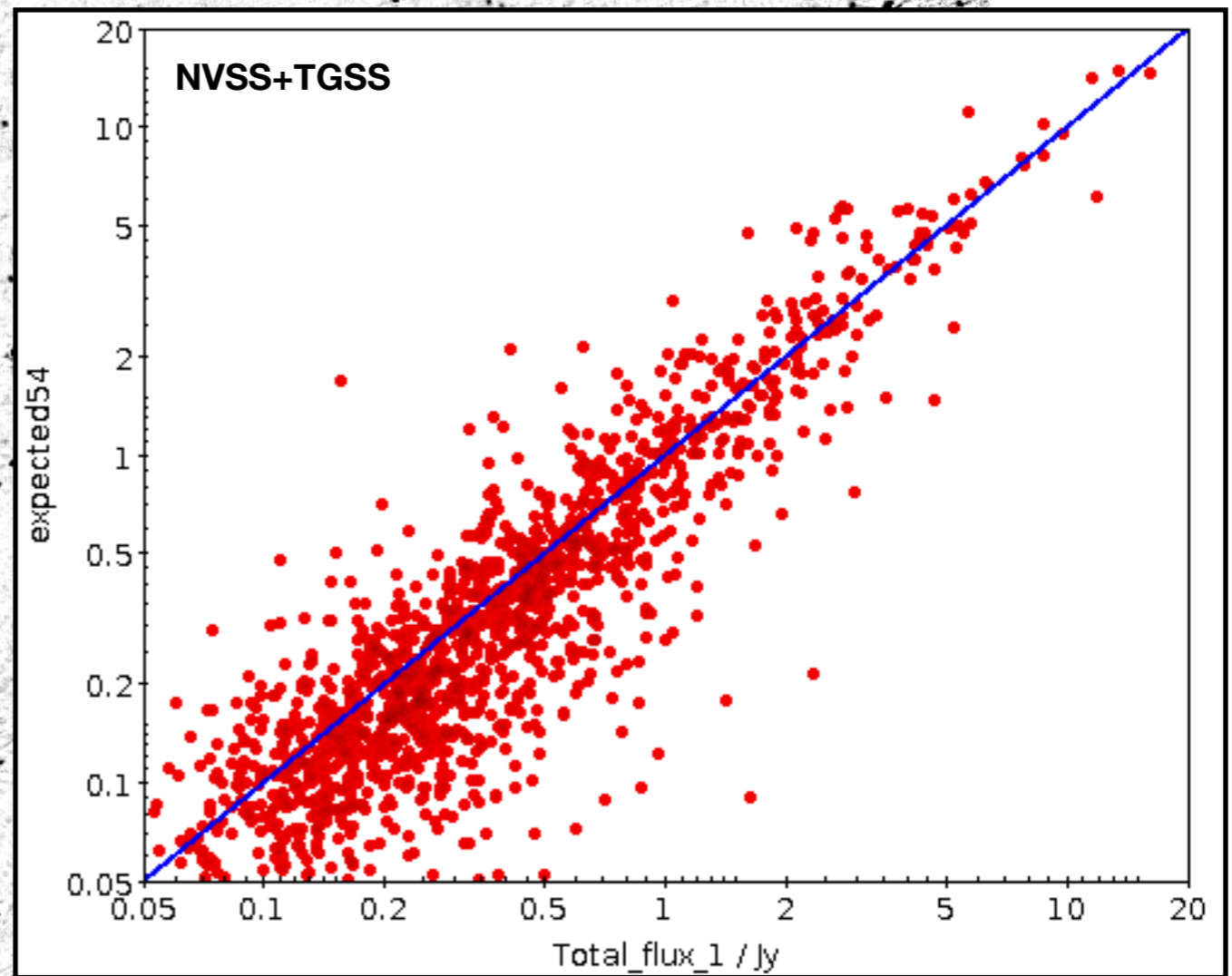


LOLSS





Sources: >2600 (8 pointings)
Rms noise: ~5 mJy/b
Resolution: 30" x 60"



