

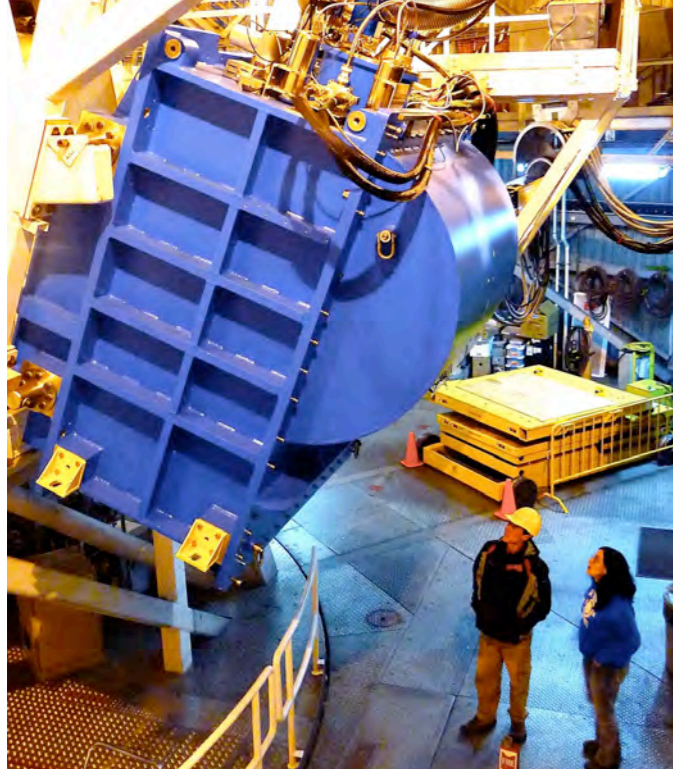
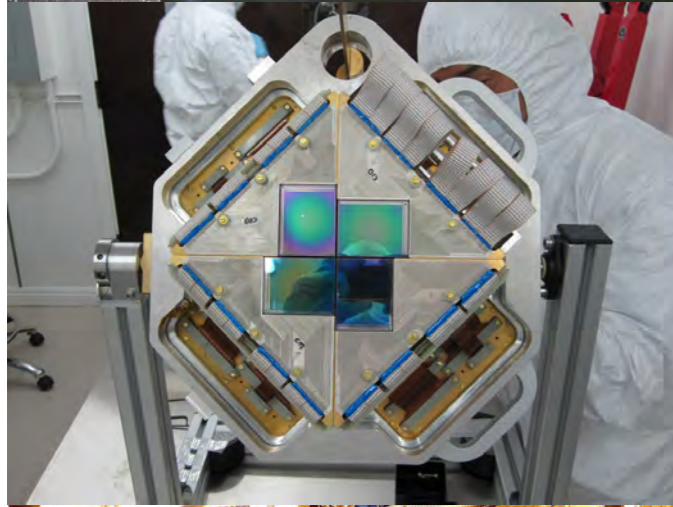
University of
Hertfordshire



The SCUBA-2 Ambitious Sky Survey

Mark Thompson, Gaius Manser, Larry Morgan, Andy Gibb, Tim Jenness,
Douglas Scott, Stephen Serjeant on behalf of the SASSy Consortium

The SCUBA-2 Ambitious Sky Survey



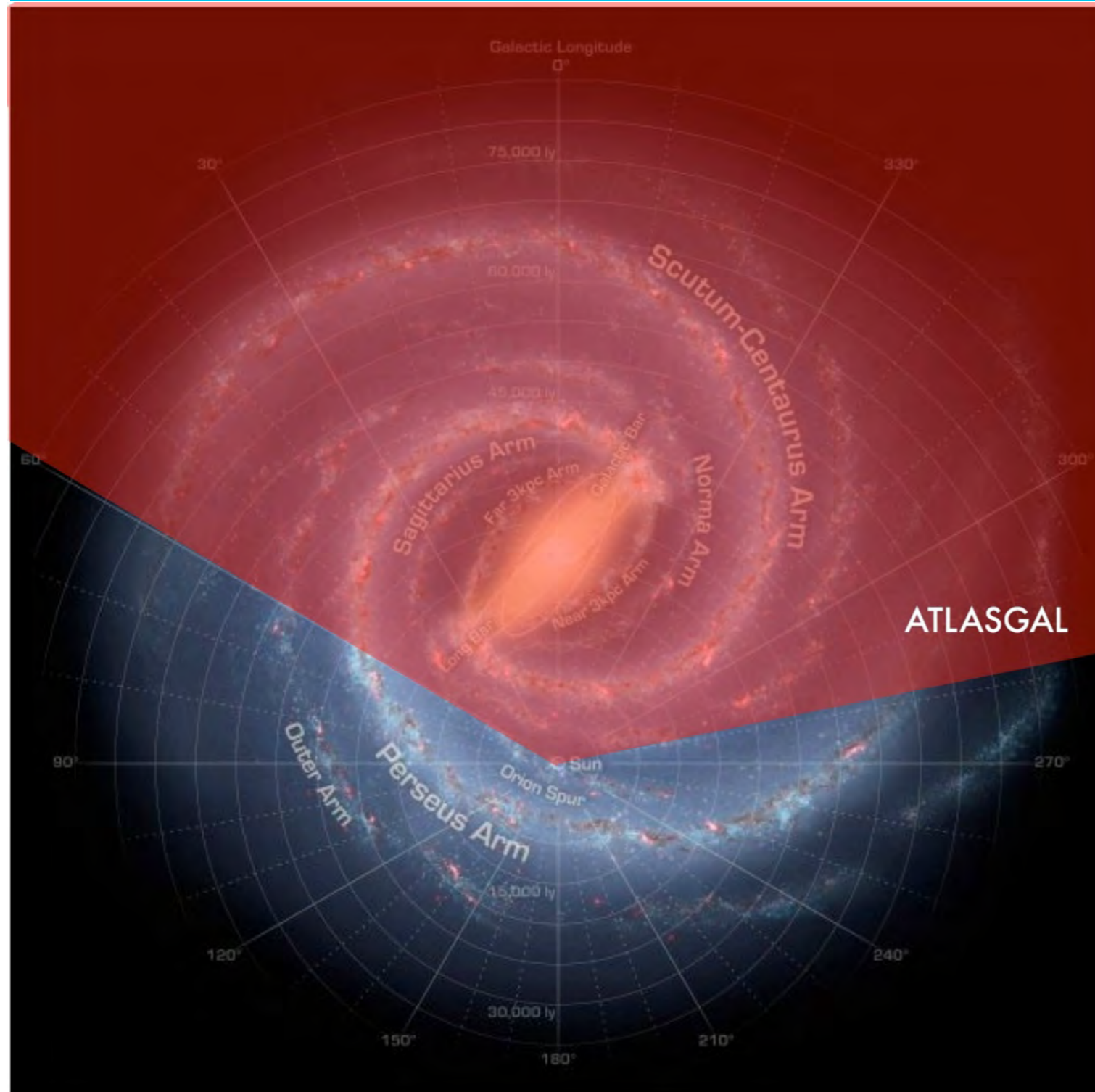
Originally the “A” in SASSy stood for “All-Sky” but that turned out to be just a bit too ambitious...

SASSy is now targeted at a wide-area survey of the Outer Galaxy

Our aims remain the same:

- The widest area 850 μm survey carried out from the ground
- Pioneering continuum observations in weather grade 4
- Fully exploiting SCUBA-2’s fast mapping capability
- Long wavelength counterpart to *Herschel* (cold, early stage objects - “IRDCs”)

FIR/sub-mm Galactic Plane Surveys



Hi-GAL (70-500 μm)/
ATLASGAL (870 μm)
 $280 < l < 60, |b| \sim 1$

But then came Hi-GAL OT1...

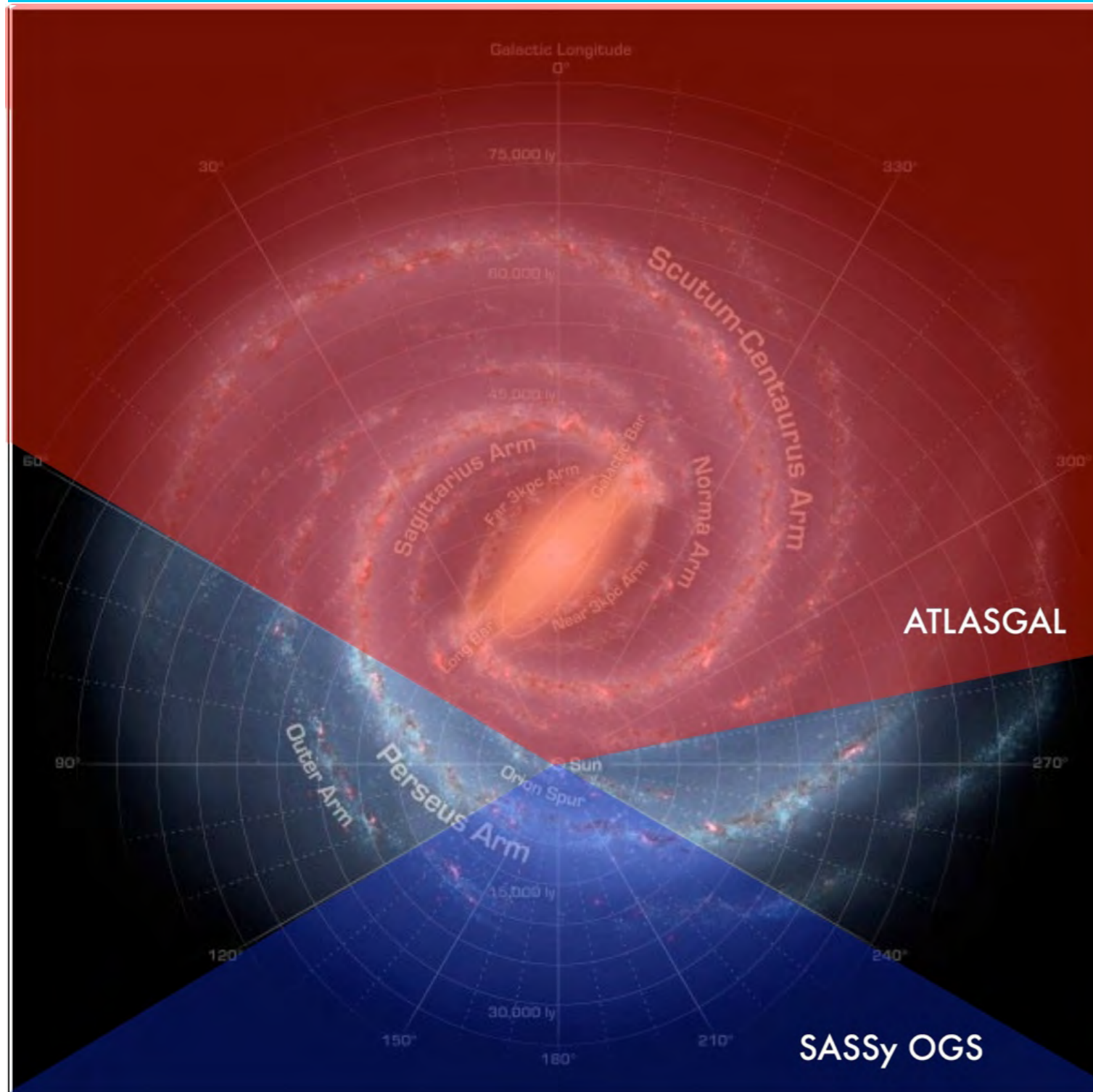
SASSy rescoped to focus on
Outer Galaxy & Hi-GAL OT1

However, then came HiGAL
OT2 - aka 2pi-GAL - to fill in the
gaps

So SASSy Perseus was born...
(UK/Canada PI time project)

