

ELAIS-N1 radio map at $\sim 1''$

Towards sub-arcsecond resolution

Jurjen de Jong

Deep field symposium 2023

Collaborators:

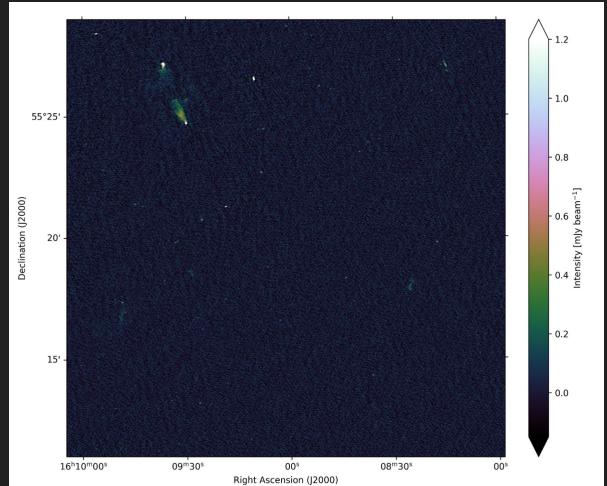
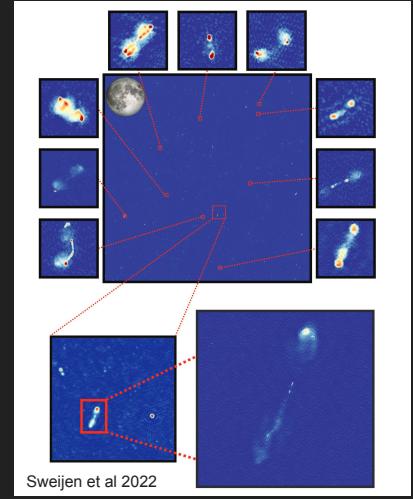
R. van Weeren, F. Sweijen, R. Oonk



Universiteit
Leiden

Previously

- ❖ First 8h 0.3" image from Lockman Hole
→ Sweijen et al 2022
(the myth, the man, the legend)
- ❖ First 8h ~1" deep field image from ELAIS-N1
→ Ye et al. in prep



Ye et al. in prep

Goals

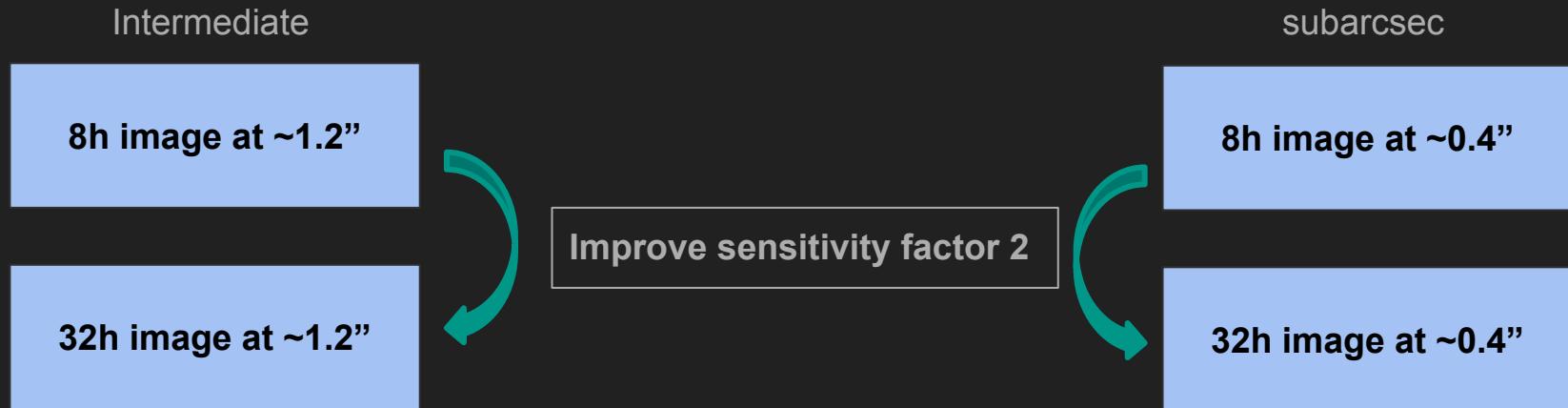
Intermediate

8h image at ~1.2"

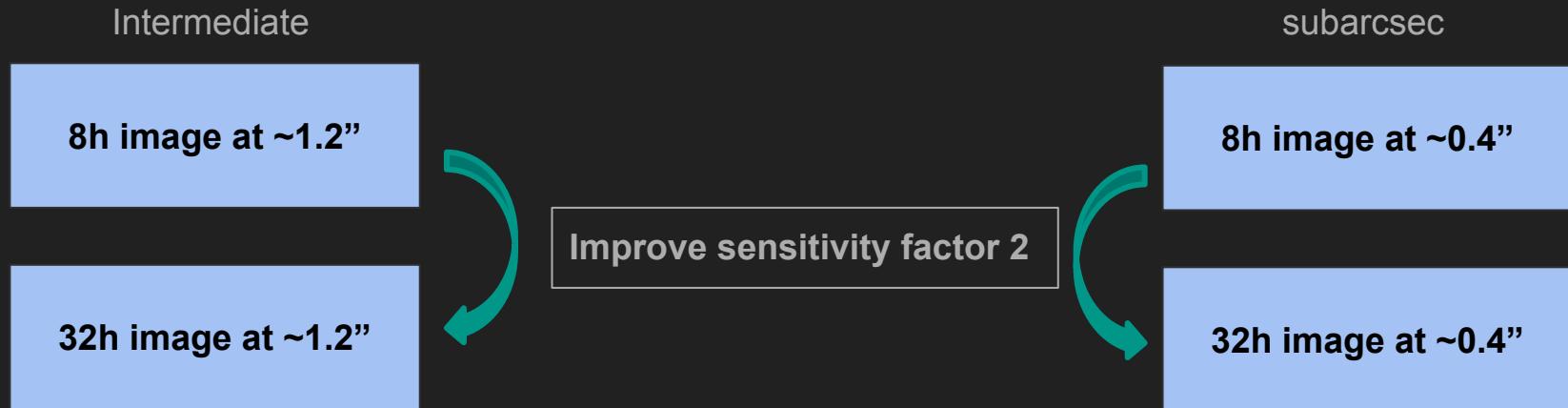
subarcsec

8h image at ~0.4"

Goals



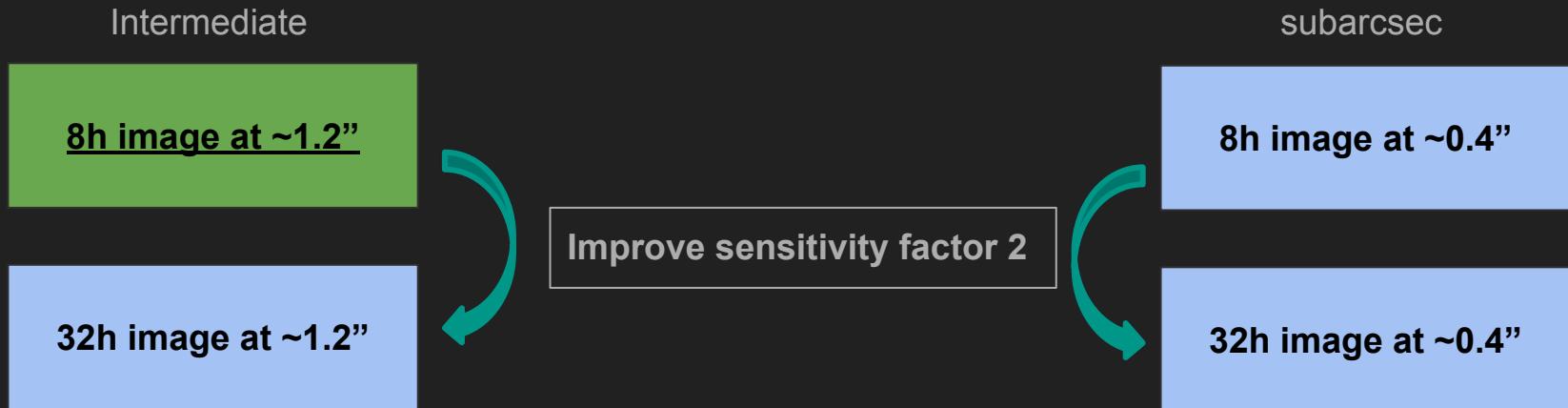
Goals



Substeps

- ❖ More automation
- ❖ Improve imaging speed

Goals



Substeps

- ❖ More automation
- ❖ Improve imaging speed

Calibration

1. Prefactor (initial corrections)
2. DDF (6" resolution [LoTSS quality])
3. Subtract (make field smaller)
4. First VLBI step