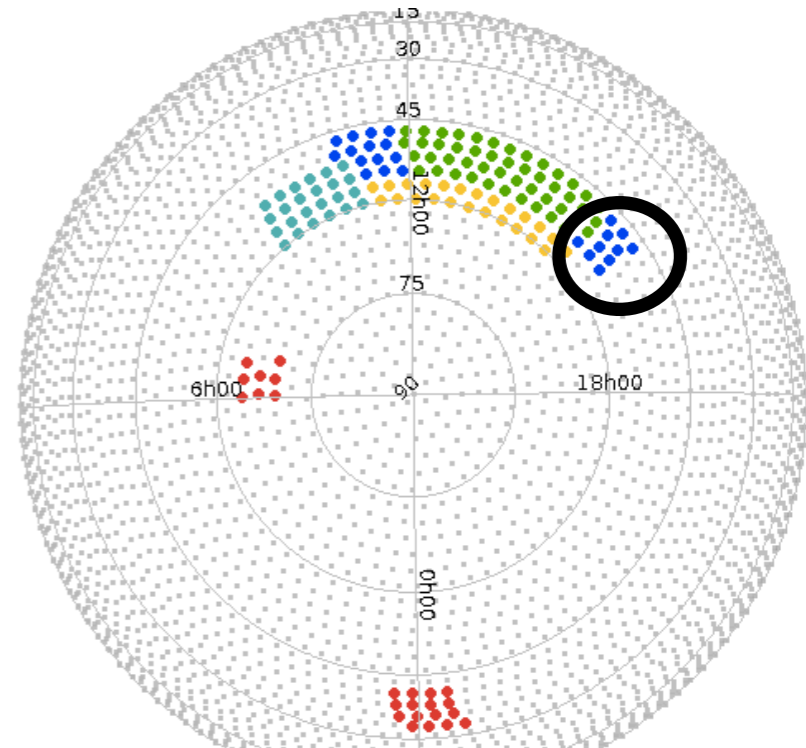
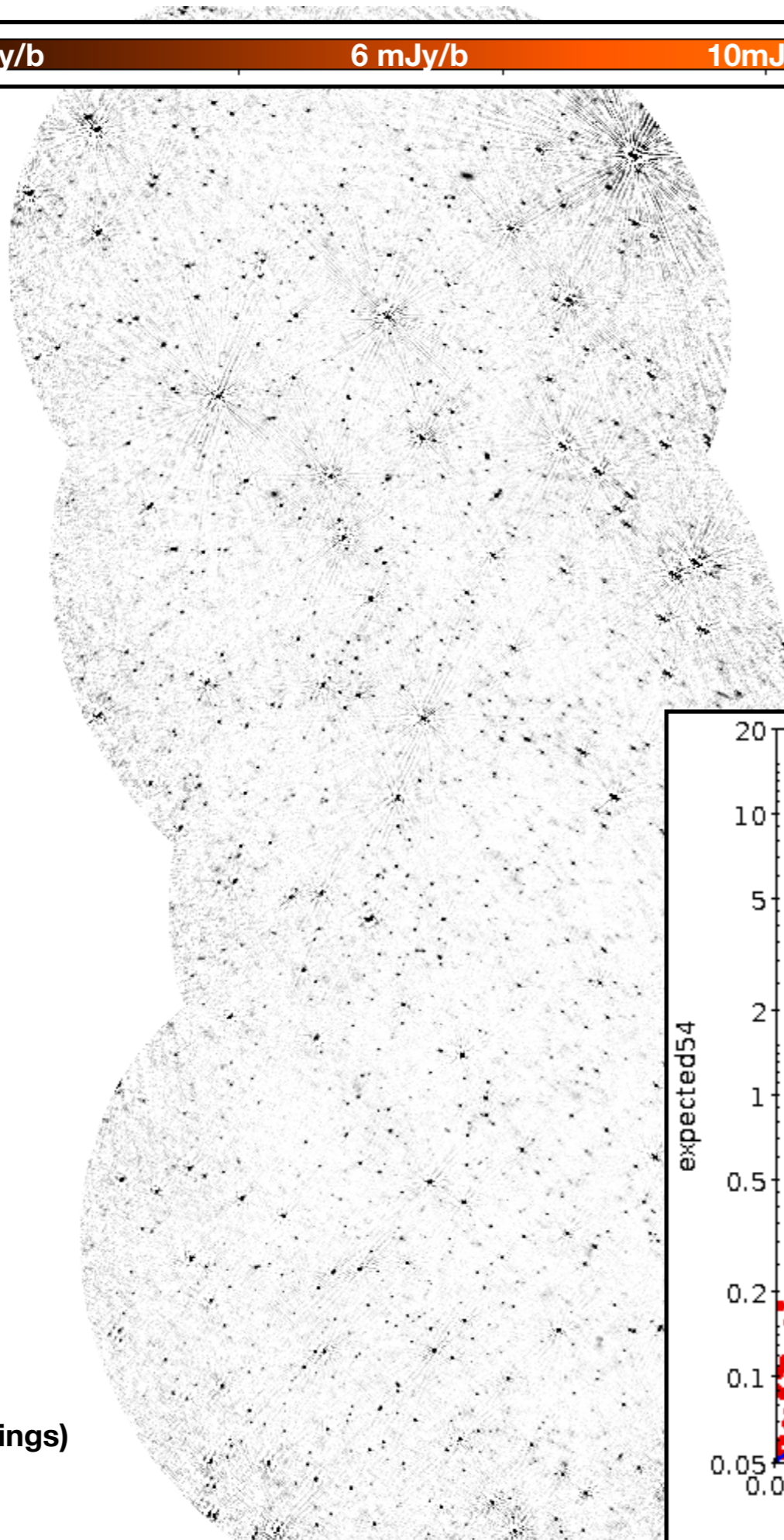
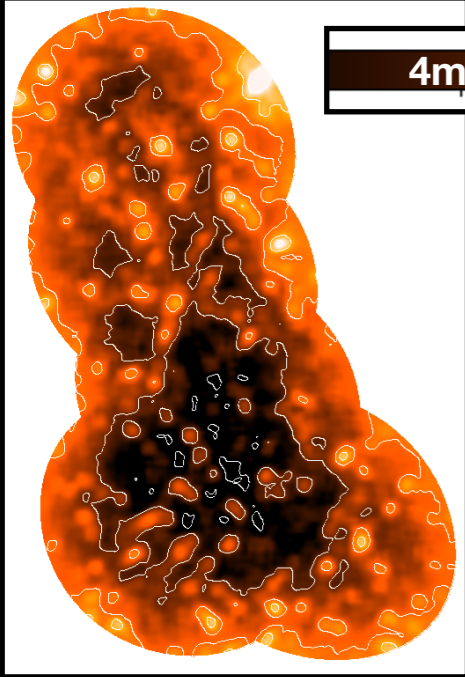
4mJy/b