In total, 826 sq. degrees to
depth ~ 30 mJy/beam

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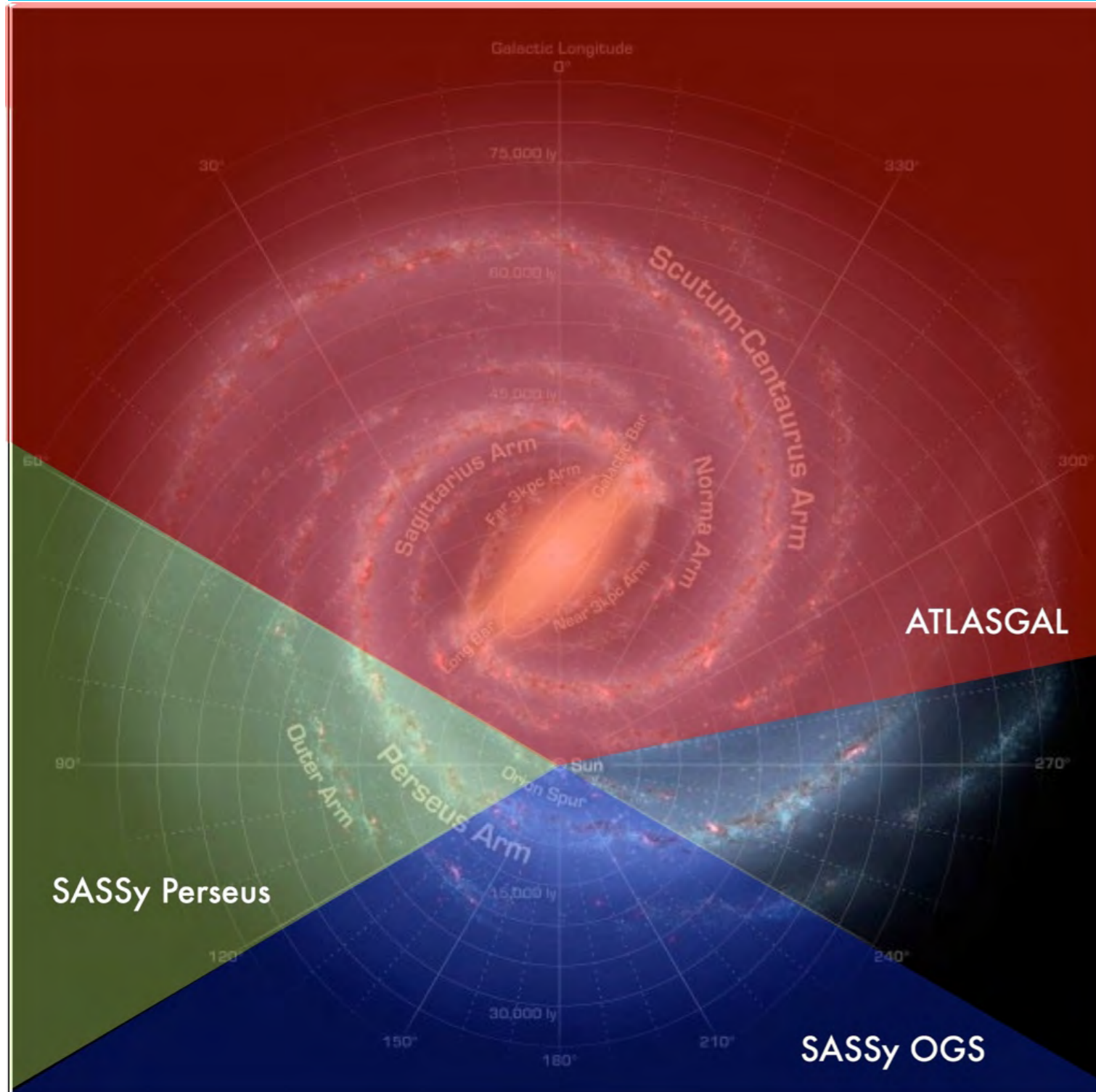
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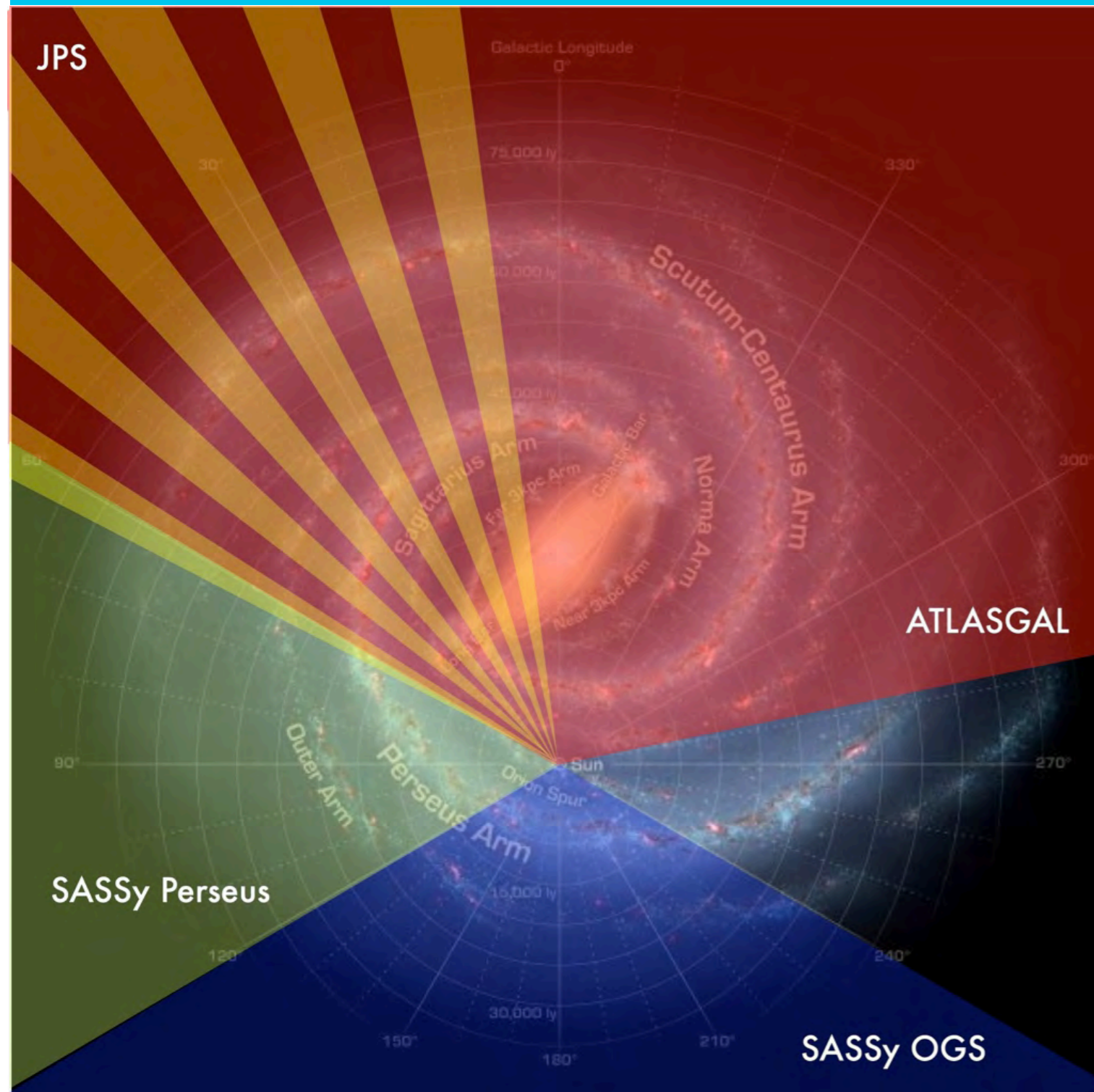
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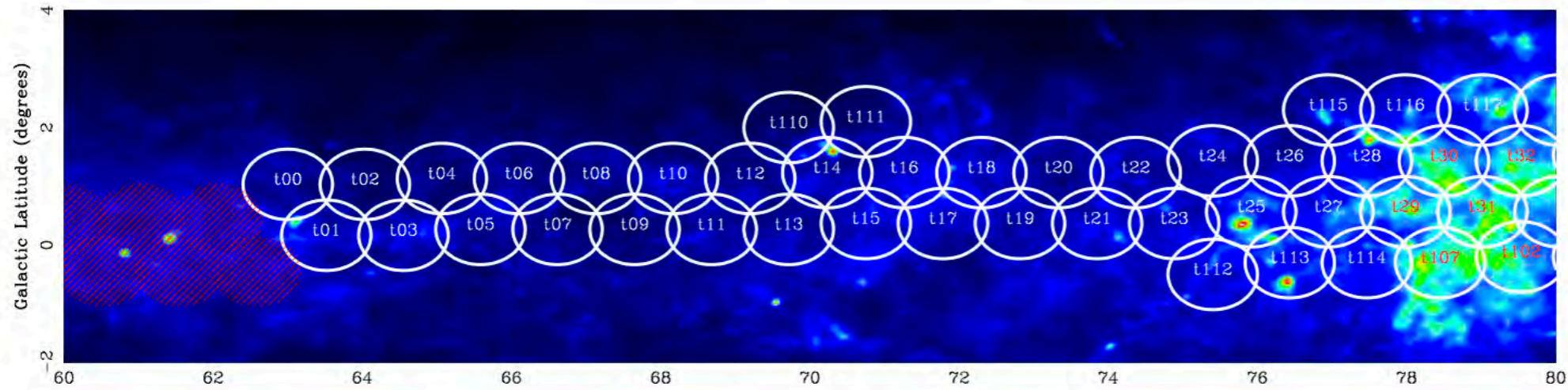
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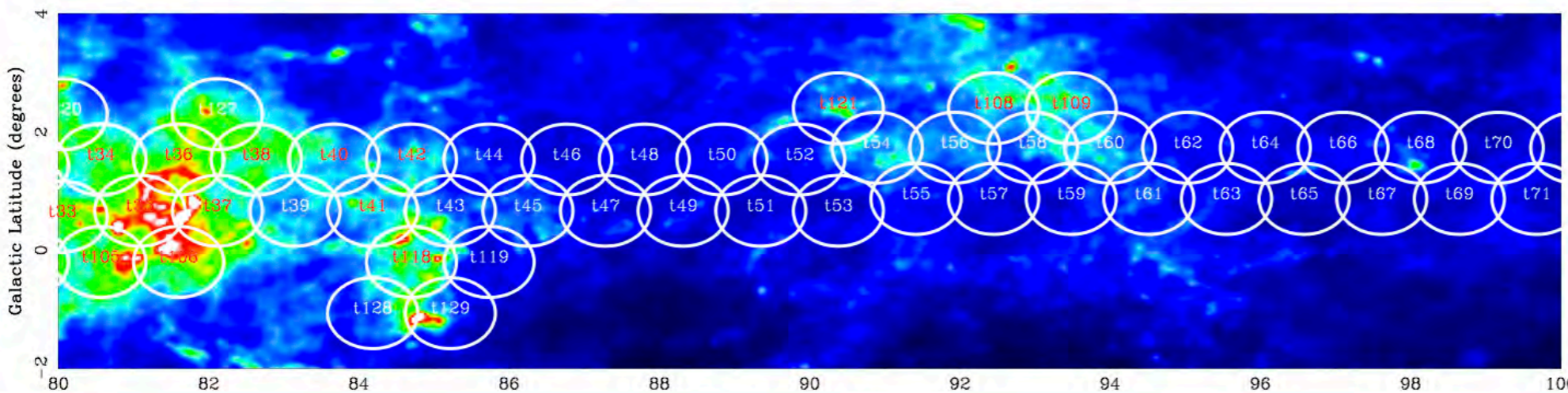
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SASSy-Perseus

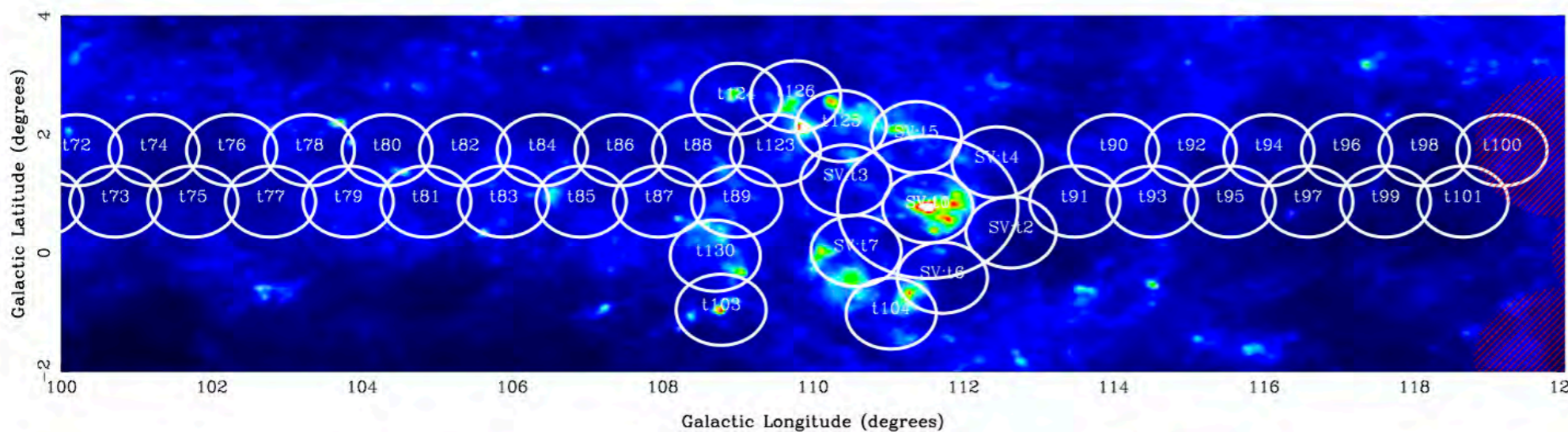


Each survey tile is a 1 degree “pong”