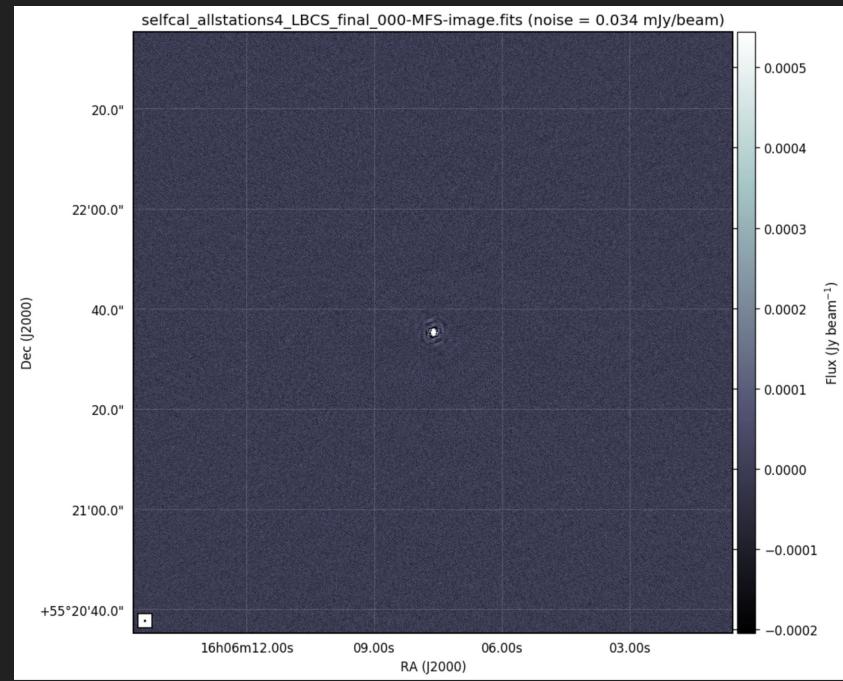
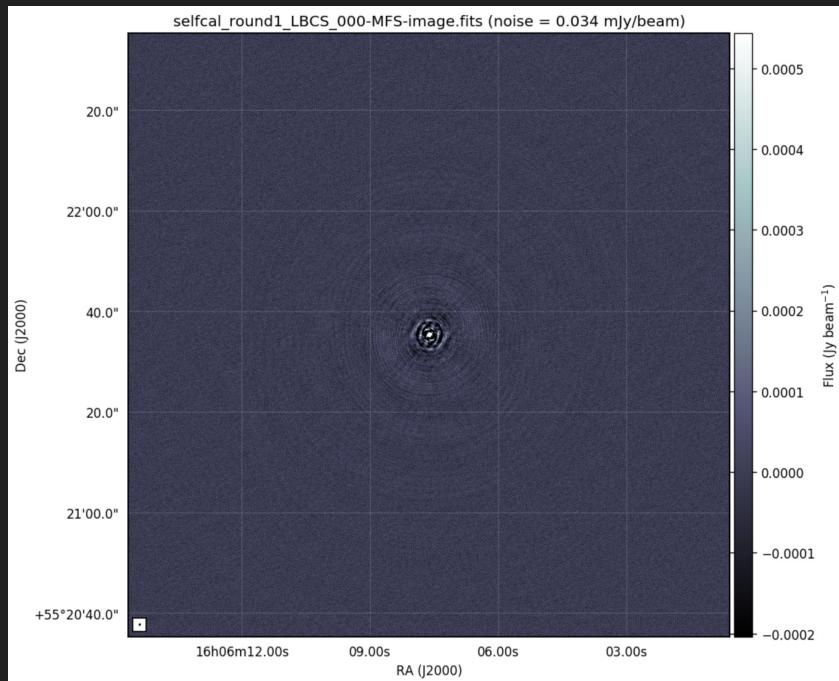
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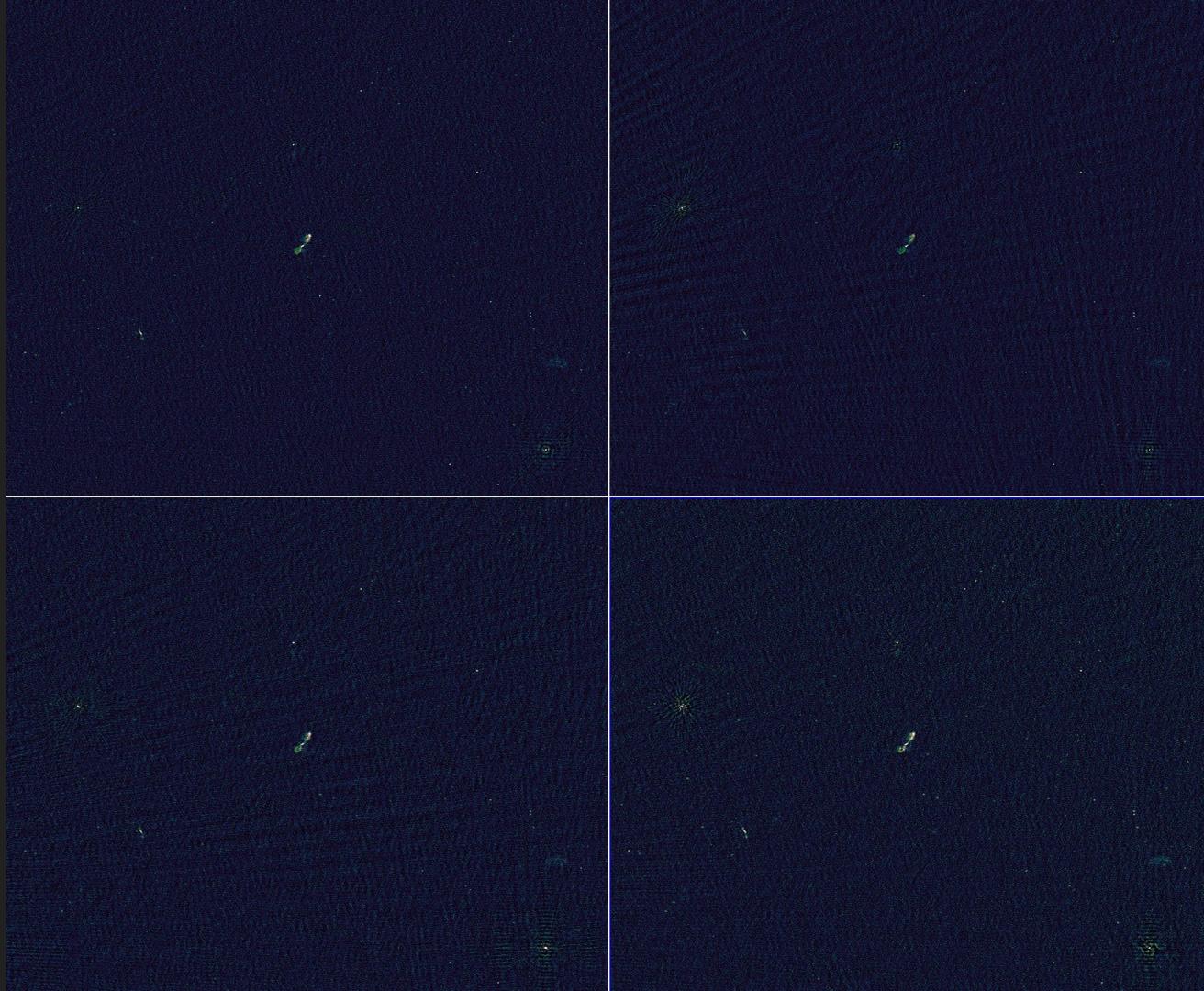