6 mJy/b

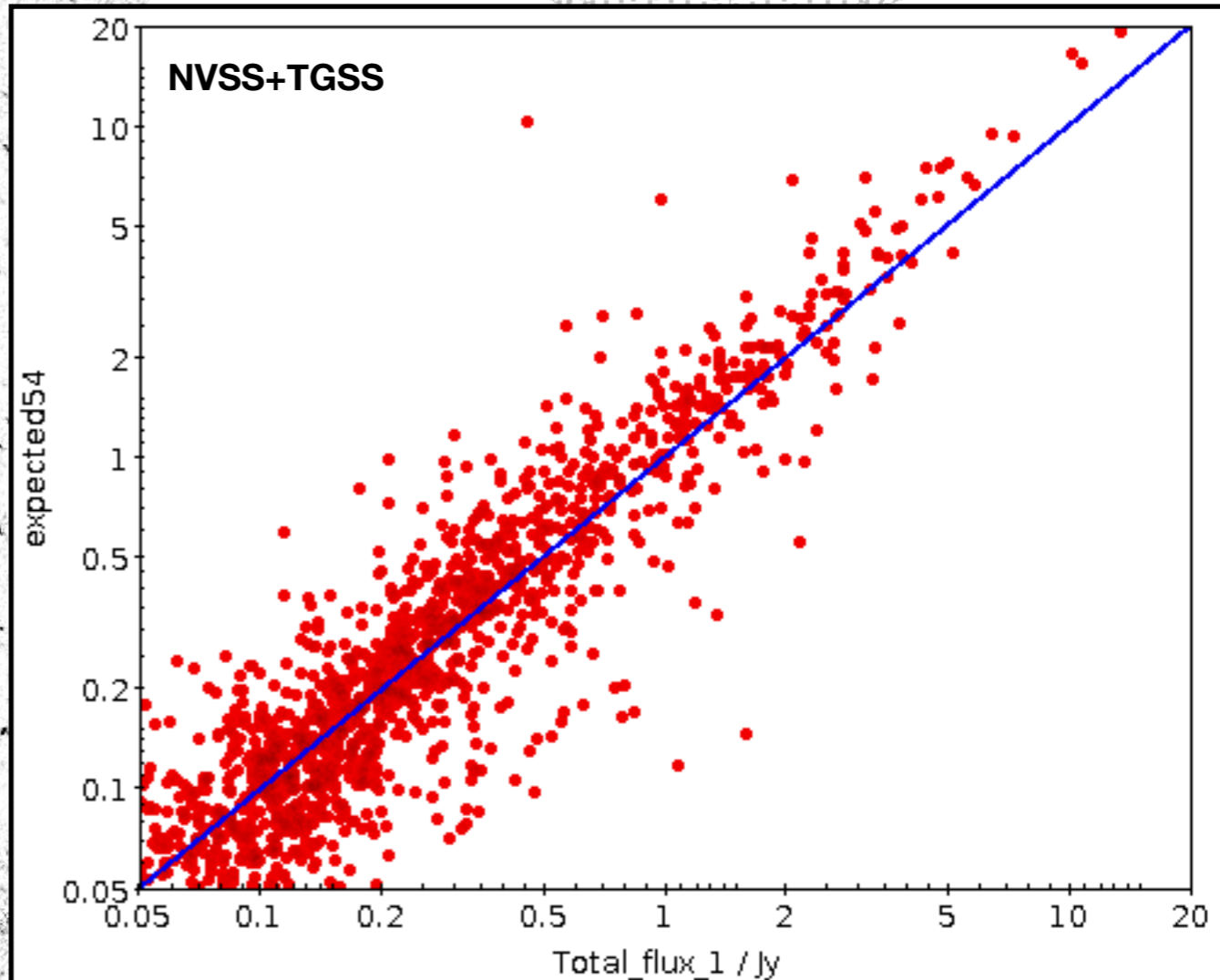
10mJy/b

15 mJy/b

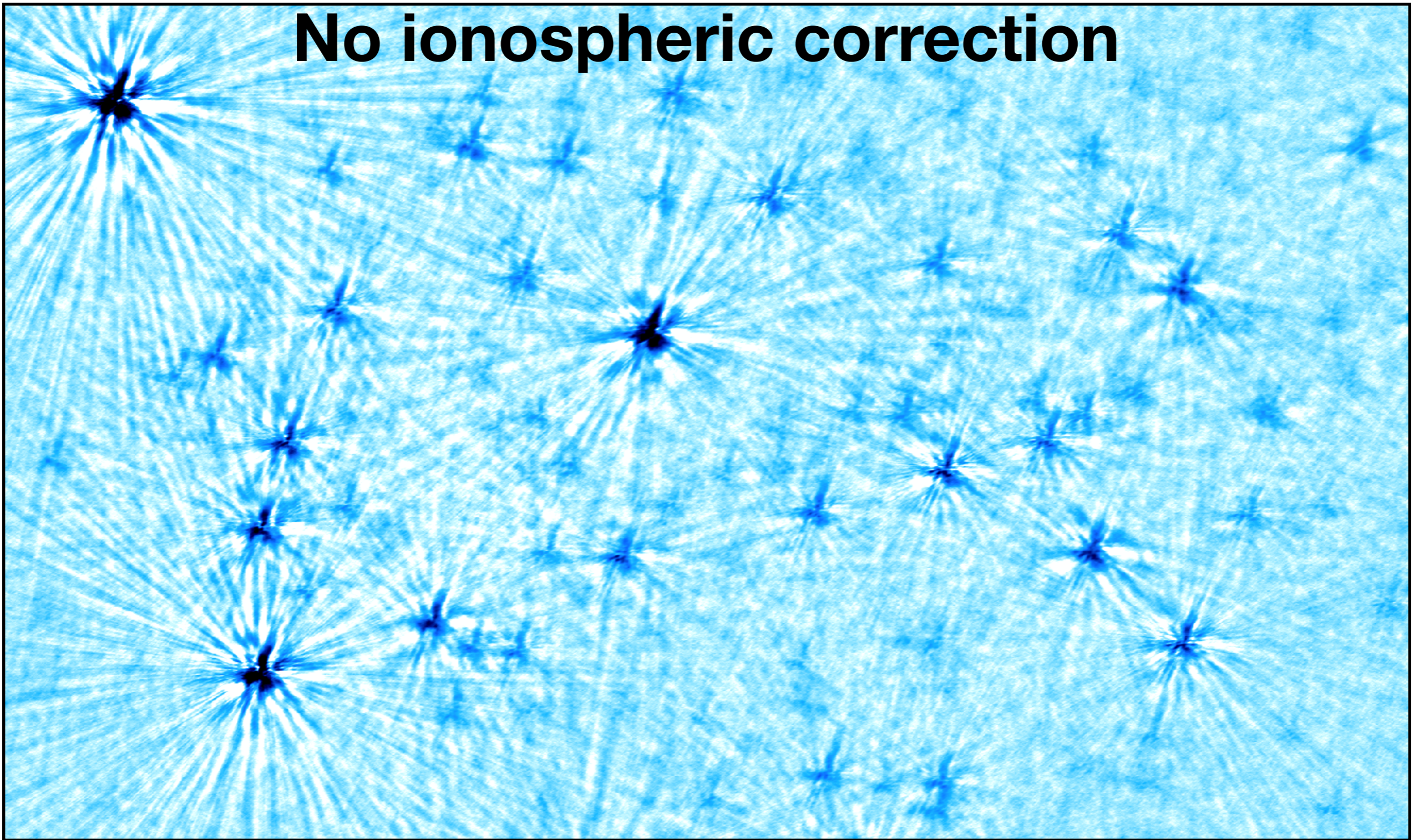
20mJy/b



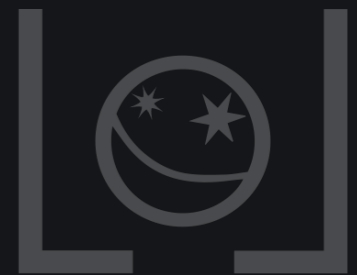
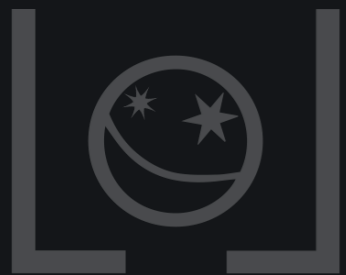
Sources: >2200 (5 pointings)
Rms noise: ~5 mJy/b
Resolution: 30" x 45"