Latitude extent is $\sim 2.4^\circ$



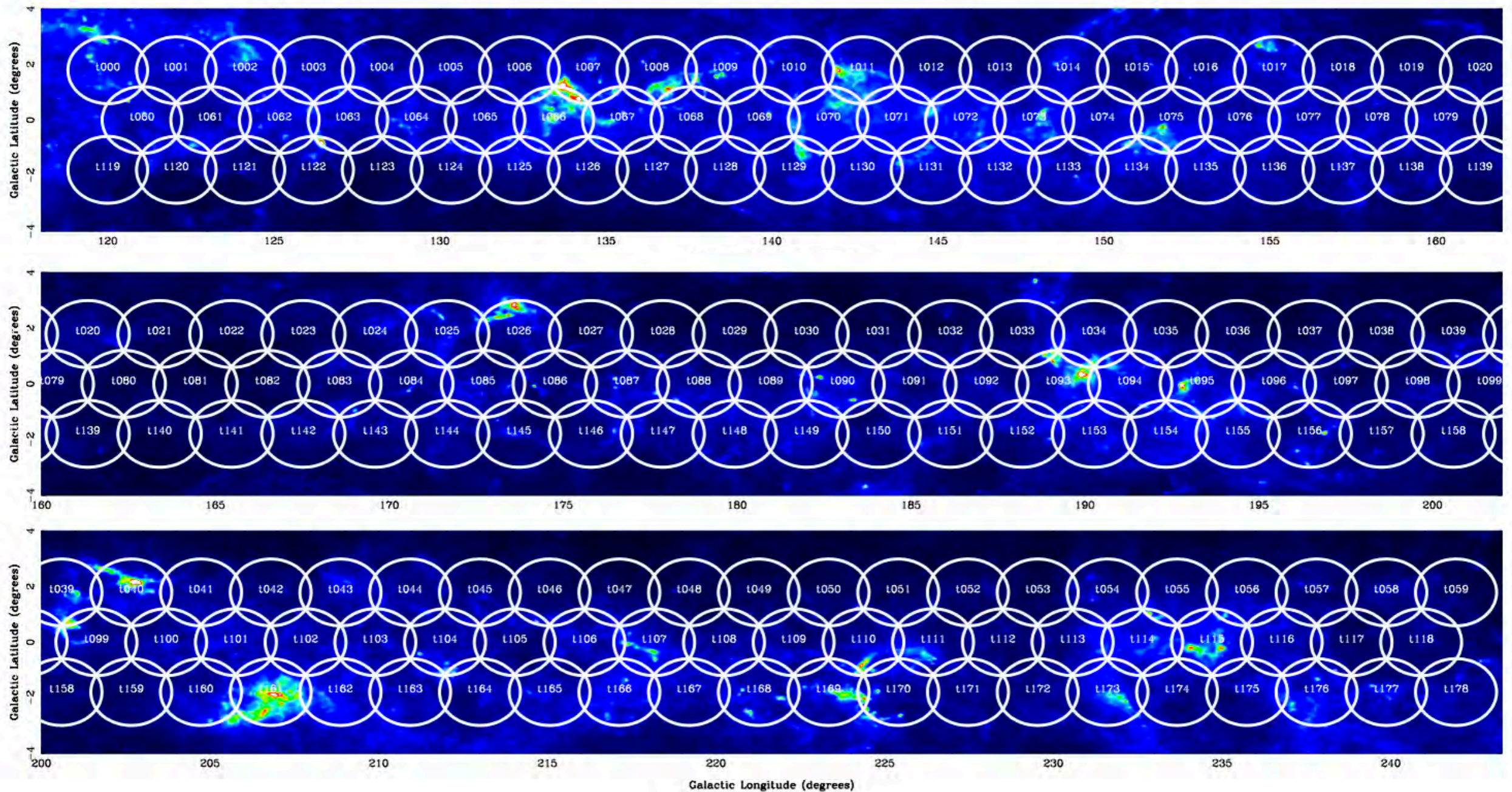
Expand latitude coverage where needed, e.g. Cygnus-X



NGC7538 already covered in SV Campaign



SASSy-Outer Galaxy



Here the survey tiles are 2 degree “pongs”

Aim here was to maximise sky coverage to find rare objects

SASSy progress in a nutshell

Observations are now complete as of Jan 2015

SASSy-Perseus 100% complete from $l=60$ to $l=120$, $|b| \sim 1.2$

SASSy-OGF 97% complete from $l=120-240$ (a couple of tiles missing)

Target depths largely met for each tile (although some variations in SASSy-Perseus data)

Data reduction largely complete (>4 TB raw data)

Preliminary source catalogue with ~ 2000 sources $>5\sigma$

About 2/3 of these sources are “unknown to SIMBAD”

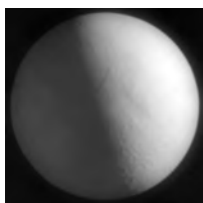
About 1/3 of these sources are in the Cygnus-X complex

Community data release coming later in the year

SASSy Science Verification: NGC 7538



The pre-SCUBA-2 view:
SCUBA Legacy Catalogue
(di Francesco et al 2008)



SASSy Science Verification: NGC 7538



The SCUBA-2 view:

SASSy SV in late 2011

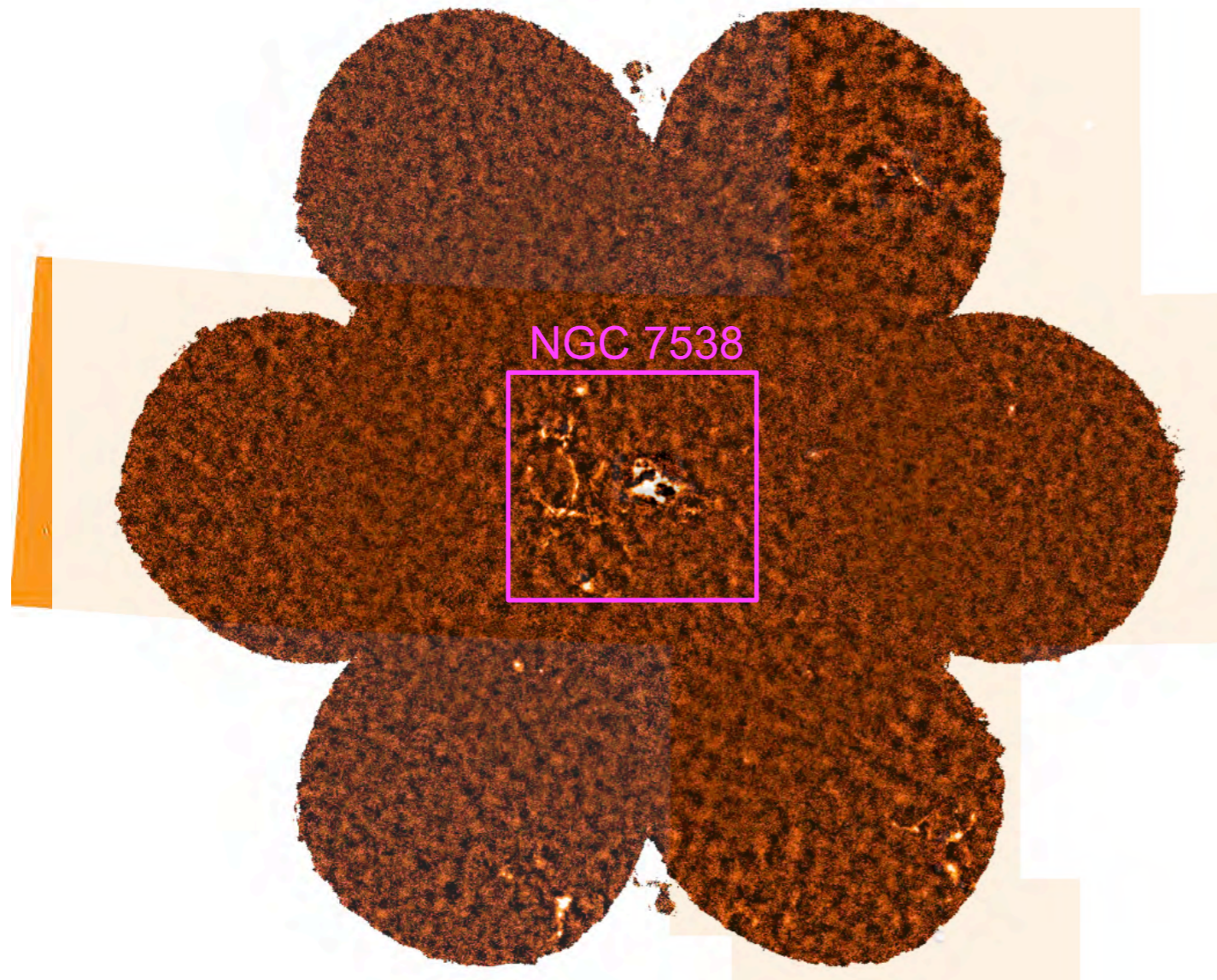
~15 hours of grade 4 time

rms noise ~25 mJy
(with spatial filtering)

Calibration agrees with
SCUBA Legacy Catalogue
(caveats of chopping &
baseline variations)

Filamentary structures
clearly visible plus bright
complexes not mapped by
SCUBA

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The SCUBA-2 view:

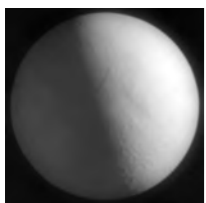
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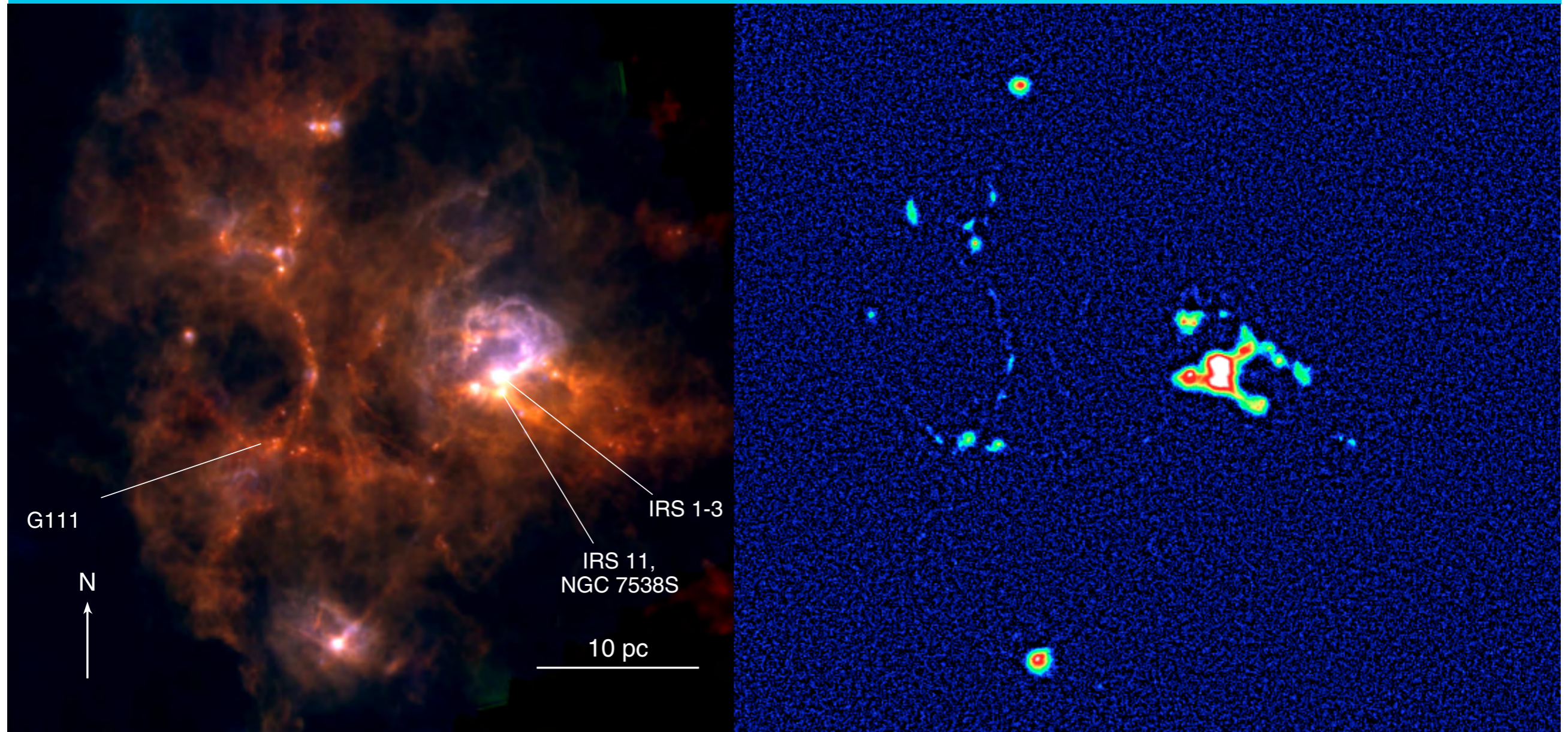
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Herschel/SASSy comparison NGC7538