In-field delay calibrator

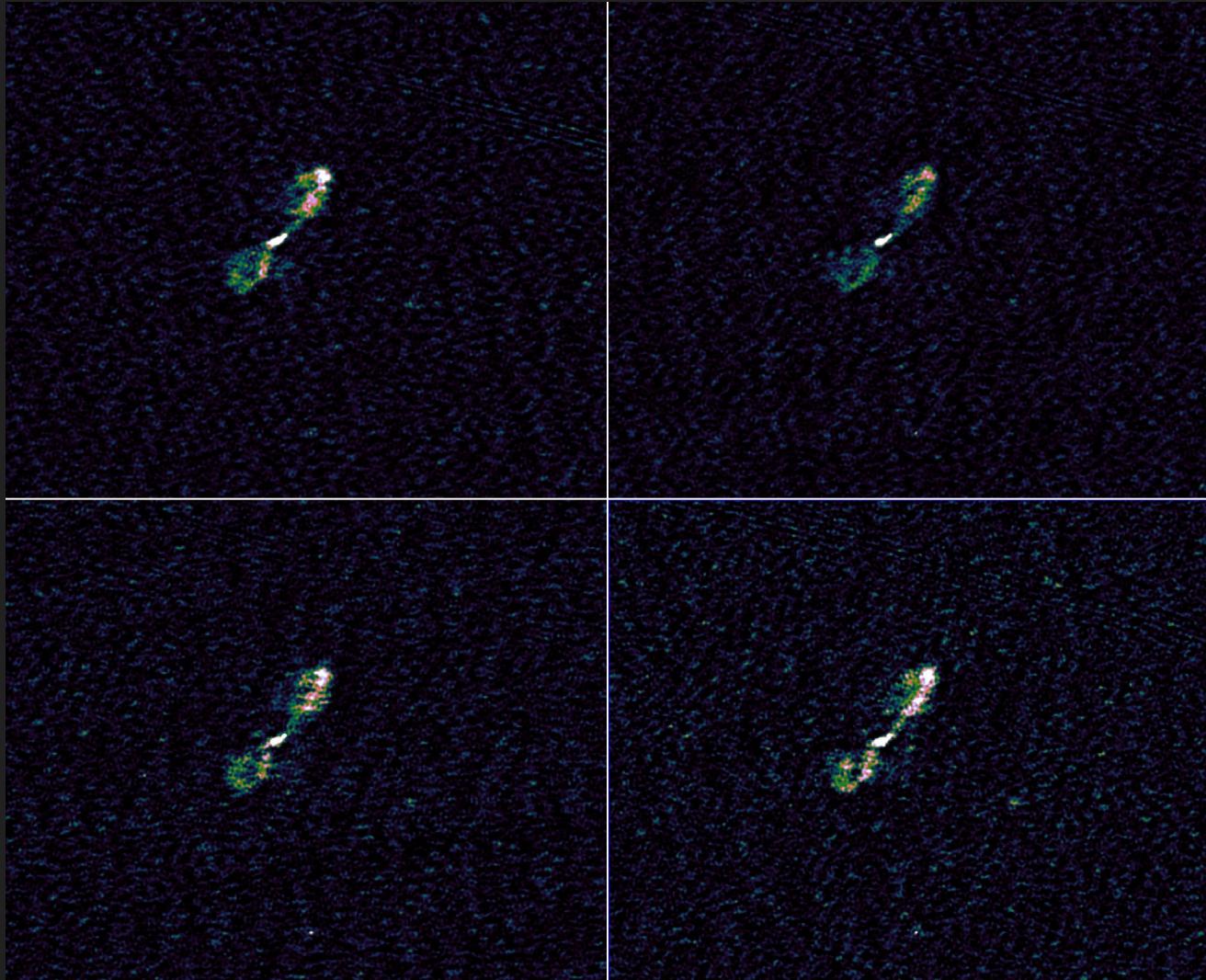
Direction-independent calibration



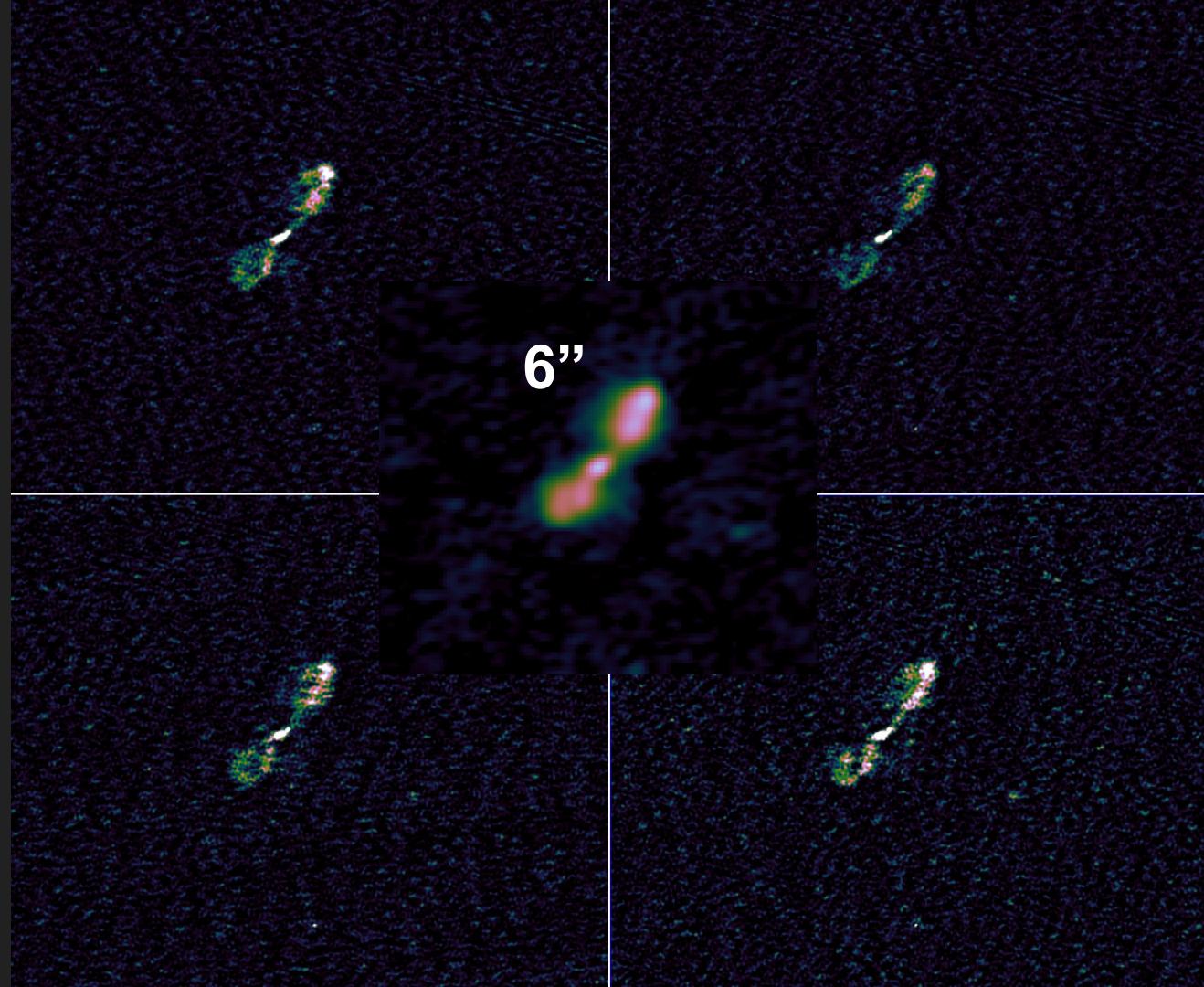
Direction
independent
images (1")