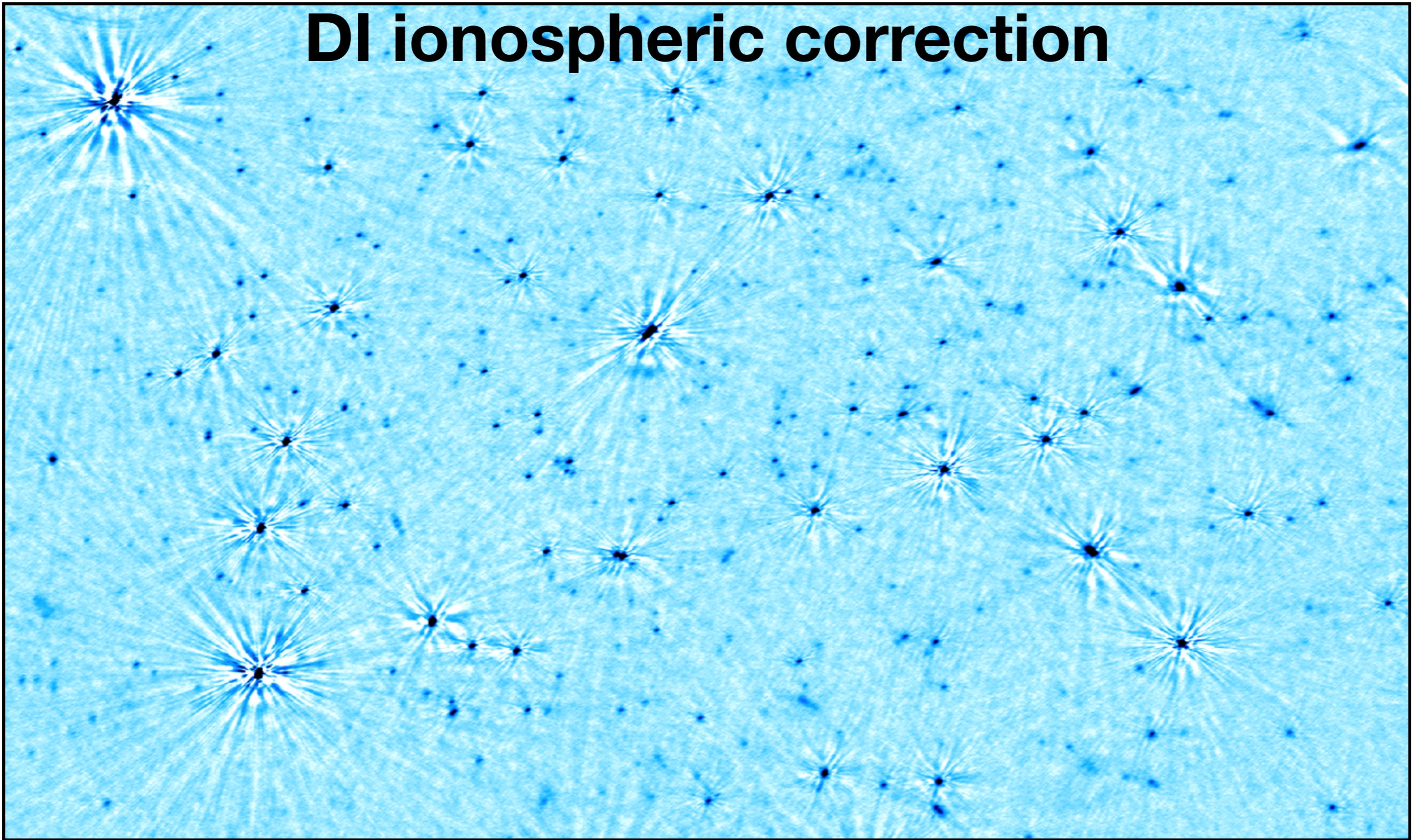
No ionospheric correction



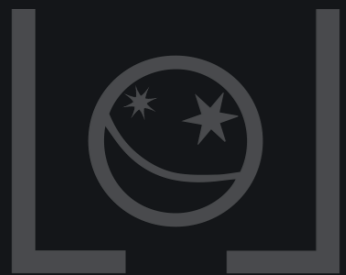
Bootes