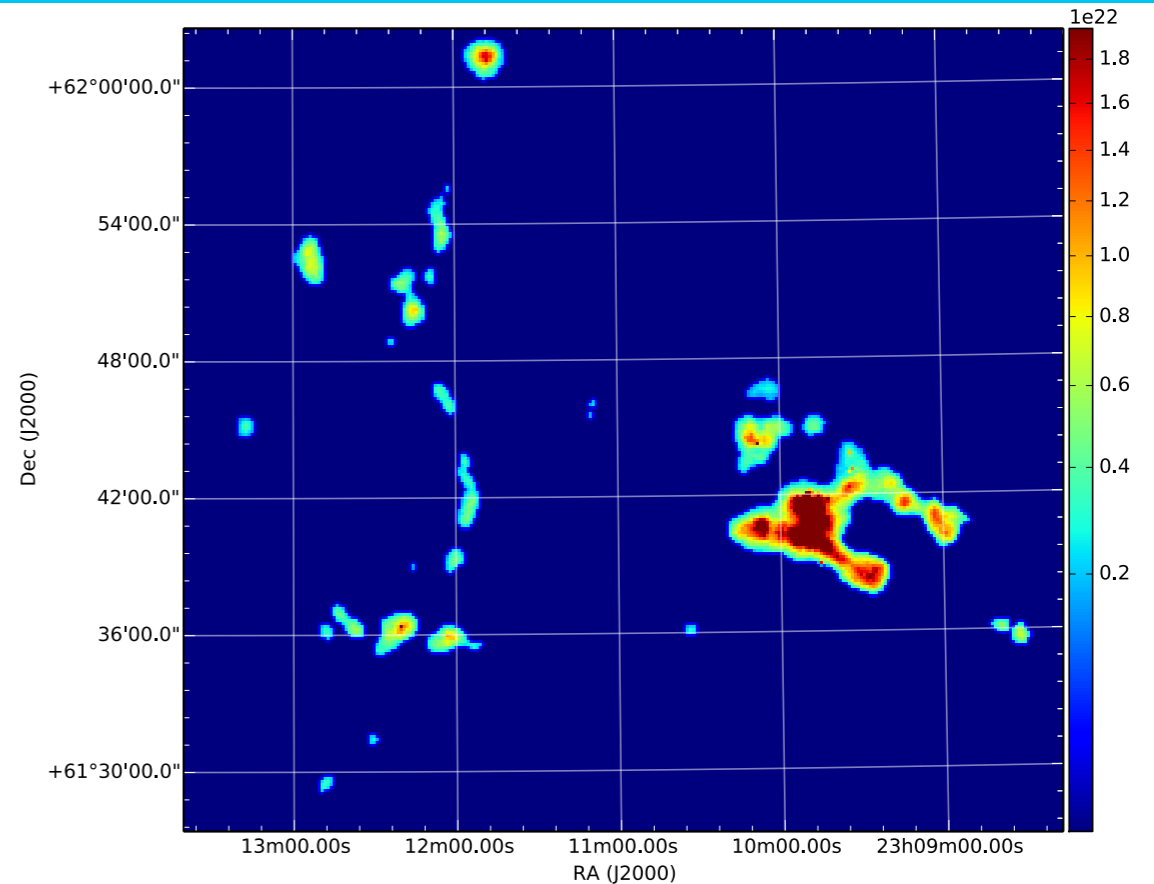
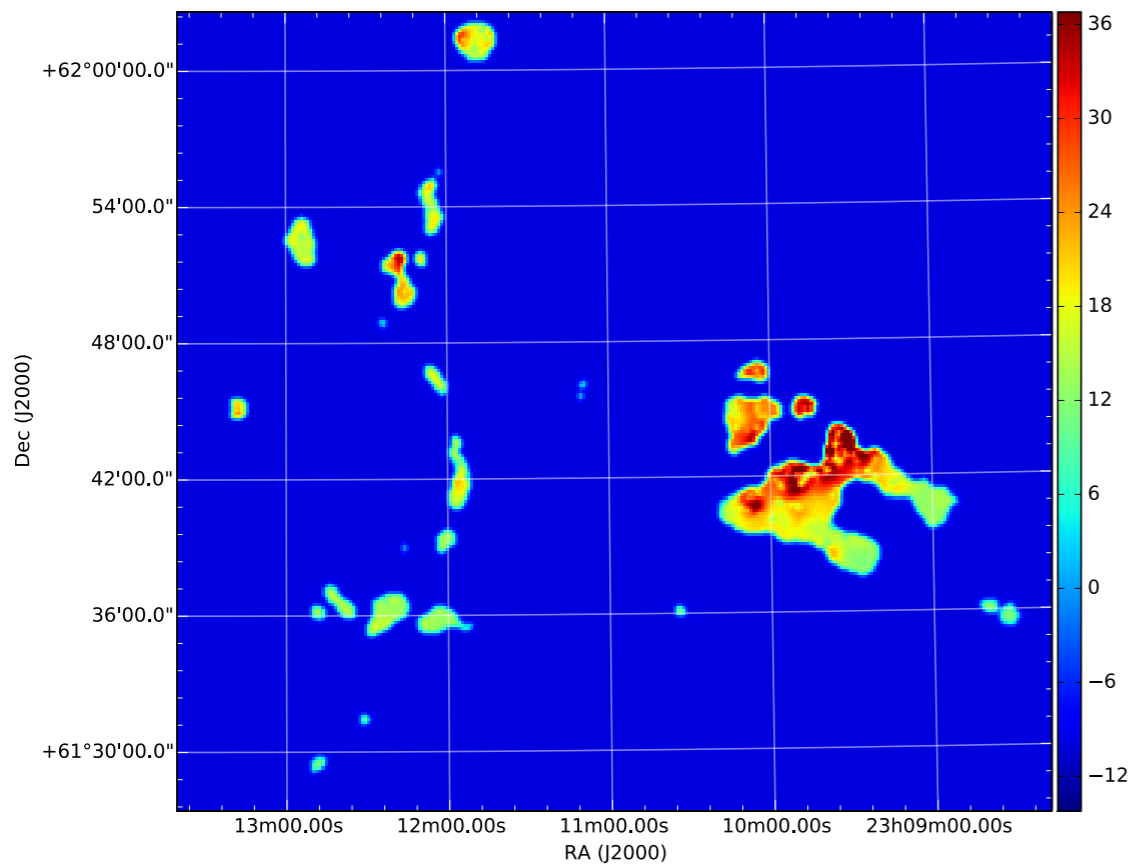


Fallscheer et al 2013 HOBYS study

Reproduce all major structures with exception of diffuse cirrus

High pass filtering applied in SCUBA-2 data reduction removes structures $>480''$

Bayesian SED fitting



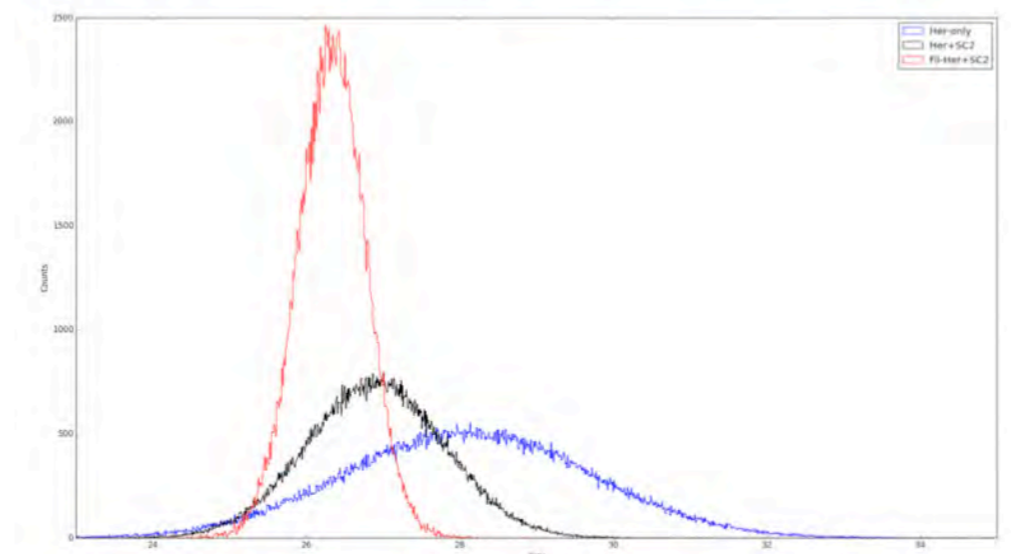
Developed pixel-pixel SED fitting code for Herschel & SCUBA-2 (Manser et al in prep)

Similar but different to Sadavoy et al 2013 (fully Bayesian, different filtering of *Herschel*)

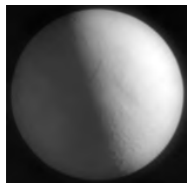
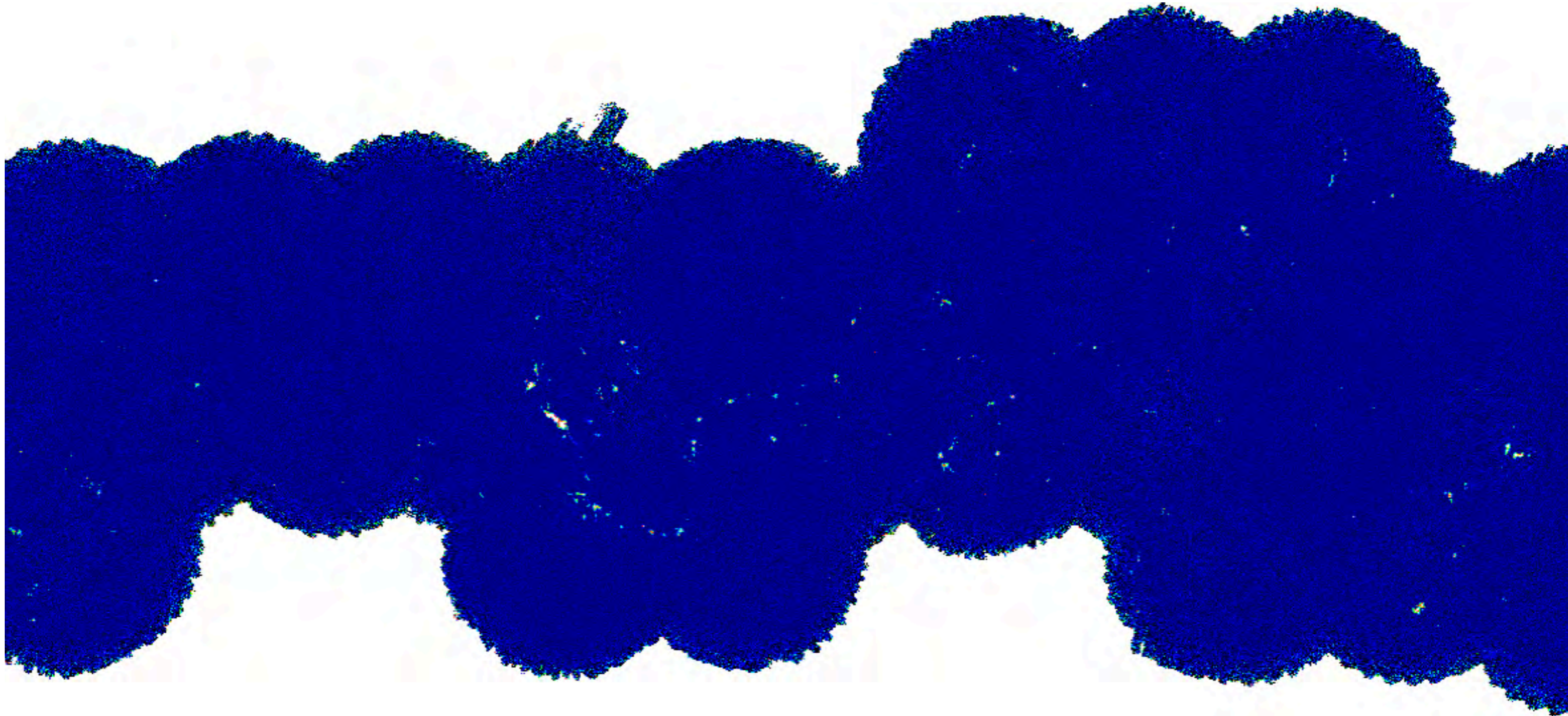
Clear bias to warmer temperature from *Herschel* data alone