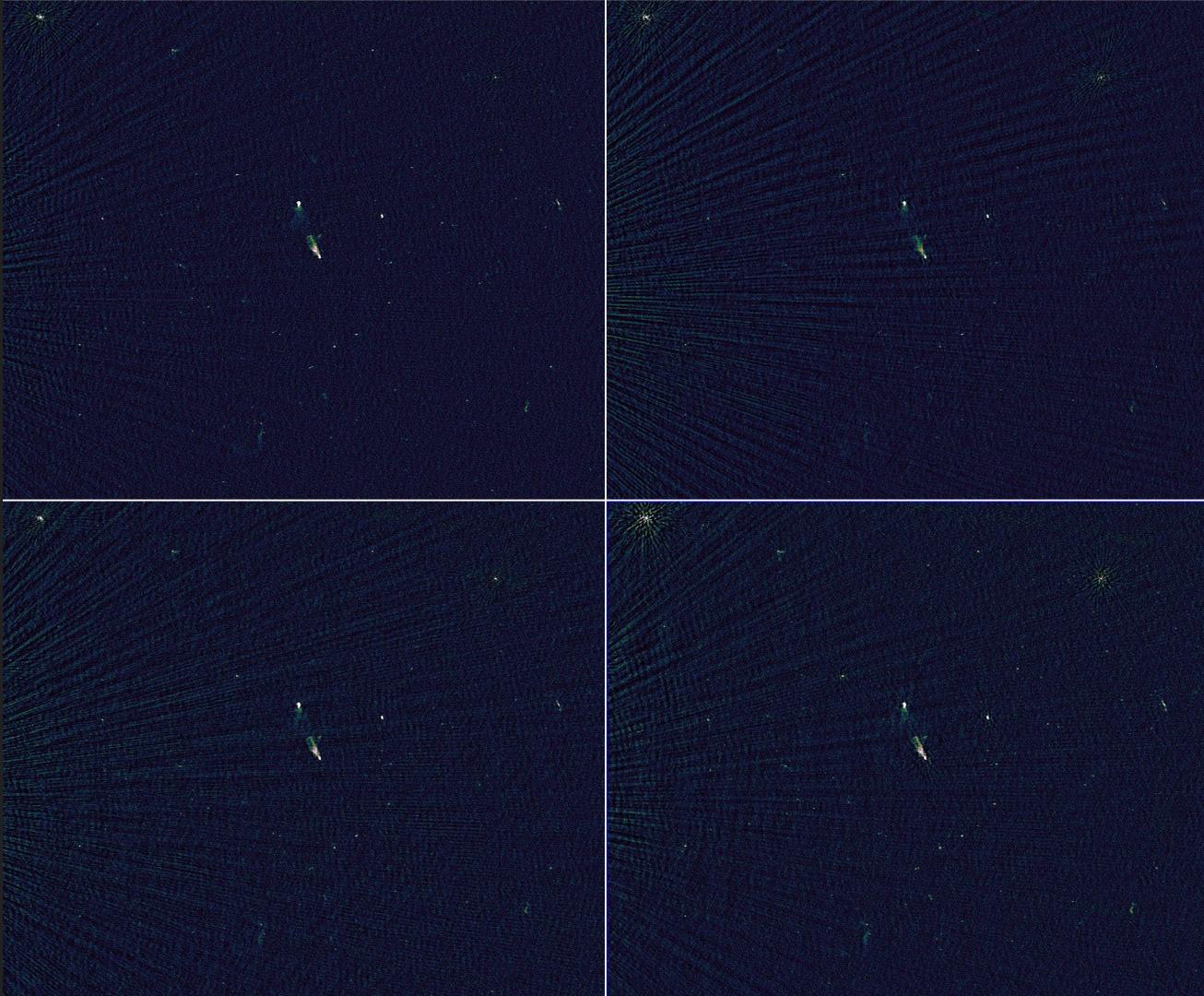
Direction
independent
images (1")



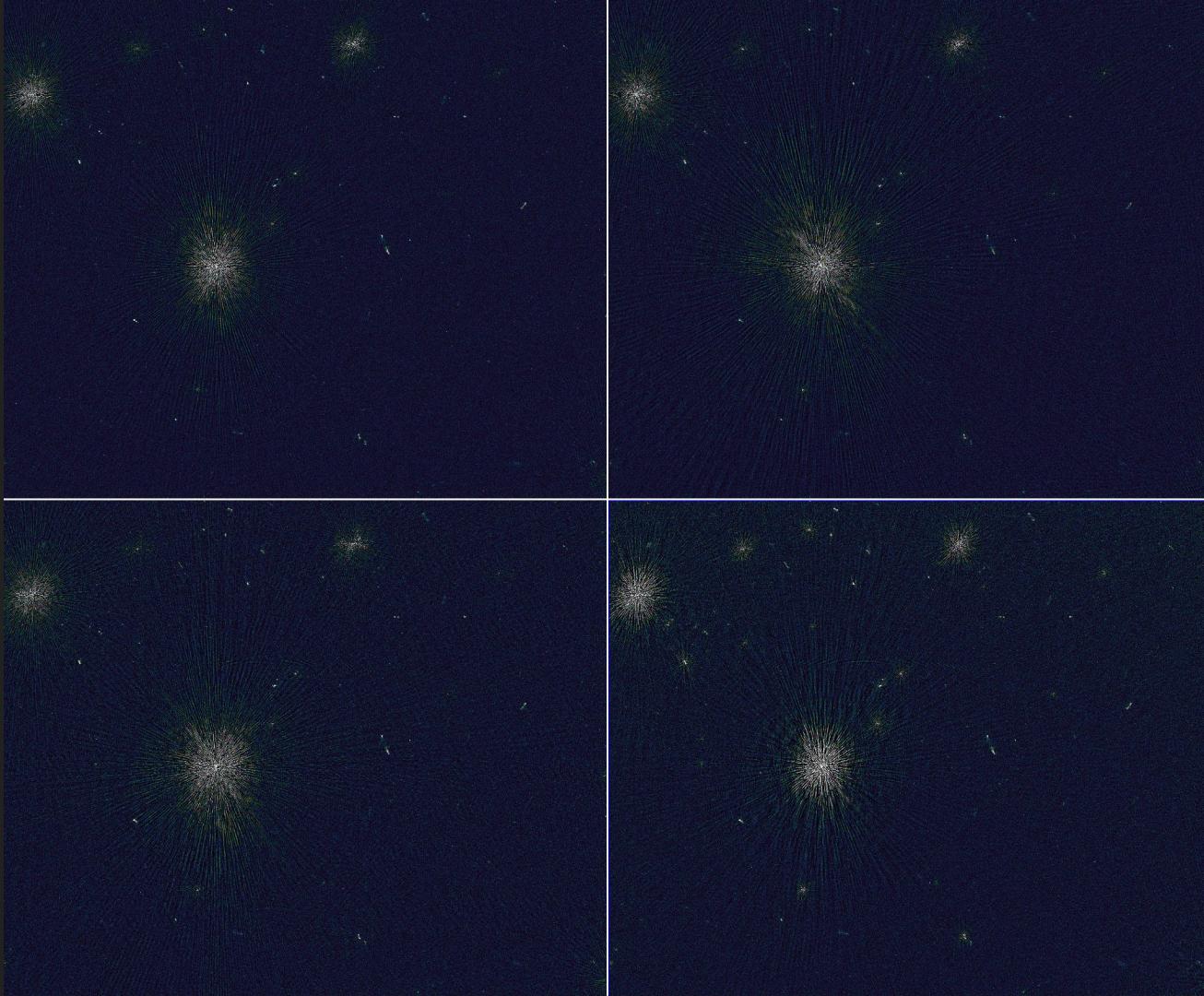
Direction
independent
images (1'')



