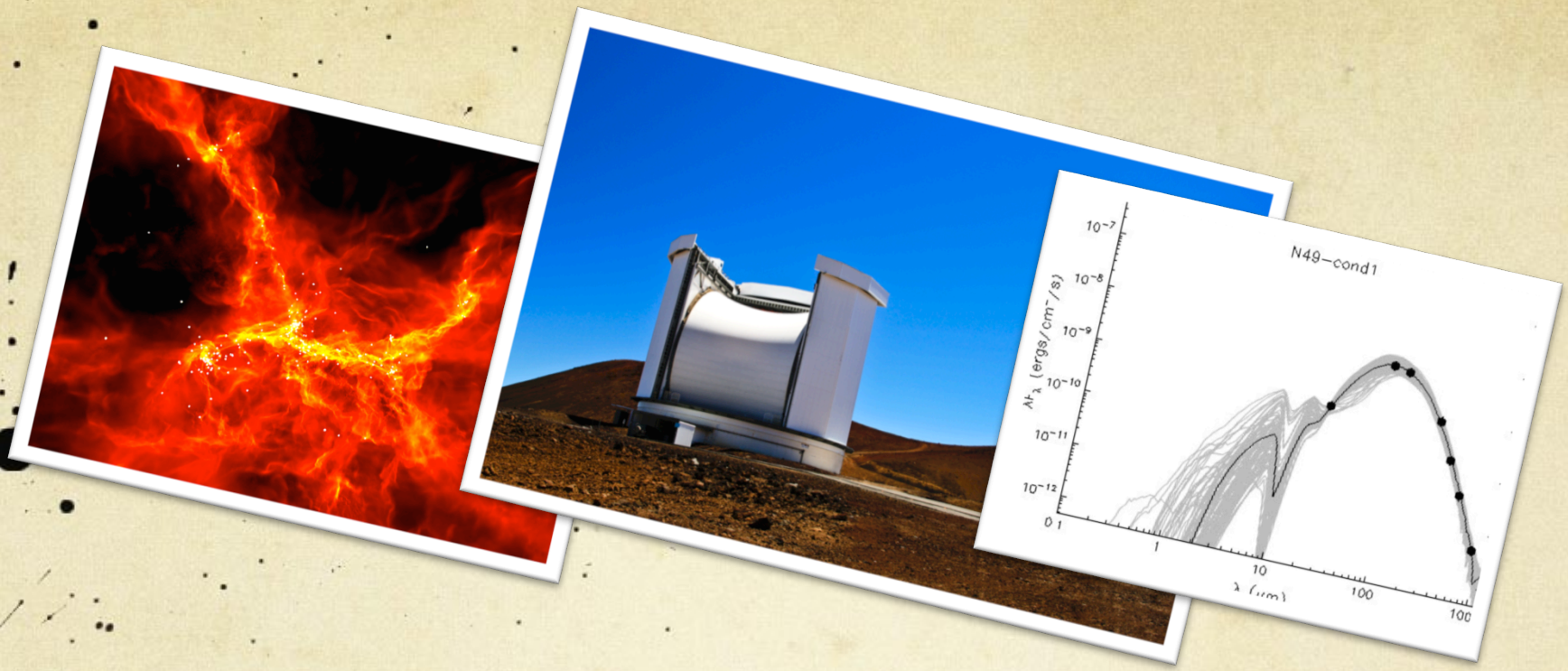