Improved angular resolution by including 850 μm instead of 500 μm

Herschel only, (K)	Pre-filtered temperature fit, (K)	Post-filtered temperature fit, (K)
28.10 ± 3.19	26.99 ± 1.79	26.34 ± 0.87



Cygnus-X

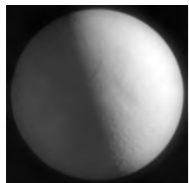
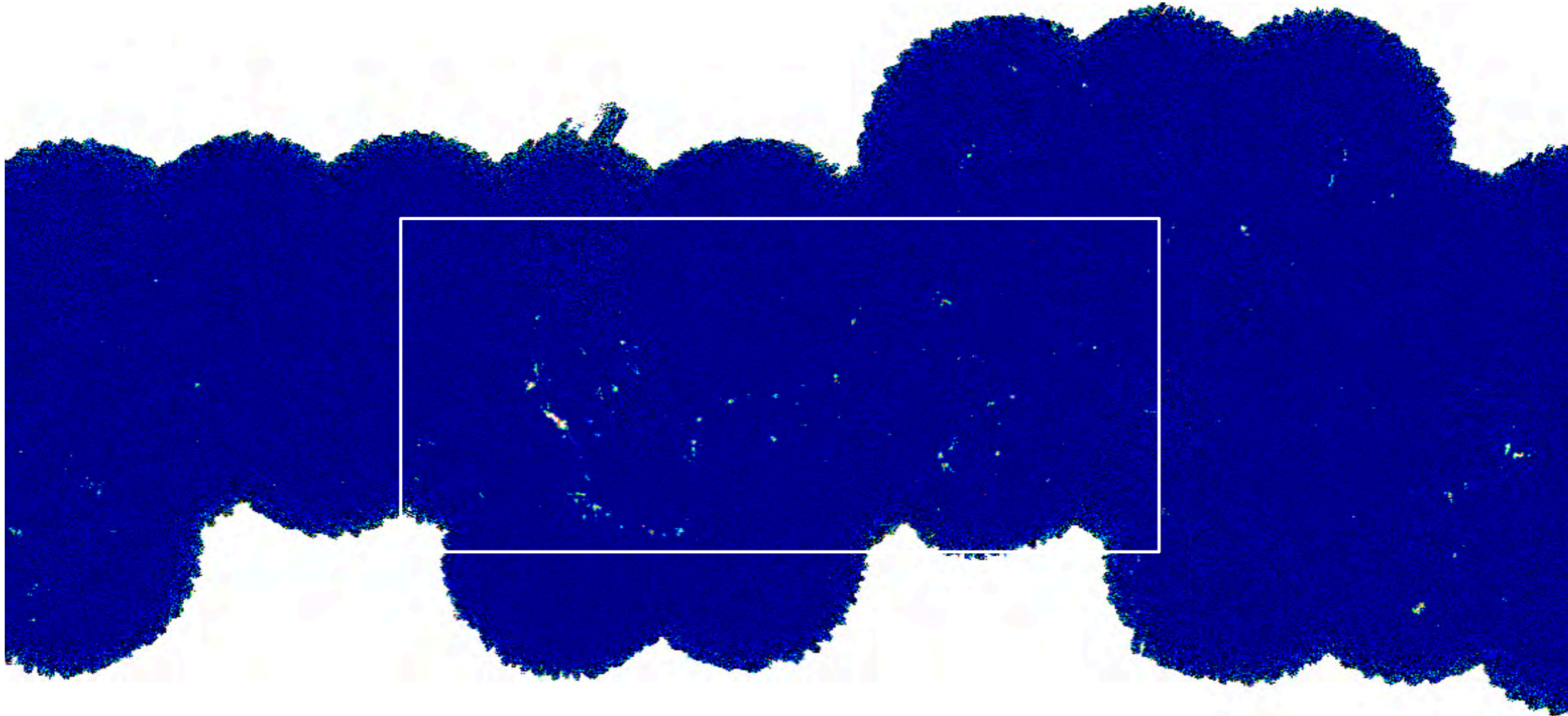


Cygnus-X is the richest survey region

Almost a third of all outer Galaxy sources found here

Many isolated (low mass?) sources

Cygnus-X

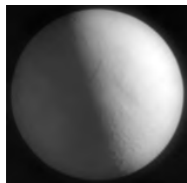
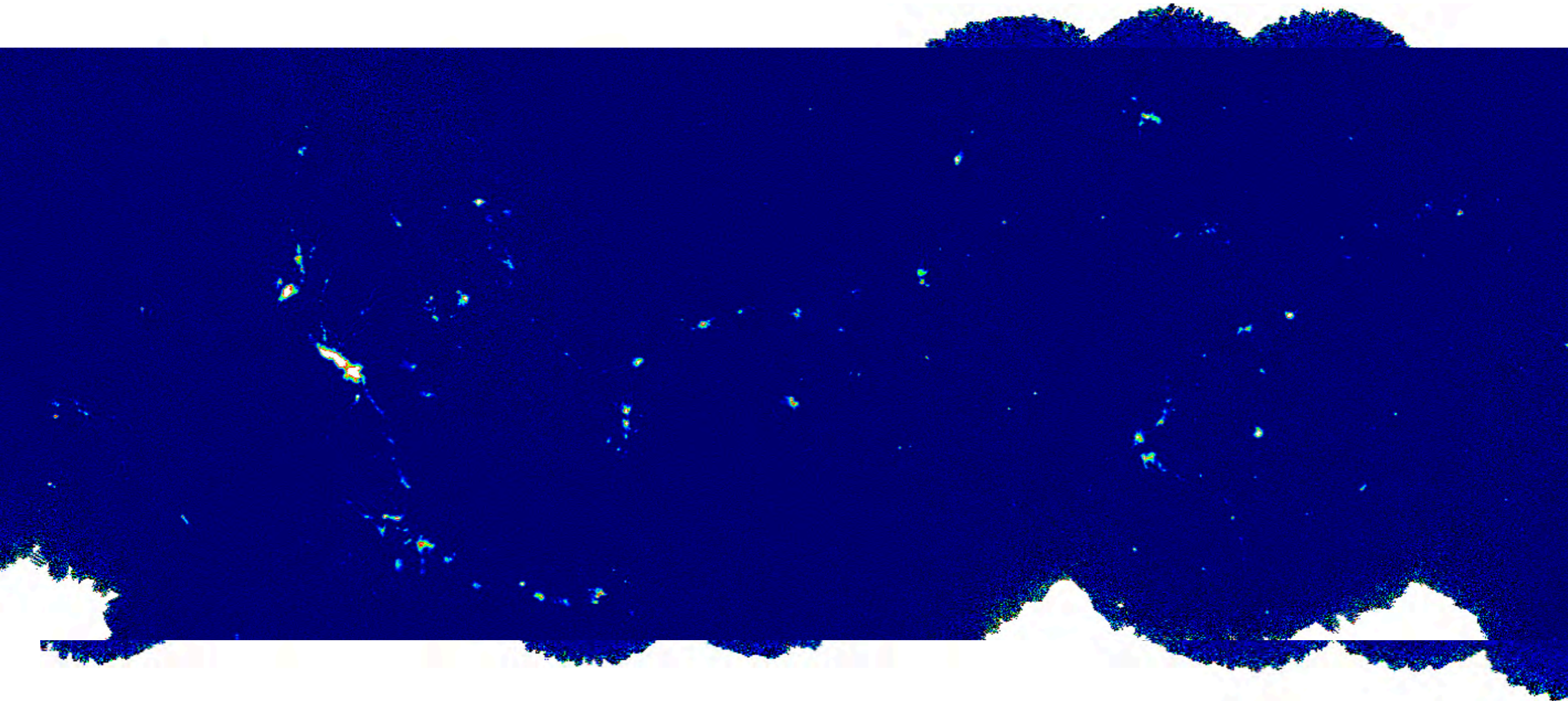


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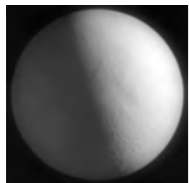
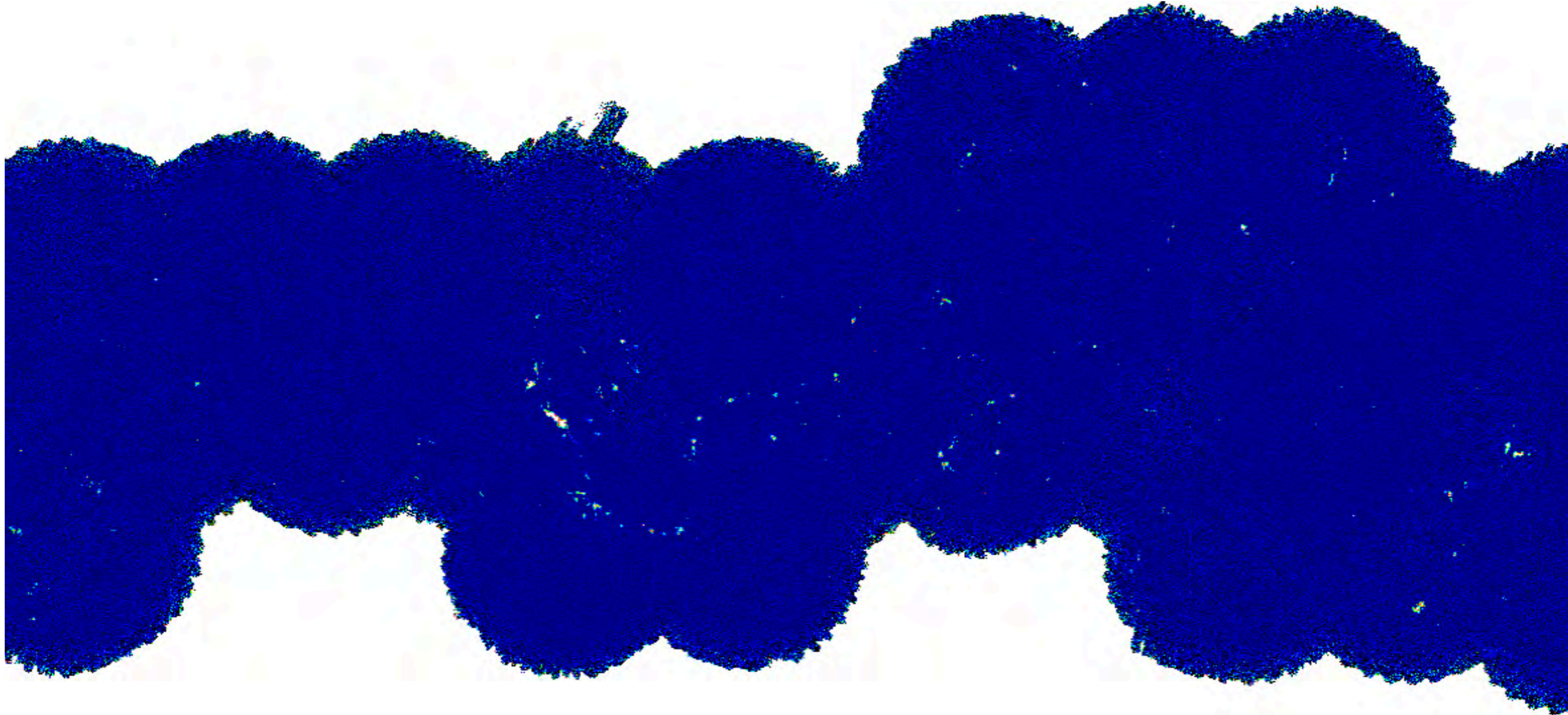