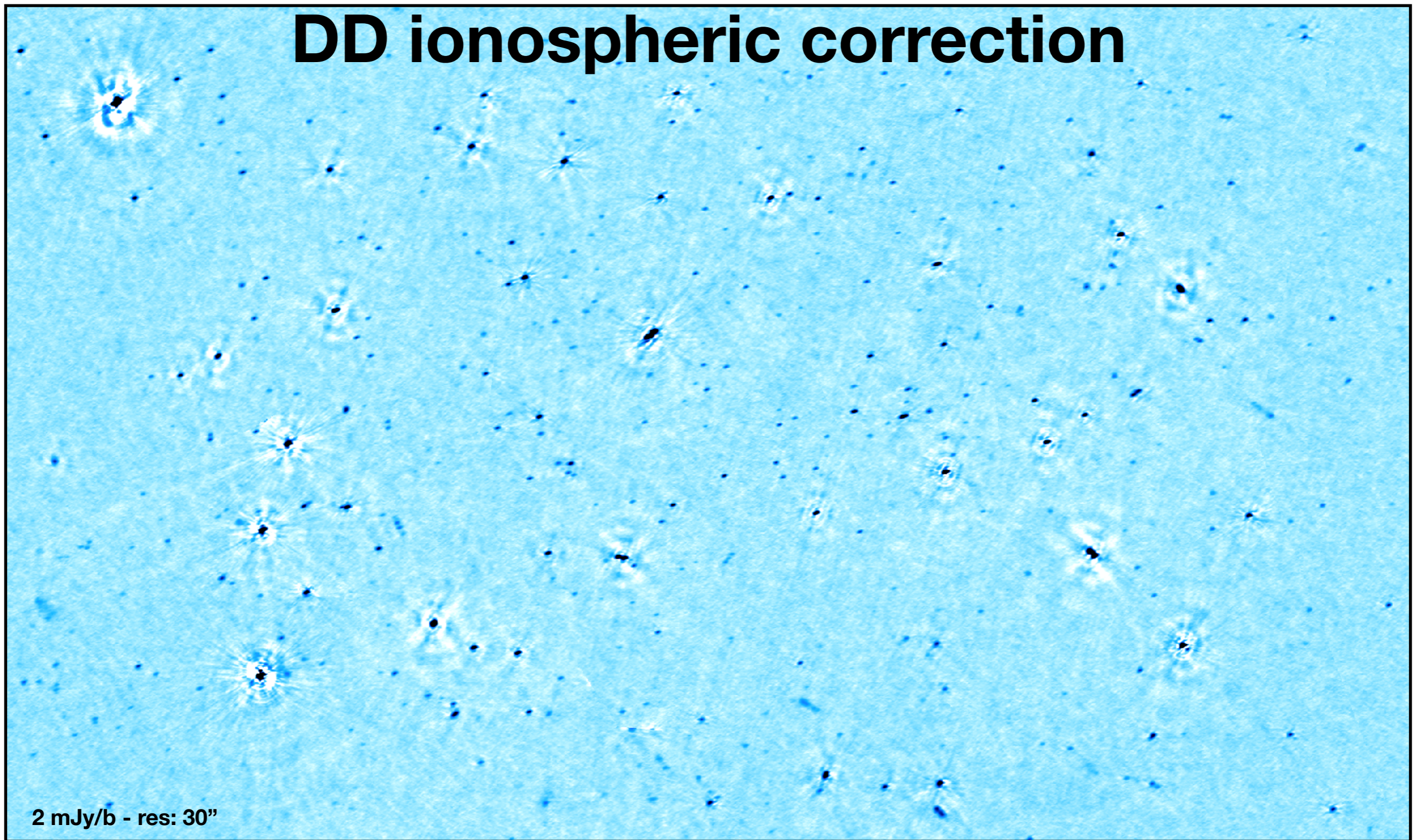
DI ionospheric correction



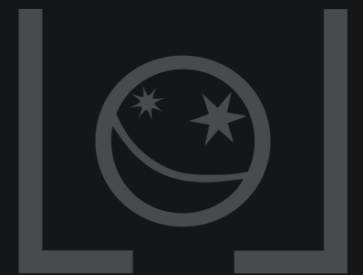
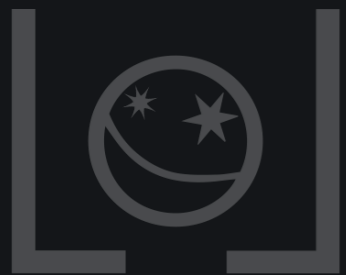
Bootes