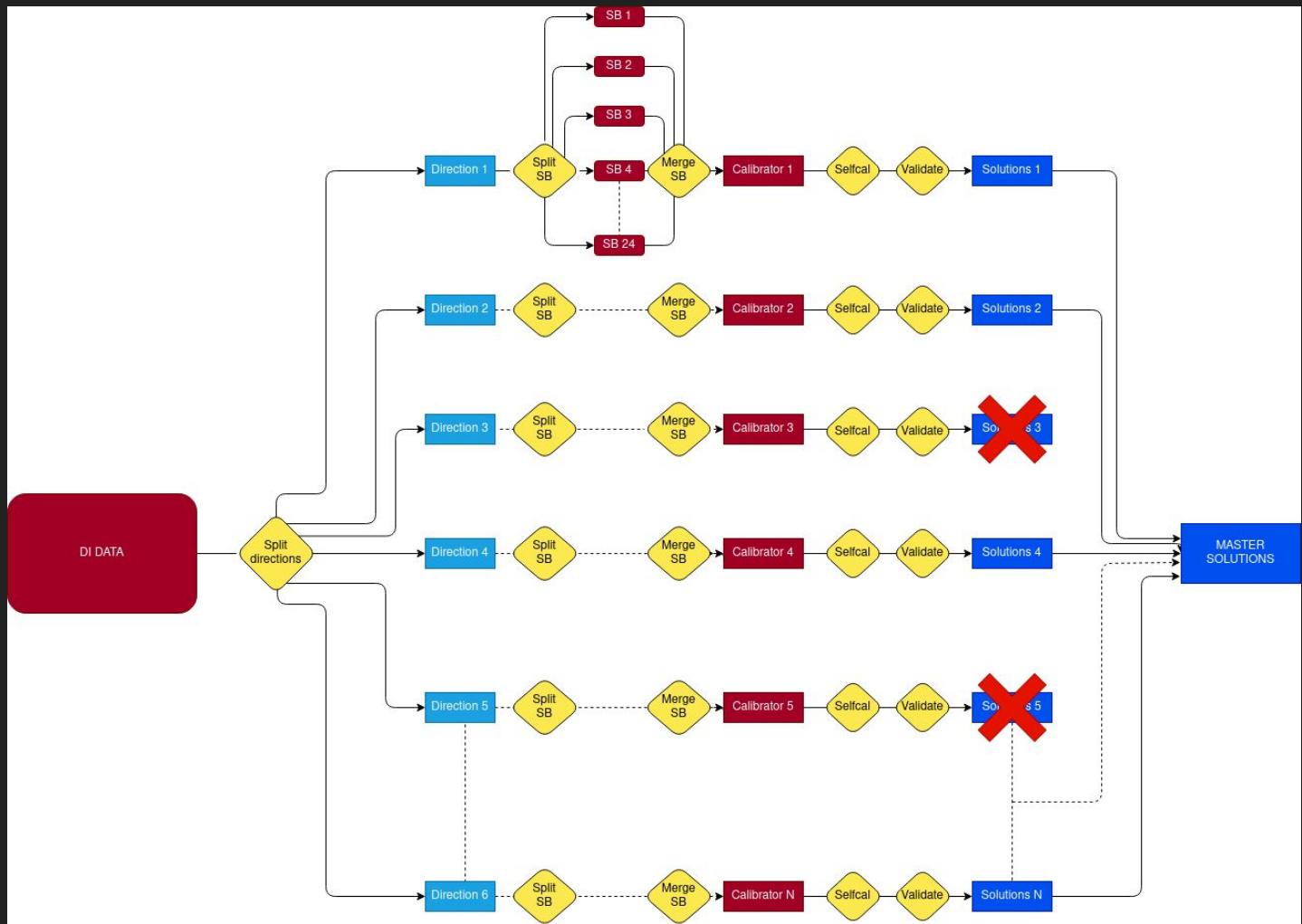
Direction
independent
images (1")



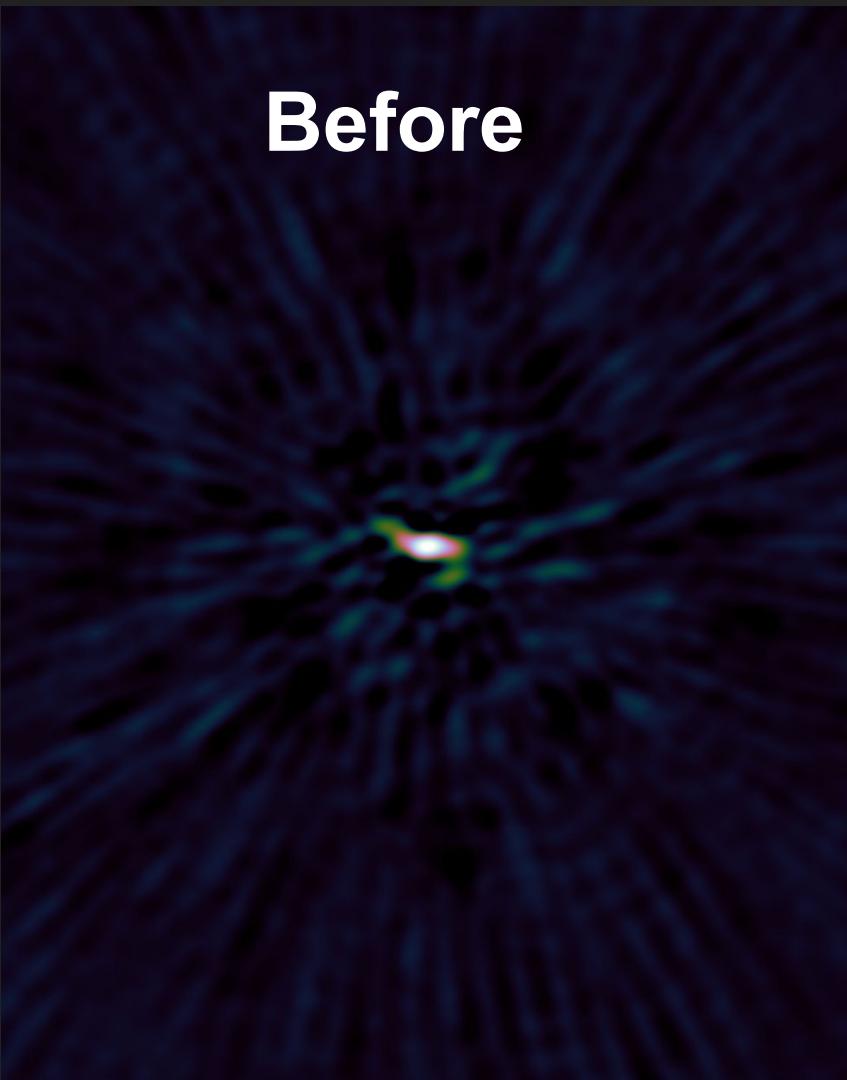
Direction
independent
images (1")