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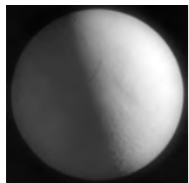
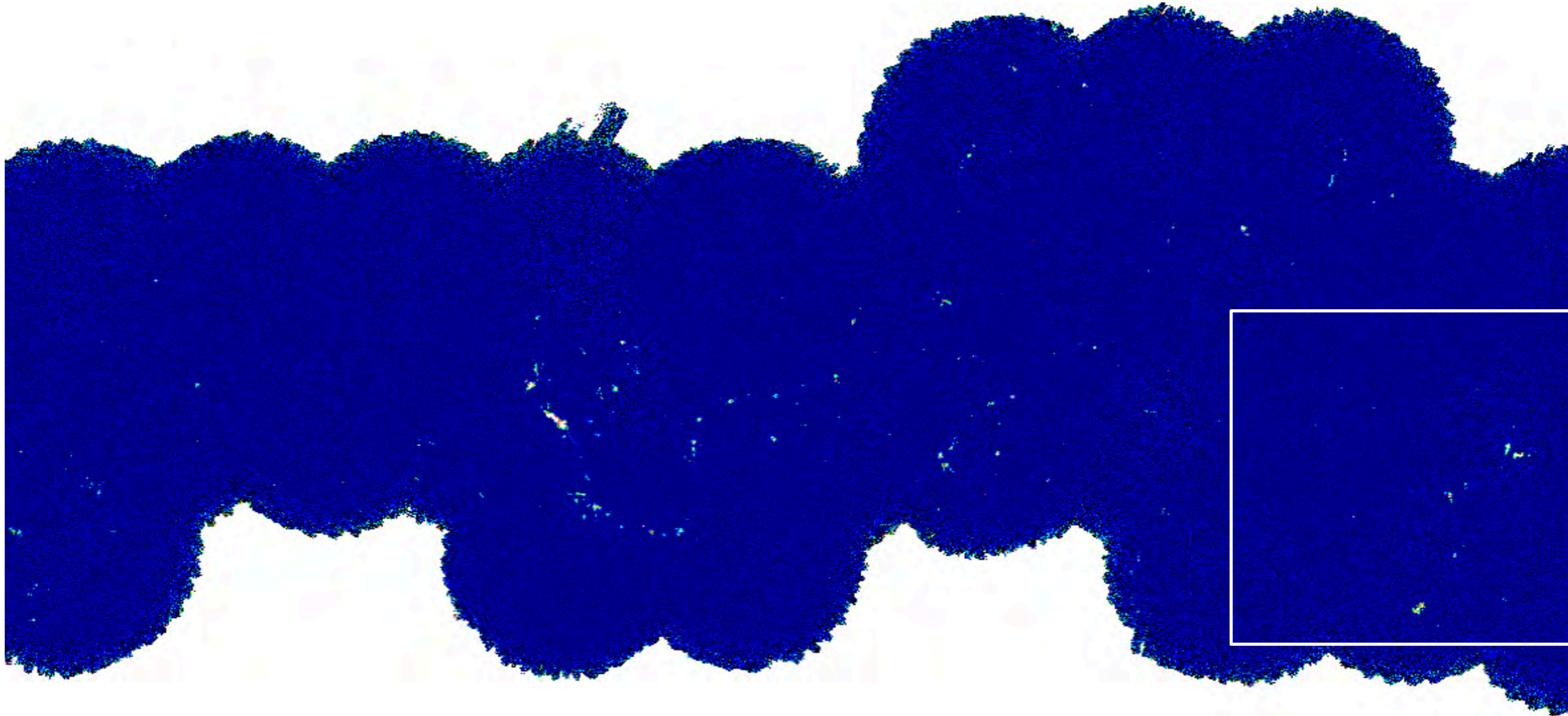


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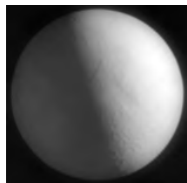
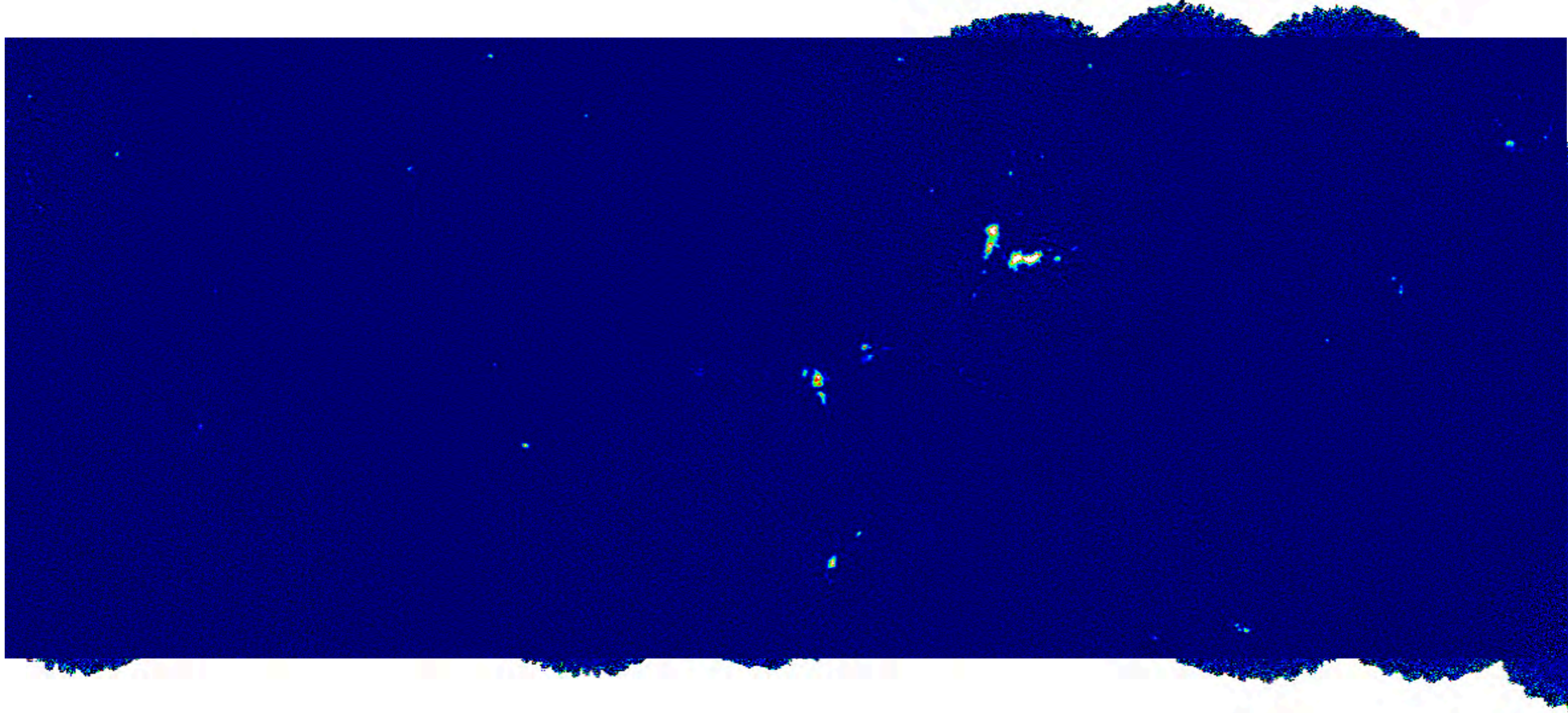


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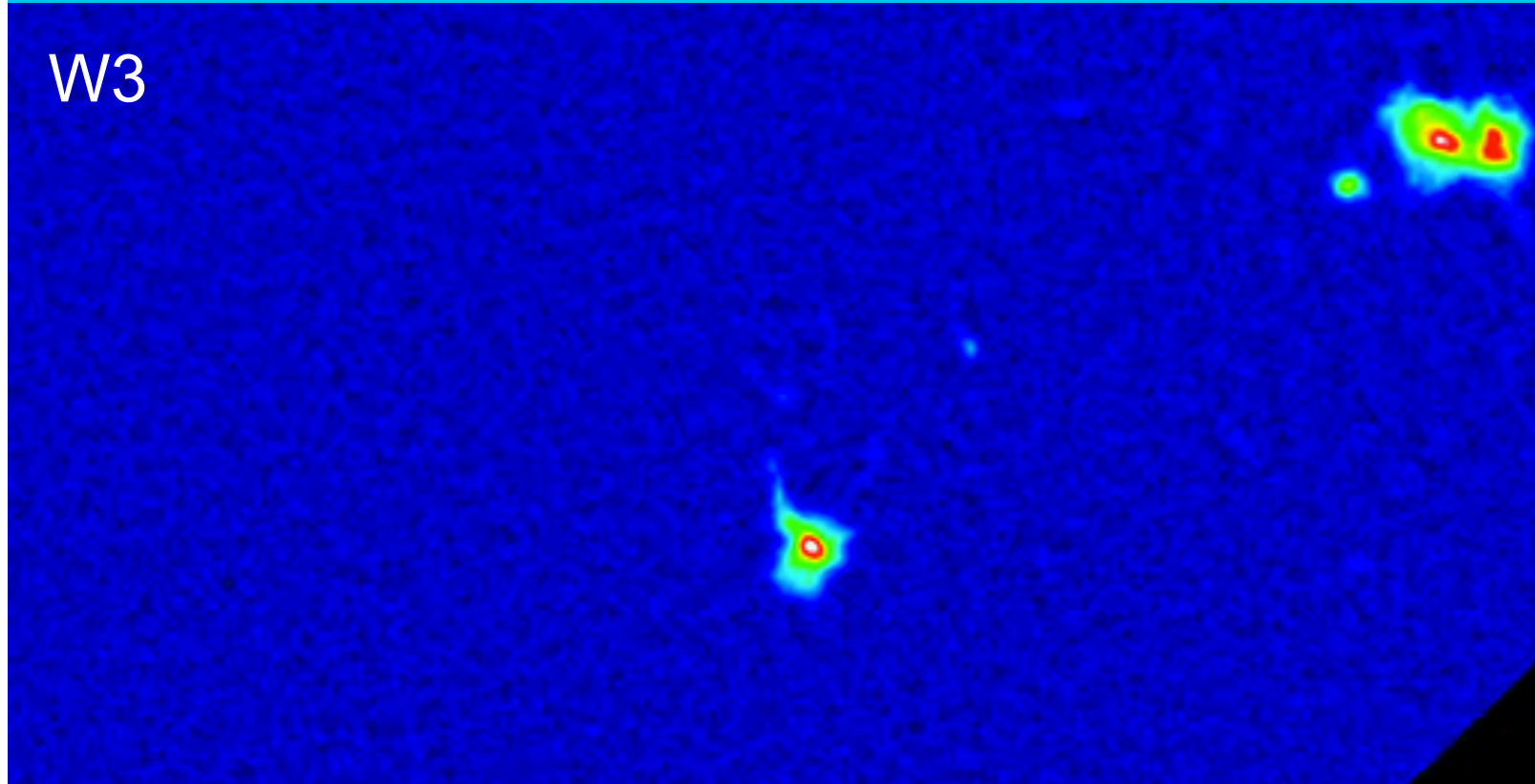
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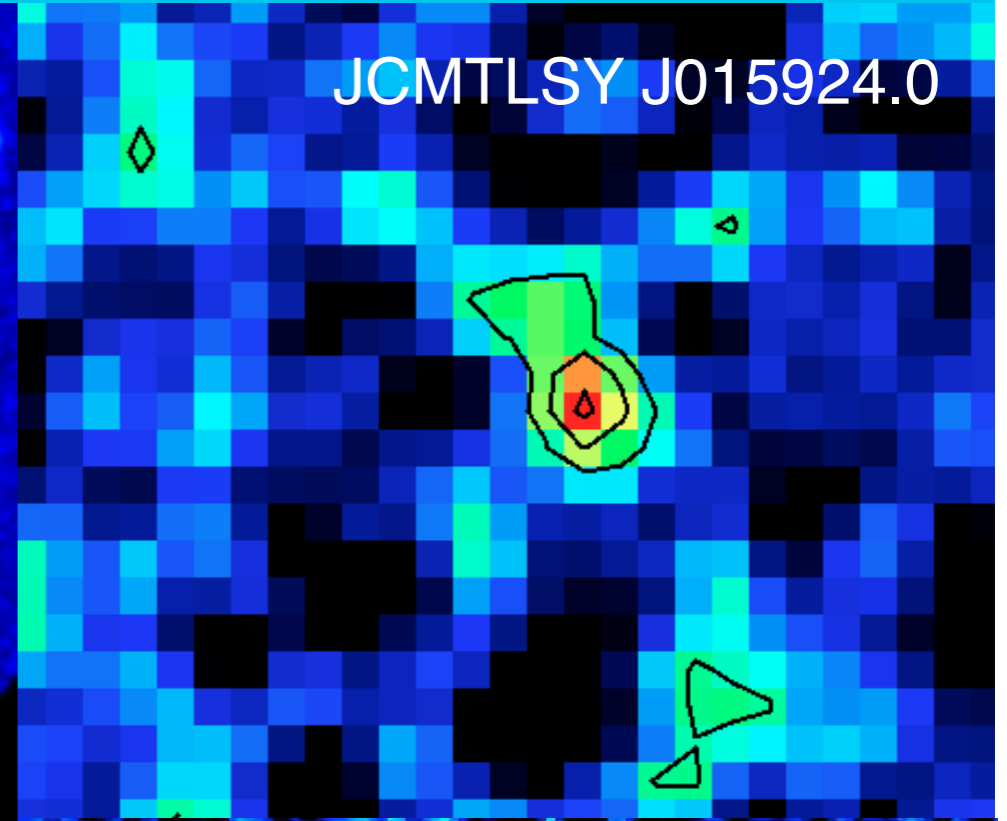
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A gallery of SASSy blobs