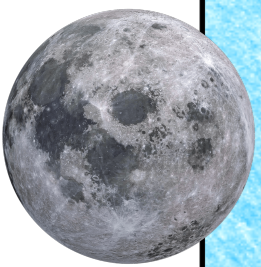


DD ionospheric correction

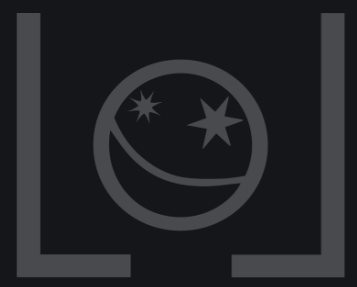
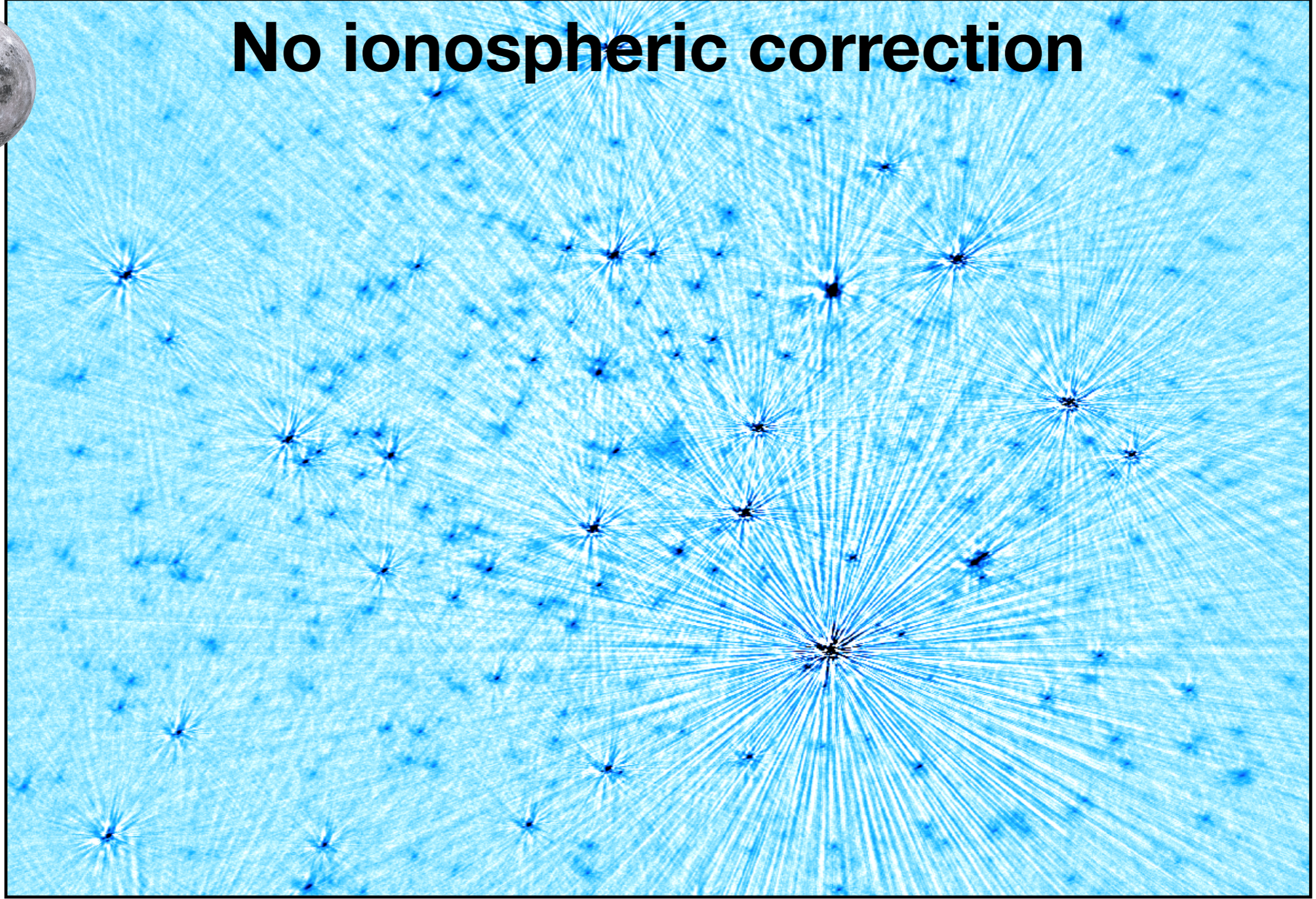