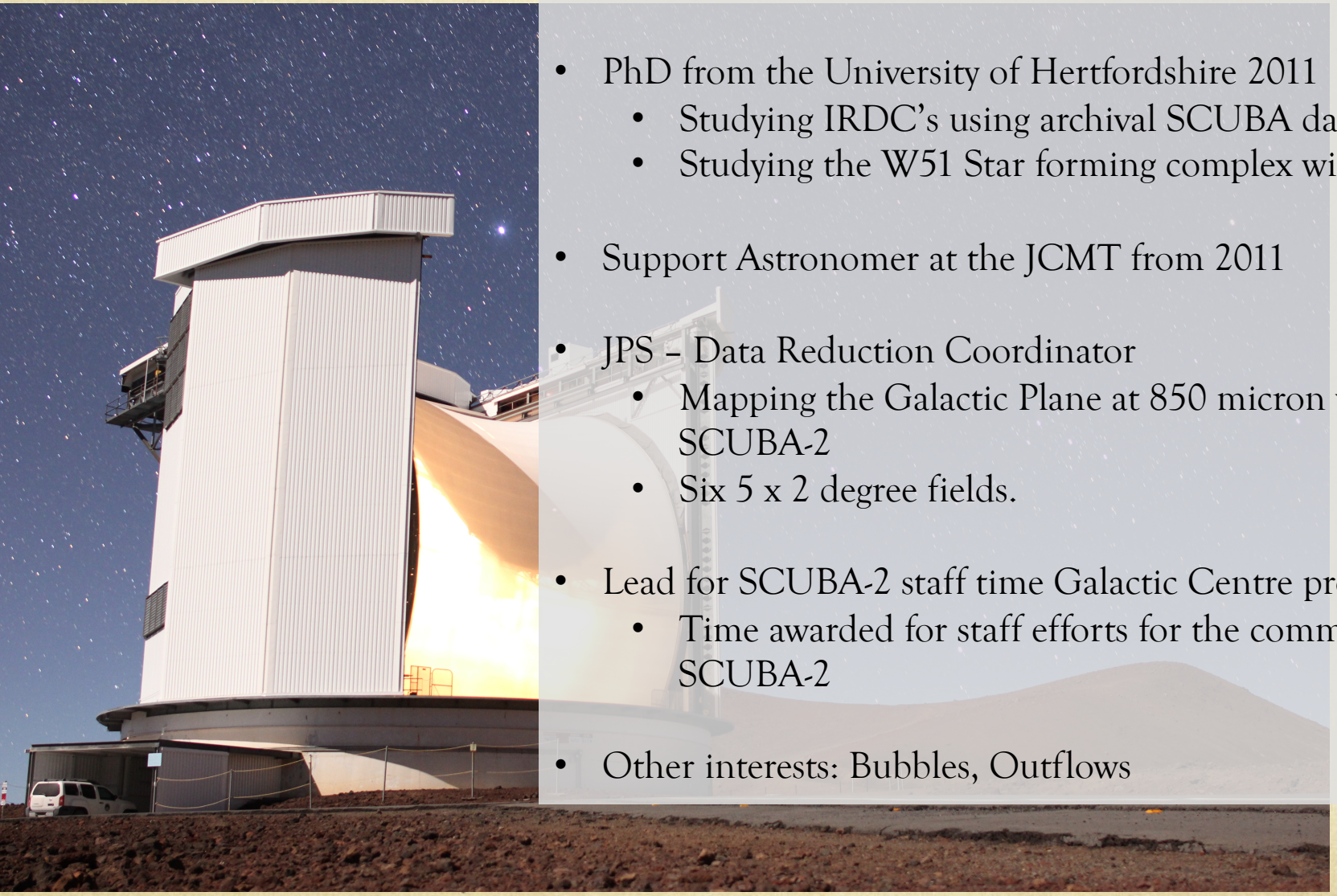