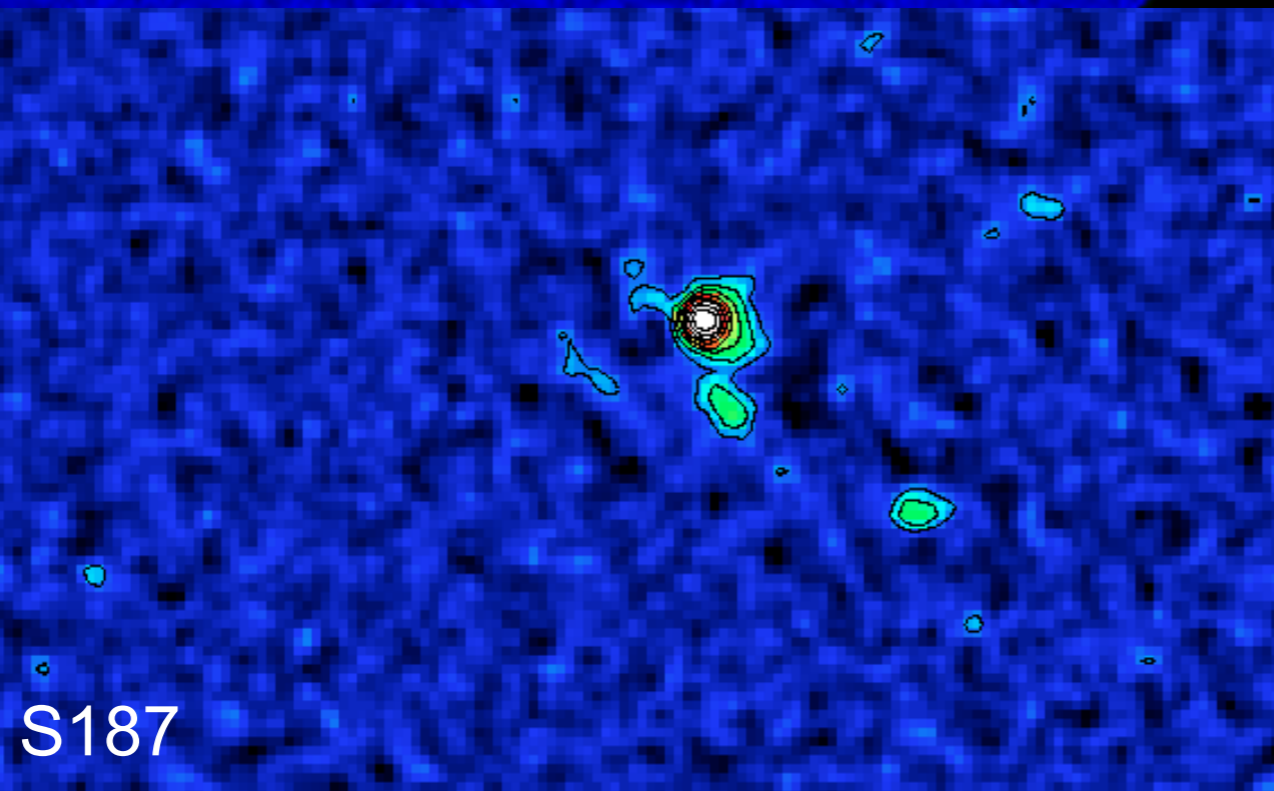
W3



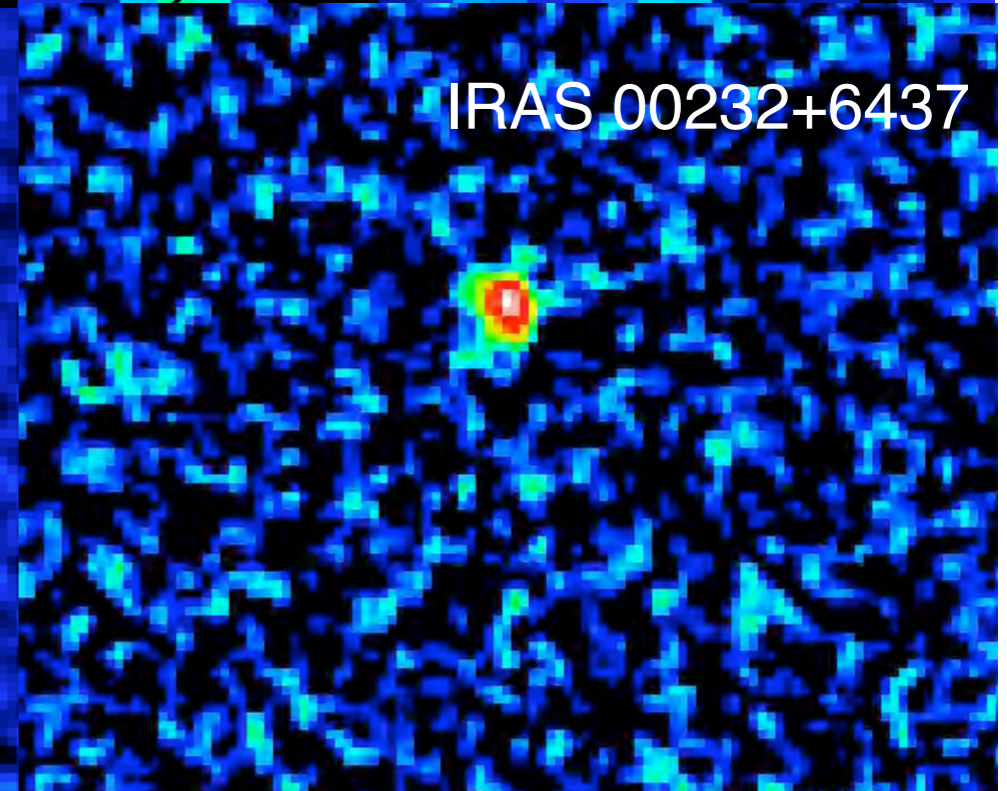
JCM TLSY J015924.0



IRAS 00232+6437



S187



Summary & the future

Survey observations fully complete as of Jan 2015

Data reduction largely complete

Survey data ready for imminent release to consortium

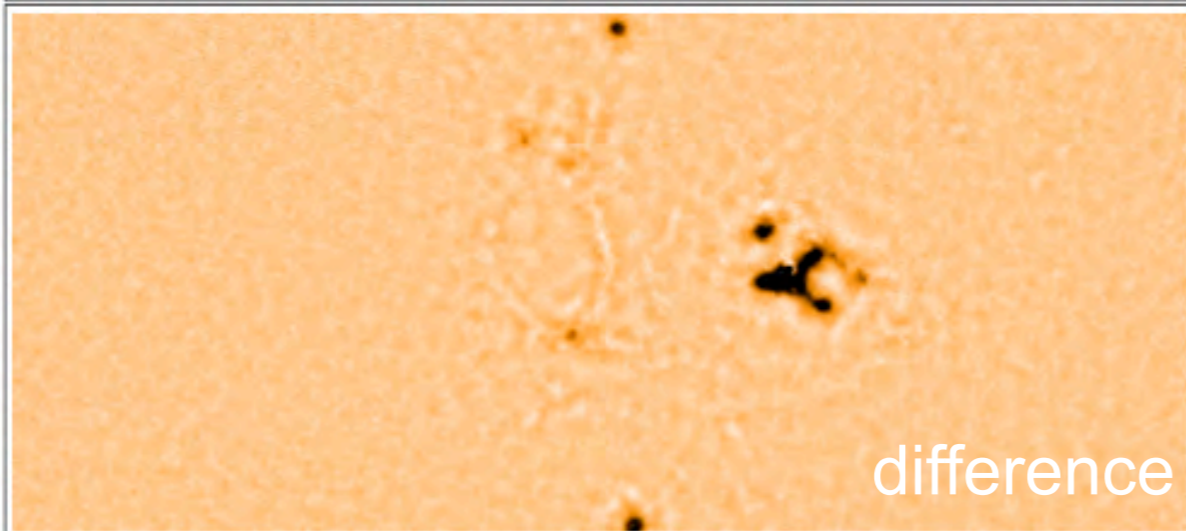
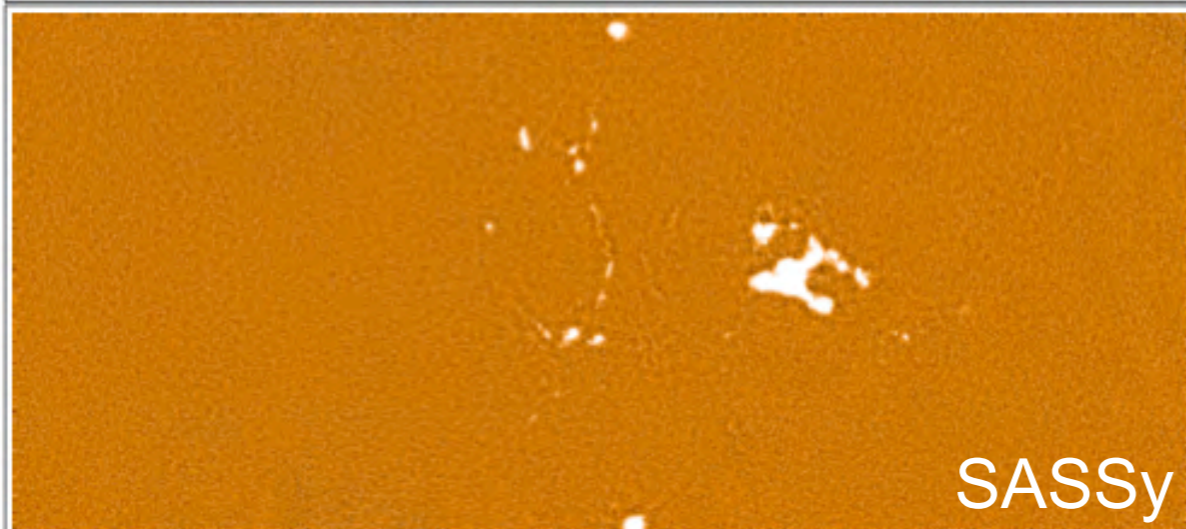
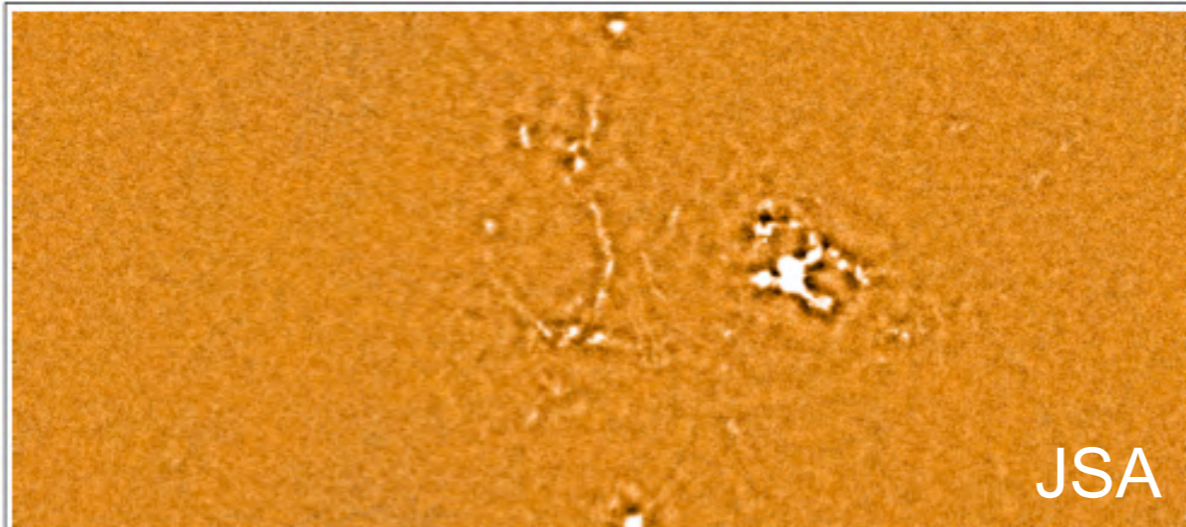
Envisage community release later in the year (6 months?)