Bootes





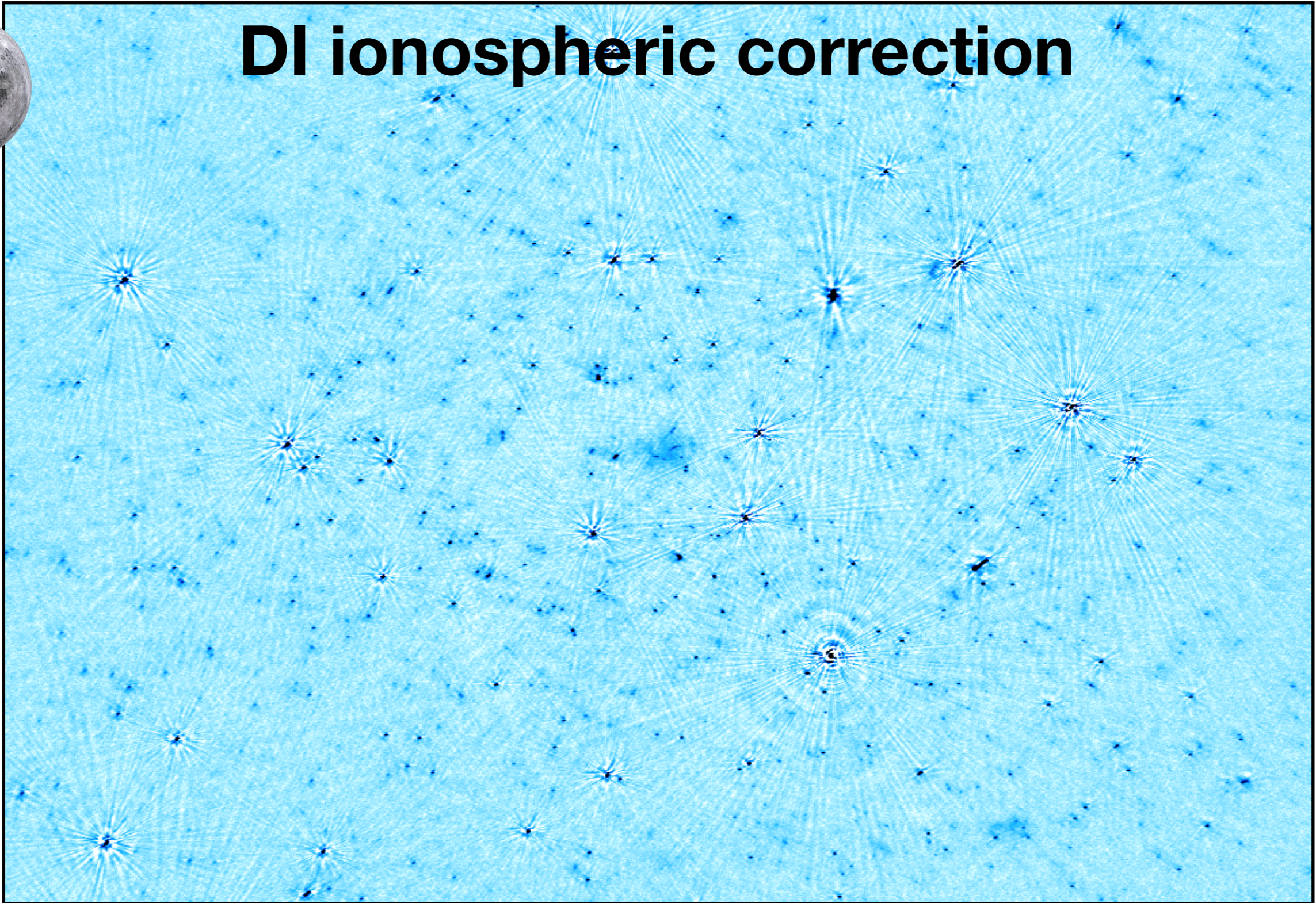
No ionospheric correction



Zwcl 0634.1+4750



DI ionospheric correction



Zwcl 0634.1+4750

DD ionospheric correction

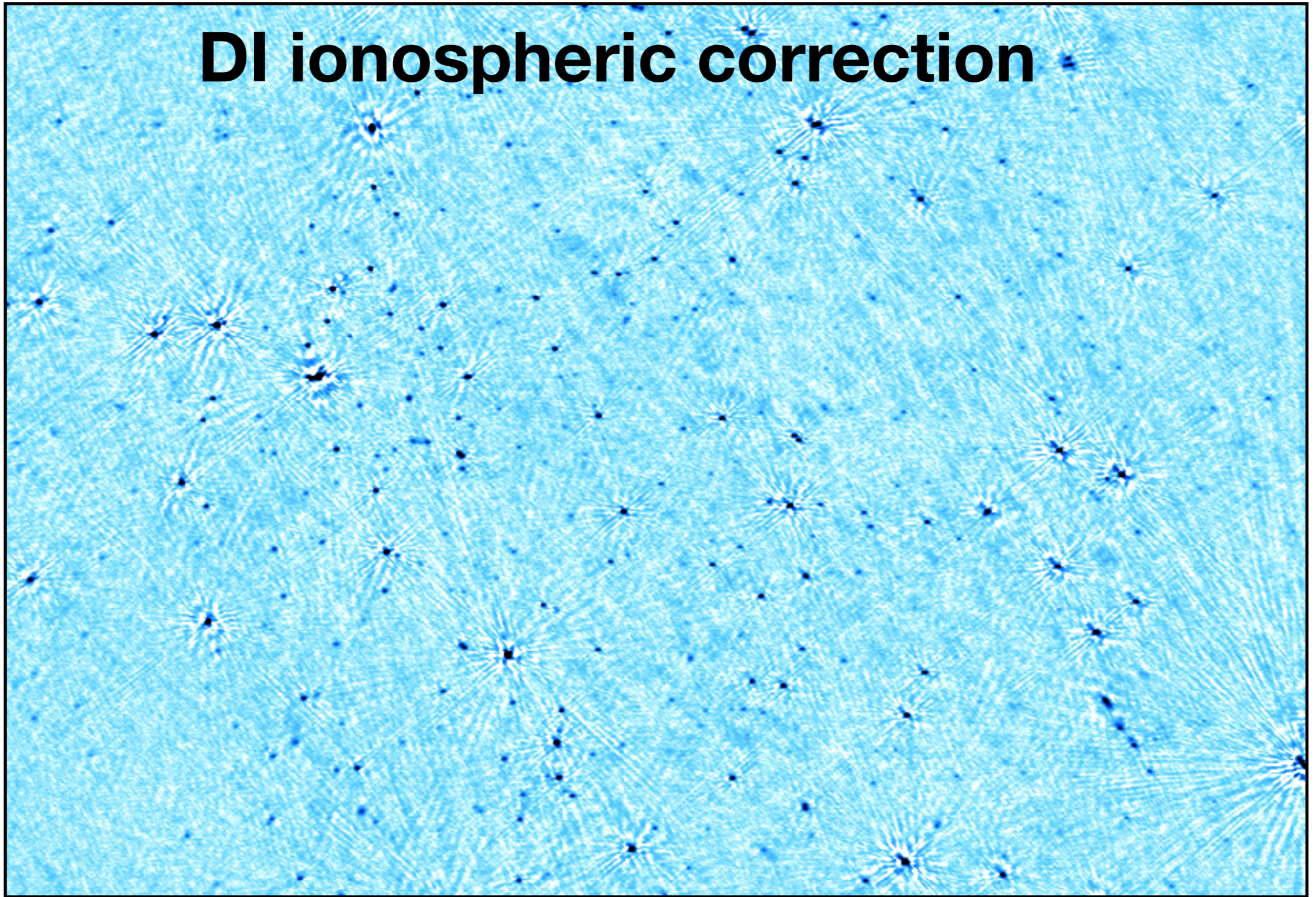


1.2 mJy/b - res: 20"

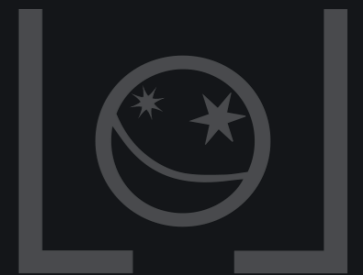
(Virginia's talk)

Zwcl 0634.1+4750

DI ionospheric correction



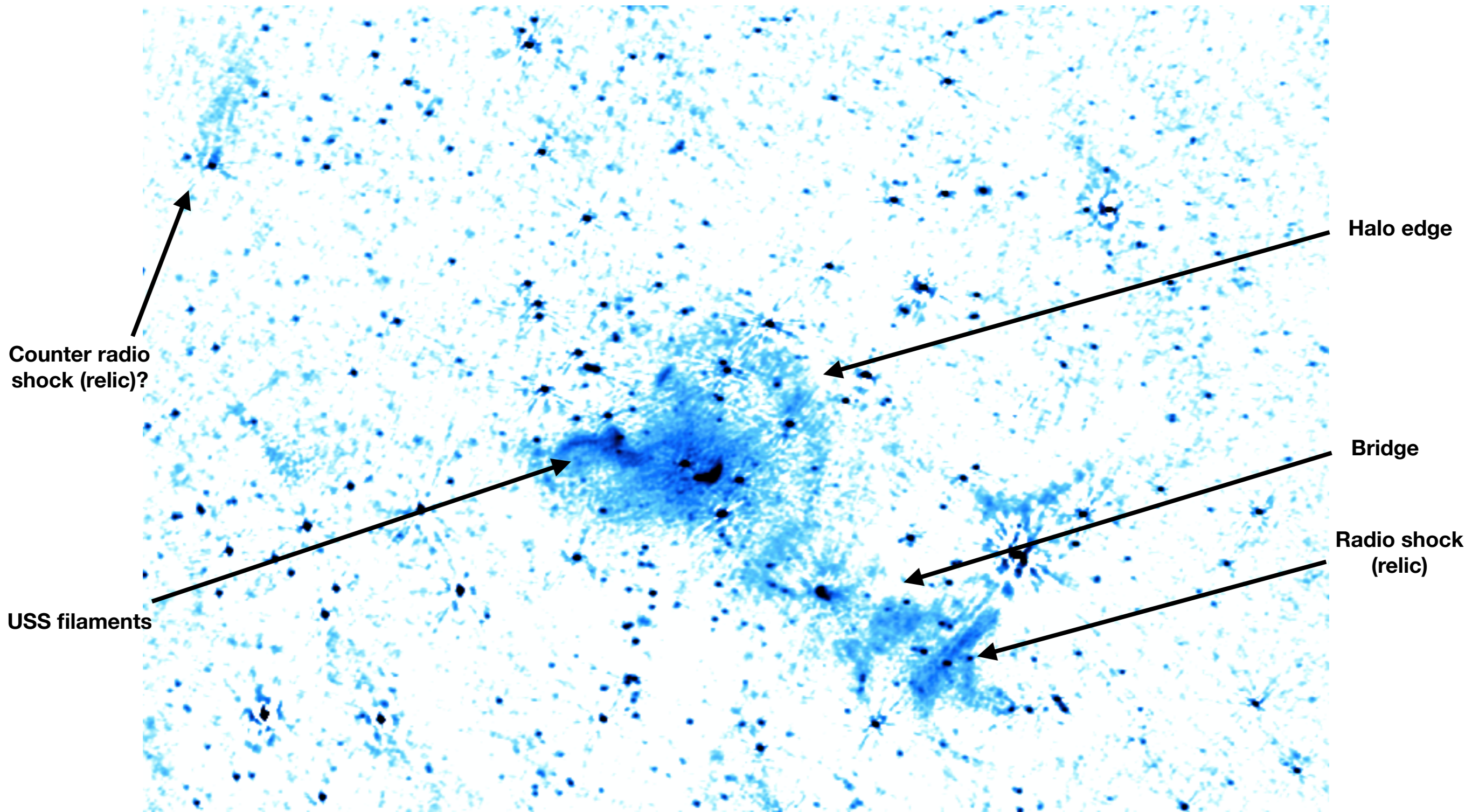
Survey field



DD ionospheric correction

2 mJy/b - res: 30"

Survey field



Coma cluster



Complimentary surveys:

- A-team survey done
- 3Crr survey on-going

LOFAR LBA sky survey:

- HETDEX (45", 5 mJy/b) ready soon
- DDE procedure on-going (first results encouraging) - more on LOFAR 2.0 talk

Few selected fields (20", 1 mJy/b):

- Bootes
- Zwcl 0634.1+4750 (Virginia's talk)
- Coma
- Toothbrush
- (...)

Conclusions