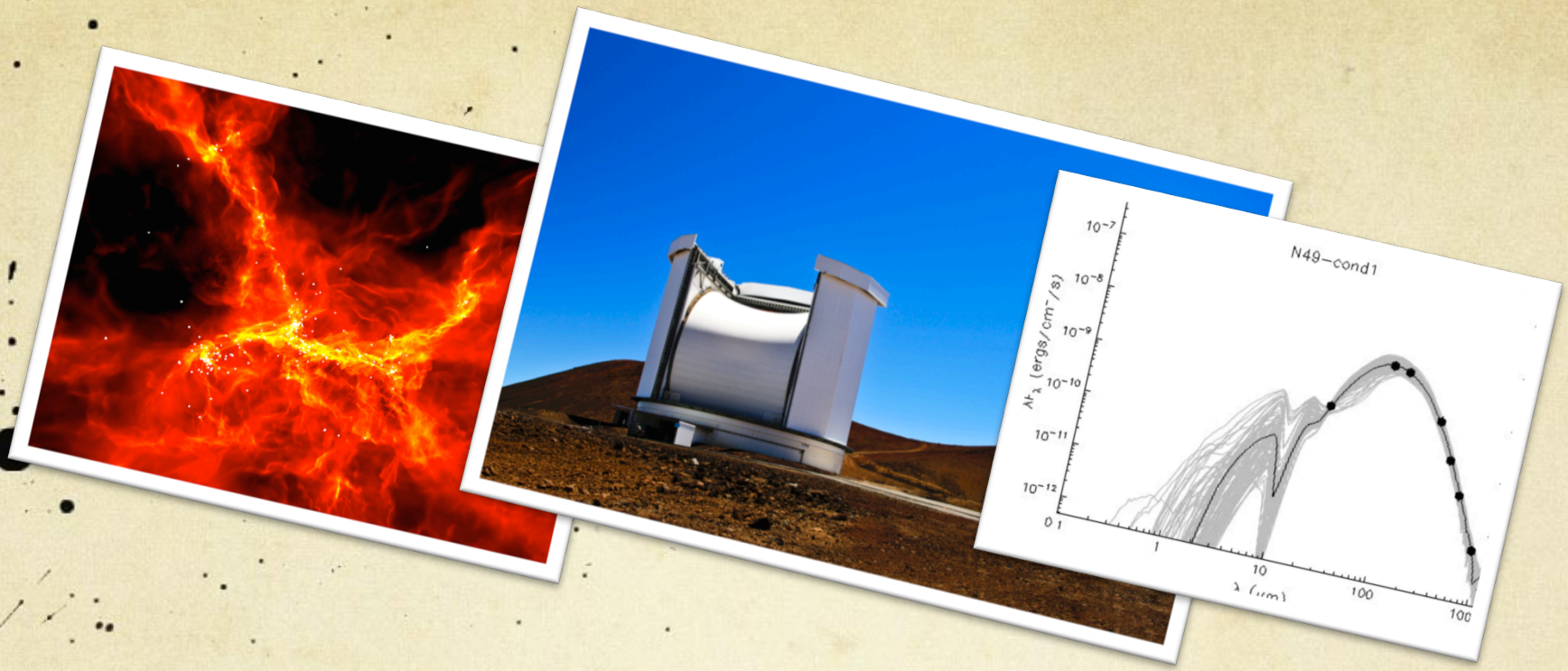