SASSy-Perseus $l=60-120$ (Manser et al)

SASSy OGF-1 $l=120-140$ (Thompson et al, Nettke et al)

SASSy OGF-2 $l=140-240$

Comparison with the JSA



JCMT Science Archive early release planned this year of all non-proprietary data (includes some SCUBA-2 survey data)

JSA pipeline focused on source recovery, not imaging quality or photometric accuracy

SASSy release will supersede JSA in the archive

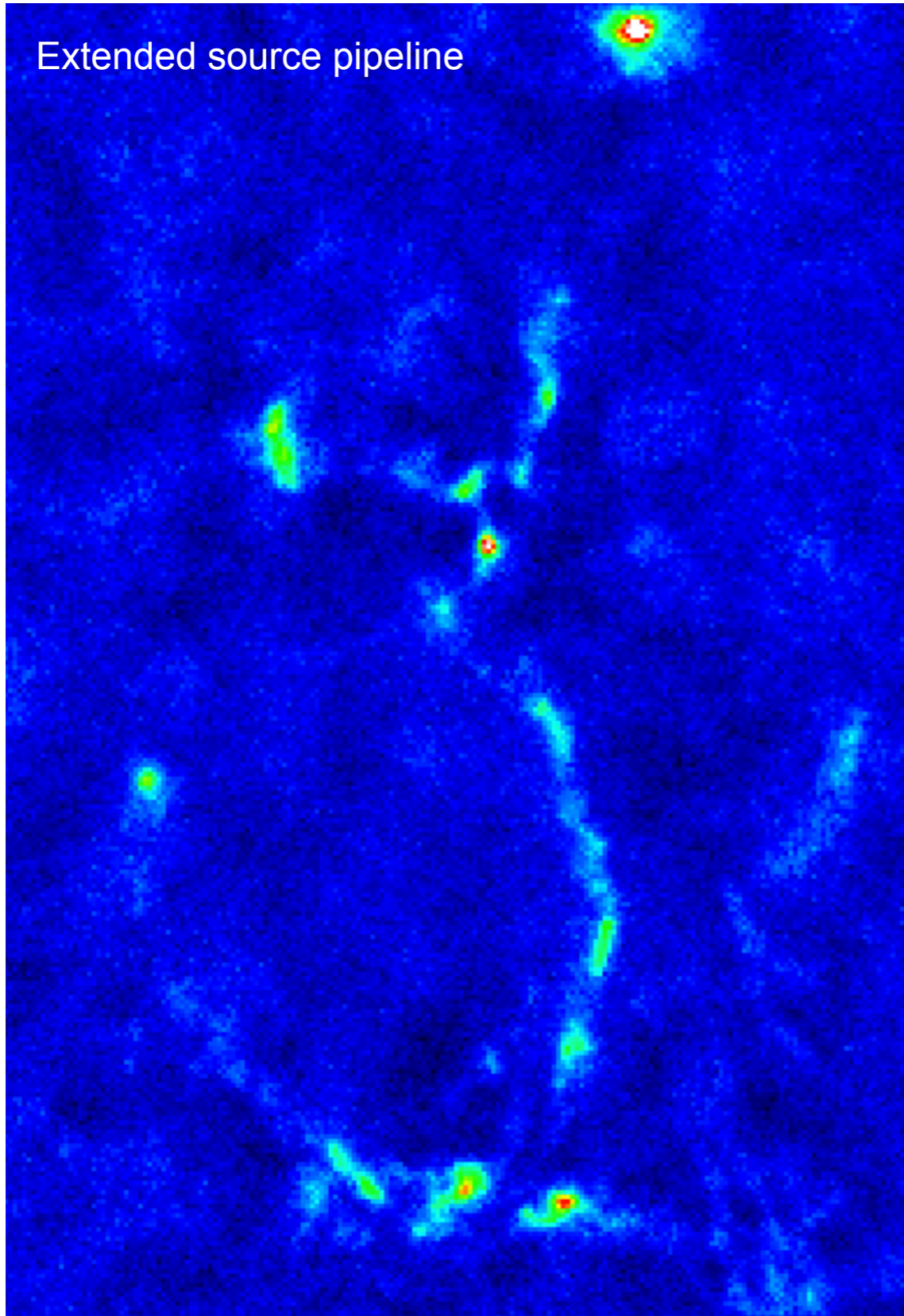
SASSy data reduction pipelines

Currently run two parallel data reduction pipelines:

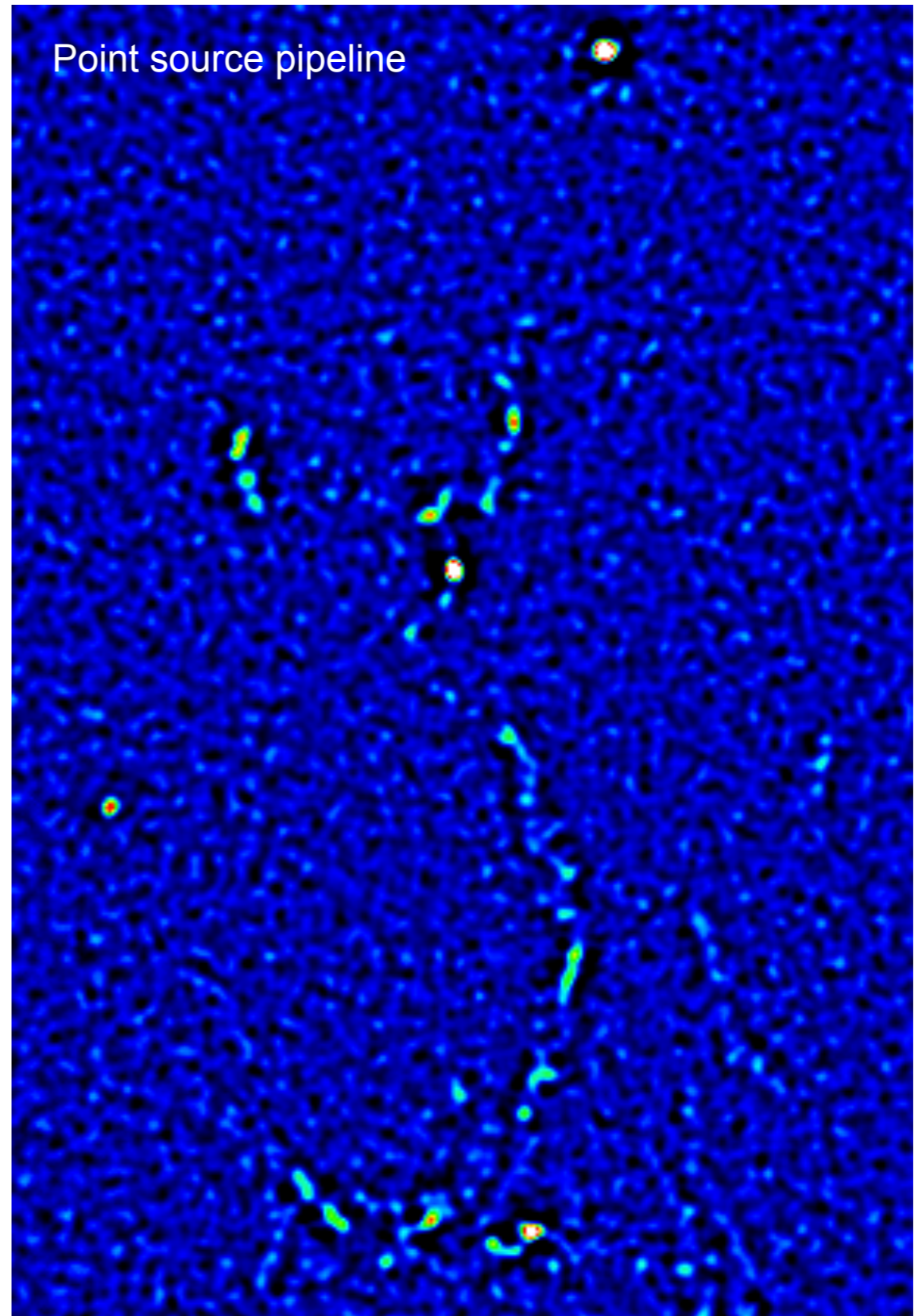
1. Optimised for point-source sensitivity
 - Harsh filtering to reduce $1/f$ noise
 - Matched point-source filter
2. Optimised for extended-source sensitivity
 - Filtering at array scale (480")
 - FLT masking missing first few iterations
 - AST automasks on individual tiles

N7538 filament - structure vs sensitivity

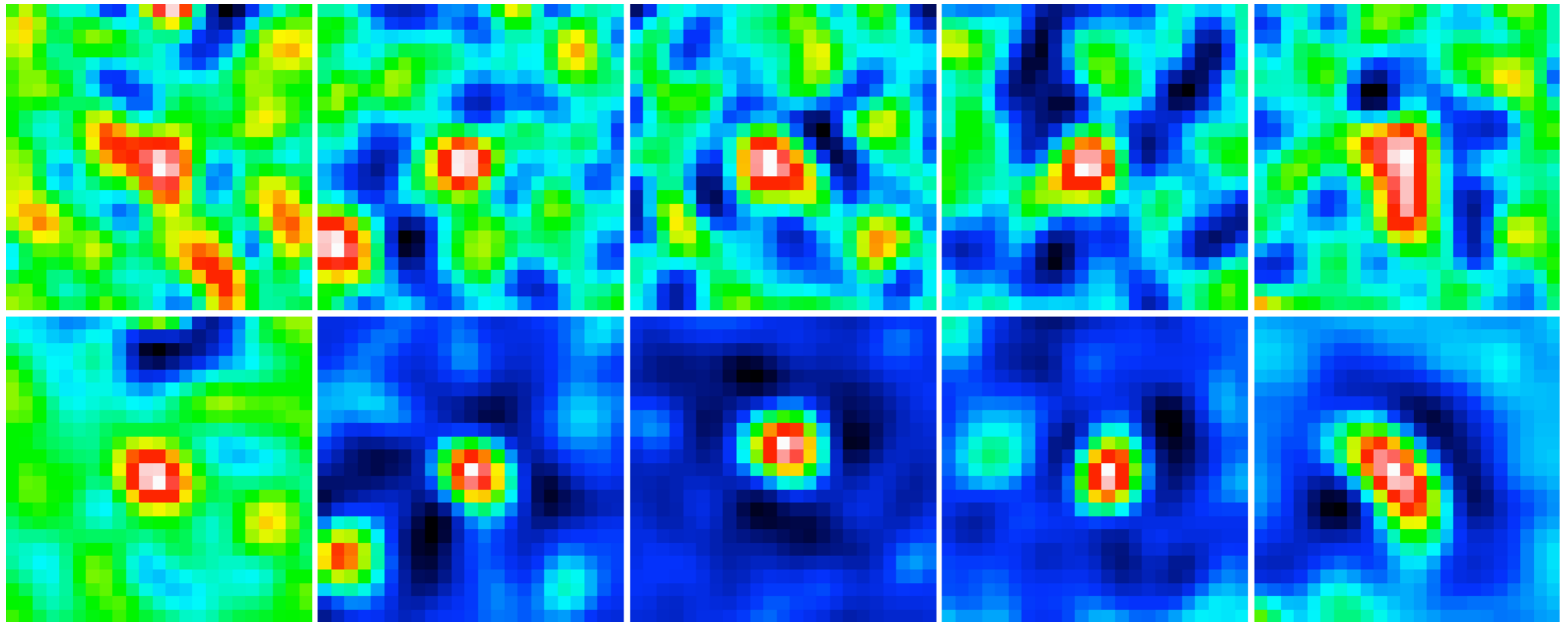
Extended source pipeline



Point source pipeline



Daisy followups of low SN sources



Snapshot daisies of 4-10 sigma sources (6 min daisy)

- Test completeness of source finder
- Uniform flux-limited catalogue

Results confirm 100% completeness at 4.6 sigma