The SCUBA-2 Ambitious Sky Survey

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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”)

http://www.eaobservatory.org/jcmt
Hi-GAL (70-500 \(\mu\)m)/ATLASGAL (870 \(\mu\)m) 
280 < l < 60, |b|~ 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
FIR/sub-mm Galactic Plane Surveys

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SASSy-Perseus

Each survey tile is a 1 degree “pong”

Latitude extent is ~2.4°

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

NGC7538 already covered in SV Campaign
Here the survey tiles are 2 degree “pongs”
Aim here was to maximise sky coverage to find rare objects
Observations are now complete as of Jan 2015

SASSy-Perseus 100% complete from l=60 to l=120, |b| ~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 (>4TB raw data)

Preliminary source catalogue with ~2000 sources >5σ

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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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”
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
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Almost a third of all outer Galaxy sources found here
Many isolated (low mass?) sources
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A gallery of SASSy blobs

W3

IRAS 00232+6437

JCMTLSY J015924.0

S187

IRAS 00232+6437
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
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