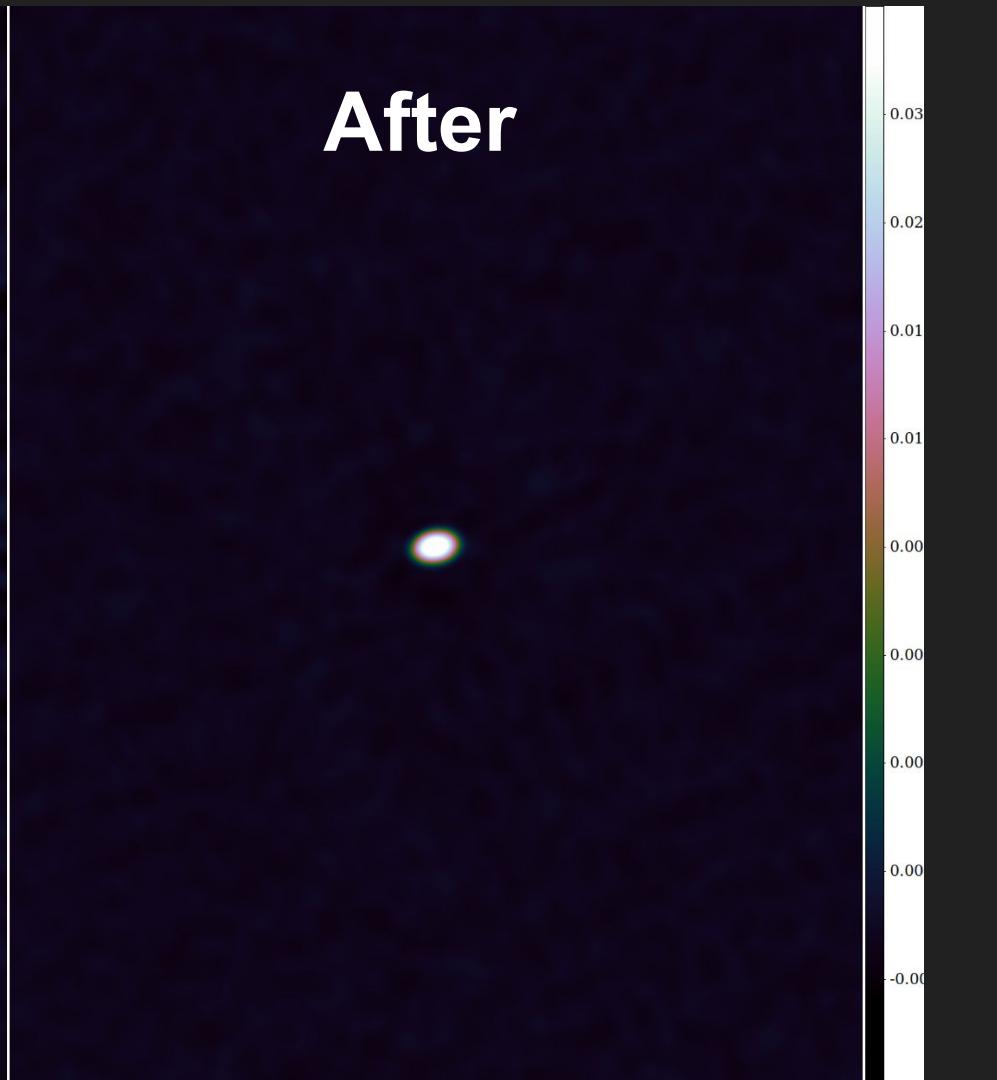
Choose calibrators



Before

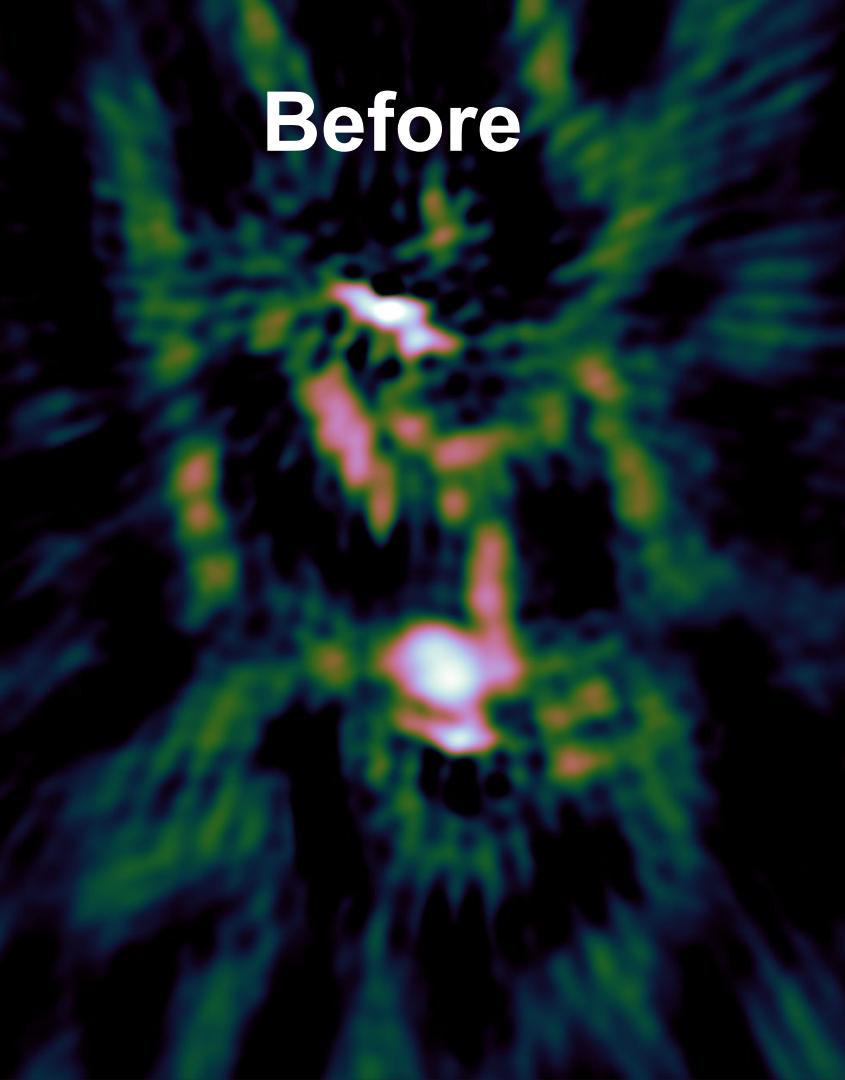


After

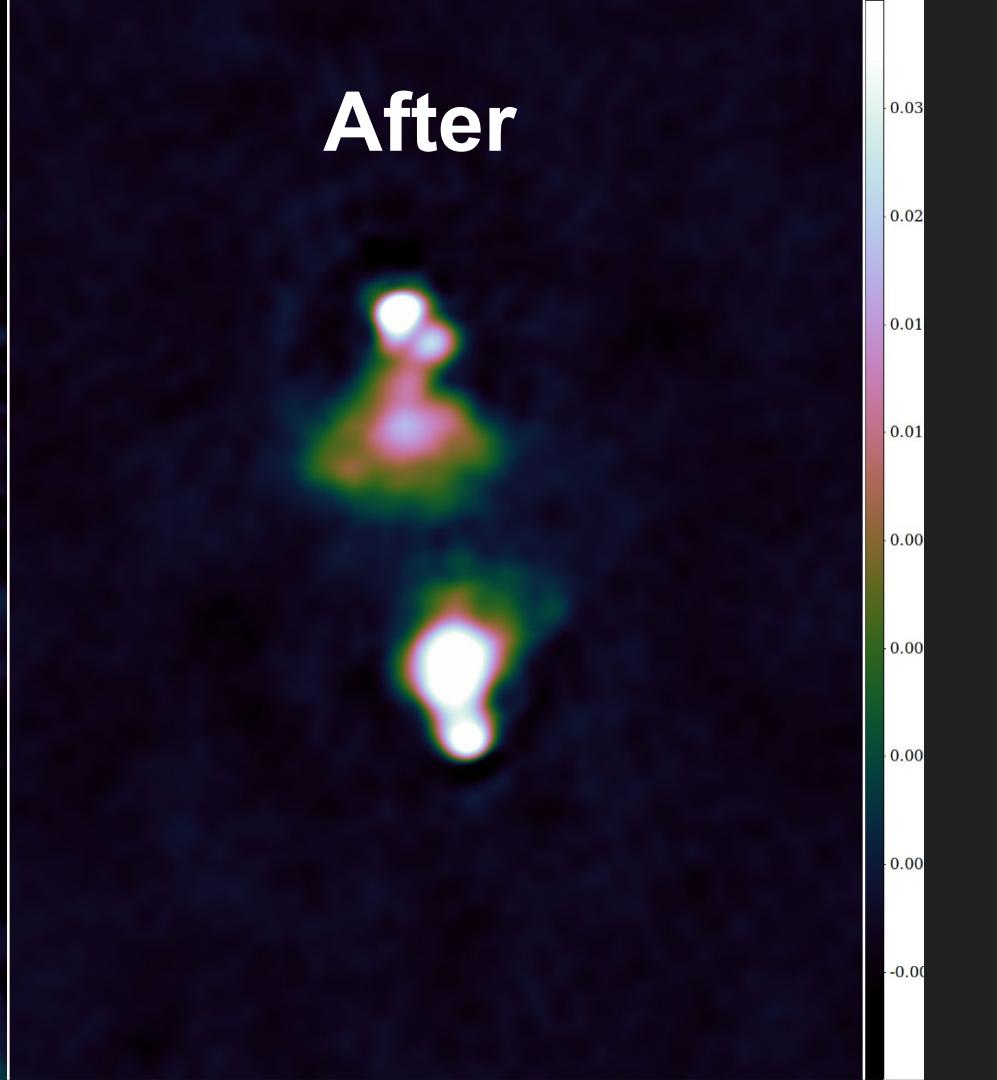


0.03
0.02
0.01
0.00
-0.00

Before

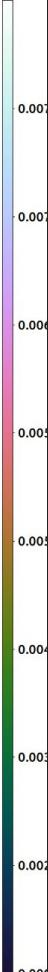


After

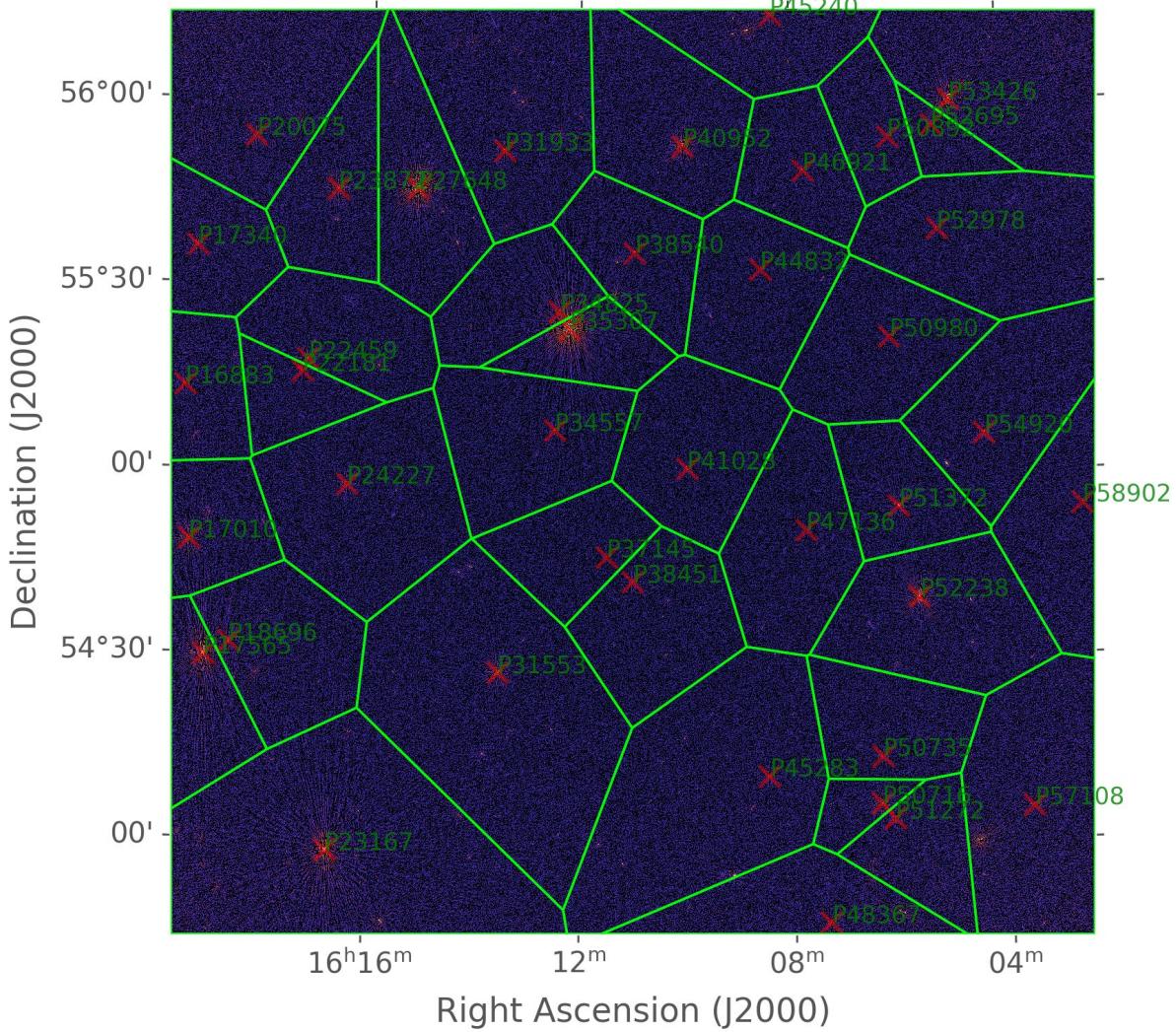


Before

After



Facets



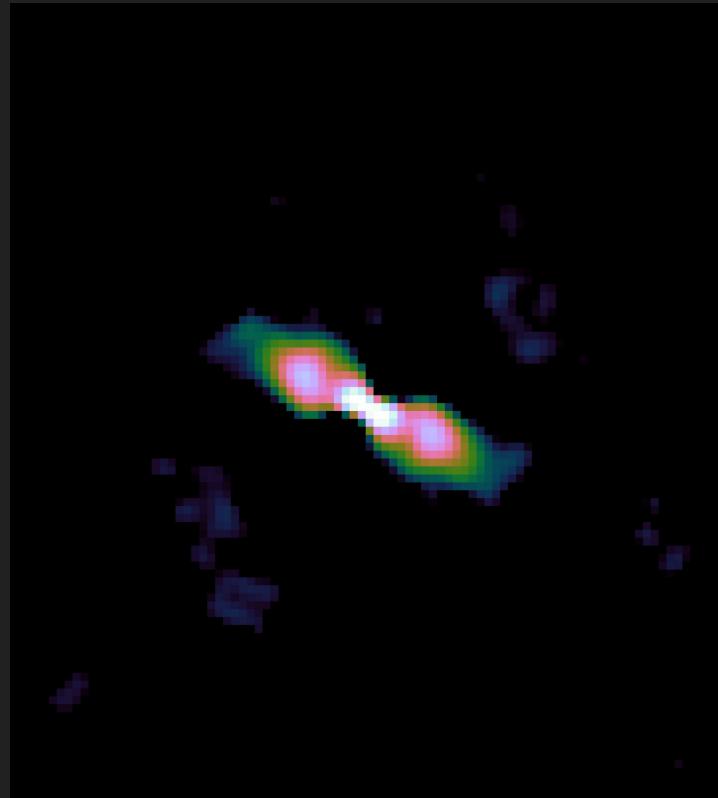
DD

DI

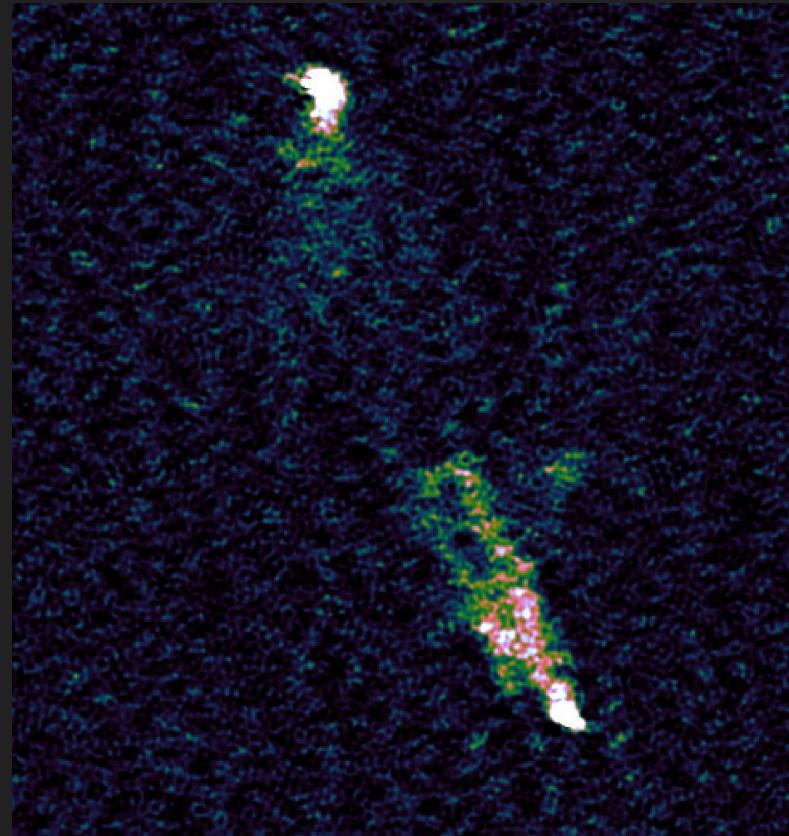
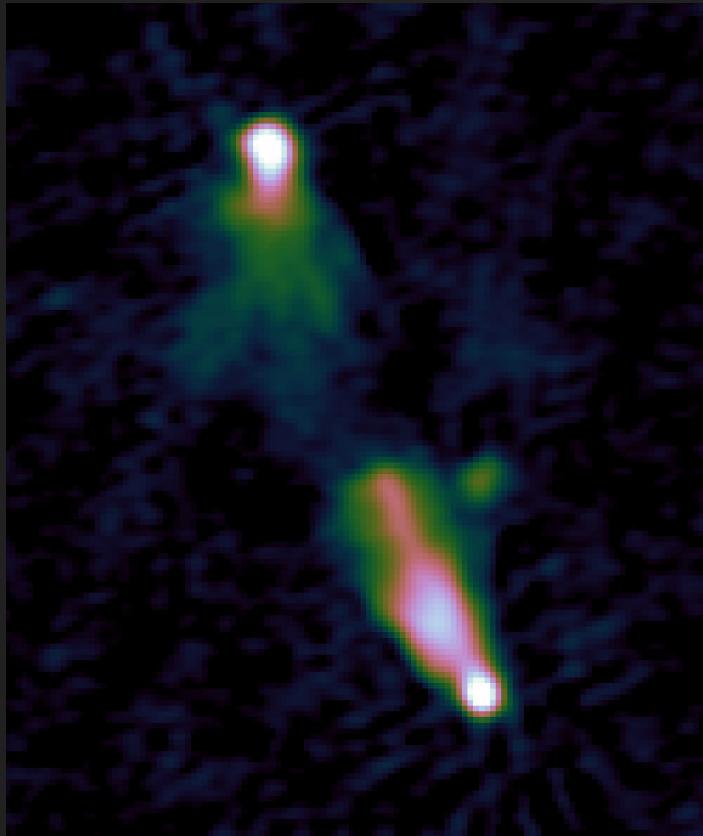
DD

DI

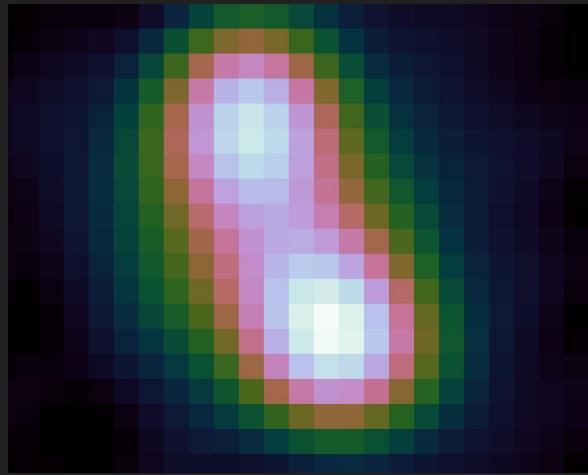
6" versus 1"



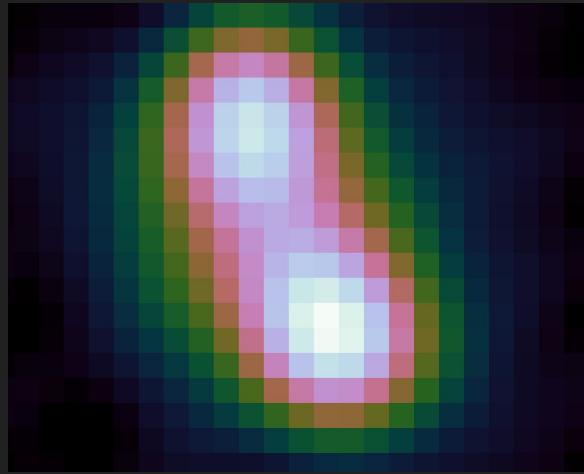
6" versus 1"



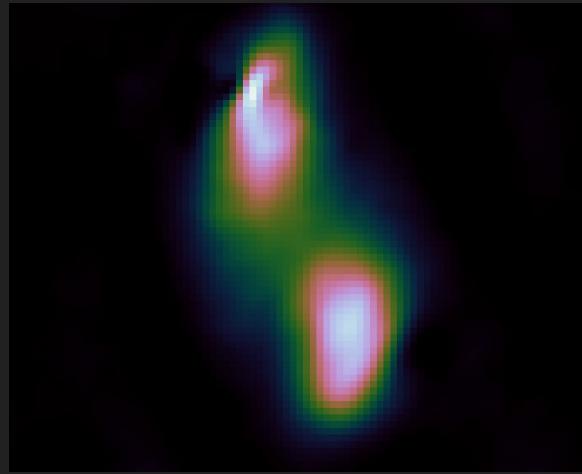
6"



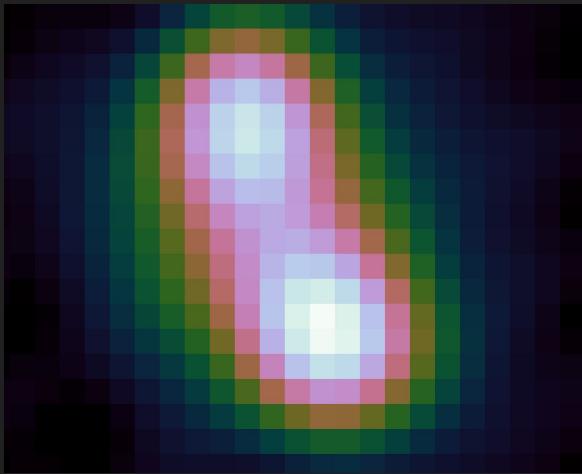
6"



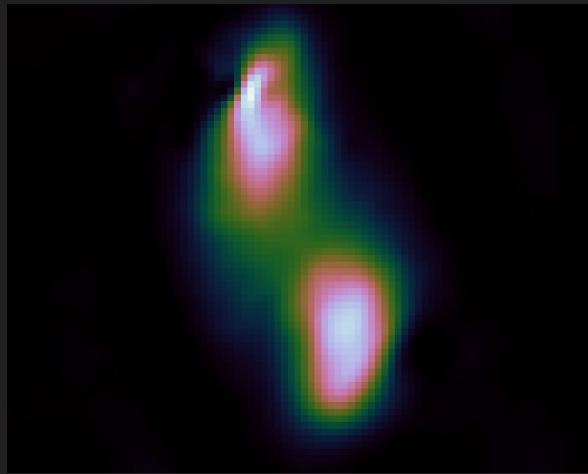
1.2"



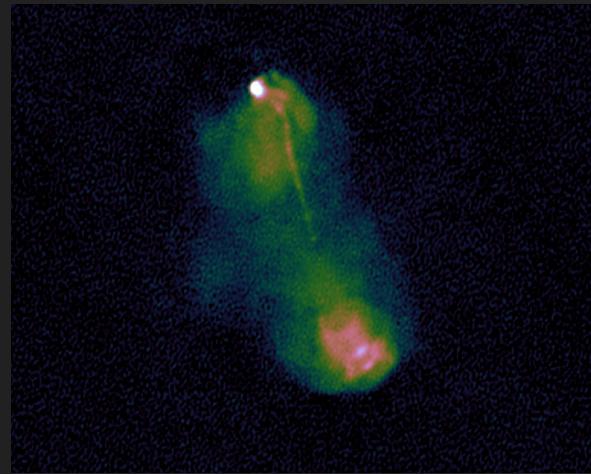
6"



1.2"



0.3"



Future steps

- Make ~1" with 4 nights
- Make subarseconds with 1 night
- Make subarcseconds with 4 nights?
- Work on automation
 - delay calibrator selection
 - DD calibrator selection

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Acknowledgement

This presentation is part of the project CORTEX (NWA.1160.18.316) of the research programme NWA-ORC which is (partly) financed by the Dutch Research Council (NWO). This work made use of the Dutch national e-infrastructure with the support of the SURF Cooperative using grant no. EINF-6218. This work is co-funded by the EGI-ACE project (Horizon 2020) under Grant number 101017567.