Ideas to data:

Harriet Parsons, Support Scientist, JAC/EAO



- BSc in Astrophysics from University of Hertfordshire, 2007
  - Year in Europe - Kapteyn Institute, Groningen
- PhD from the University of Hertfordshire 2011
  - Studying IRDC's using archival SCUBA data
  - Studying the W51 Star forming complex with HARP
- Support Astronomer at the JCMT from 2011
- JPS – Data Reduction Coordinator
  - Mapping the Galactic Plane at 850 micron with SCUBA-2
  - Six 5 x 2 degree fields.
- Lead for SCUBA-2 staff time Galactic Centre project
  - Time awarded for staff efforts for the commissioning of SCUBA-2
- Other interests: Bubbles, Outflows



Ideas to data: The Proposal Process

Harriet Parsons, Support Scientist, JAC/EAO

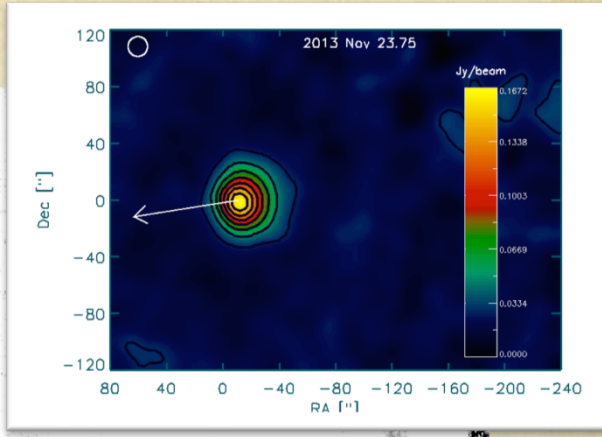
The Proposal Process

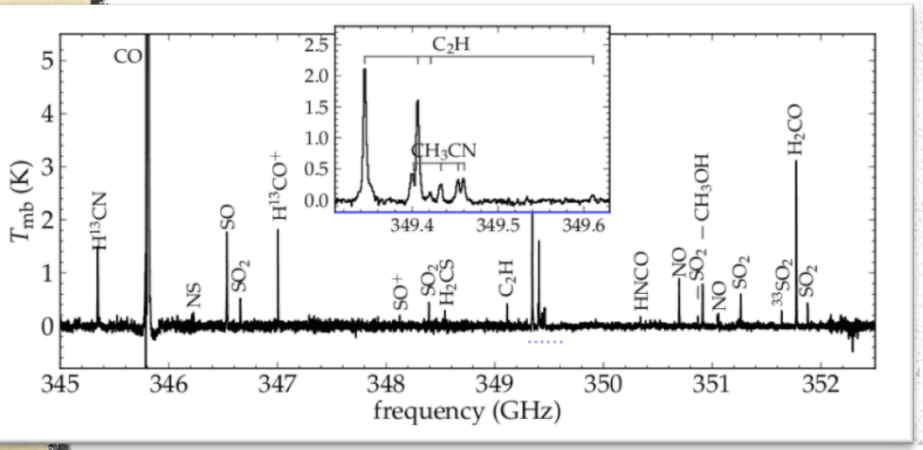
- Why might you be asking for time with the JCMT
- What do you need to consider
- An example proposal
- The submission process – NorthStar

Ideas:

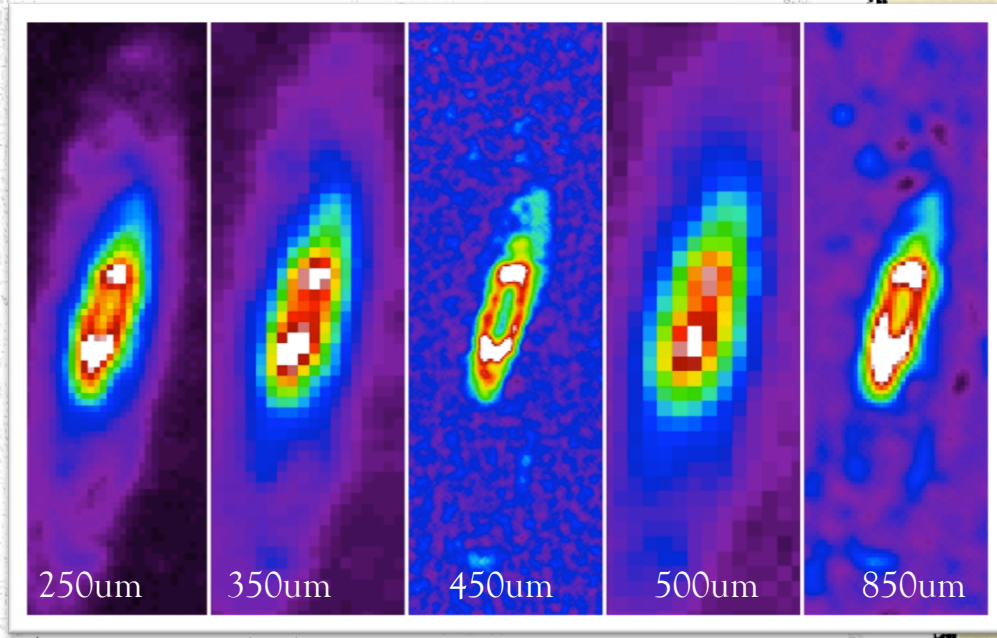
- ✓ Need data to support an ALMA proposal
- ✓ Complimentary data to Herschel, ASTE
- ✓ Large area mapping both: continuum or heterodyne
- ✓ Obtain kinematic information
- ✓ Chemistry
- ✓ Daytime observing

C/2012 S1 (ISON)





SLS - consortium



Herschel – KINGFISH consortium

What do I need/Can it be done?

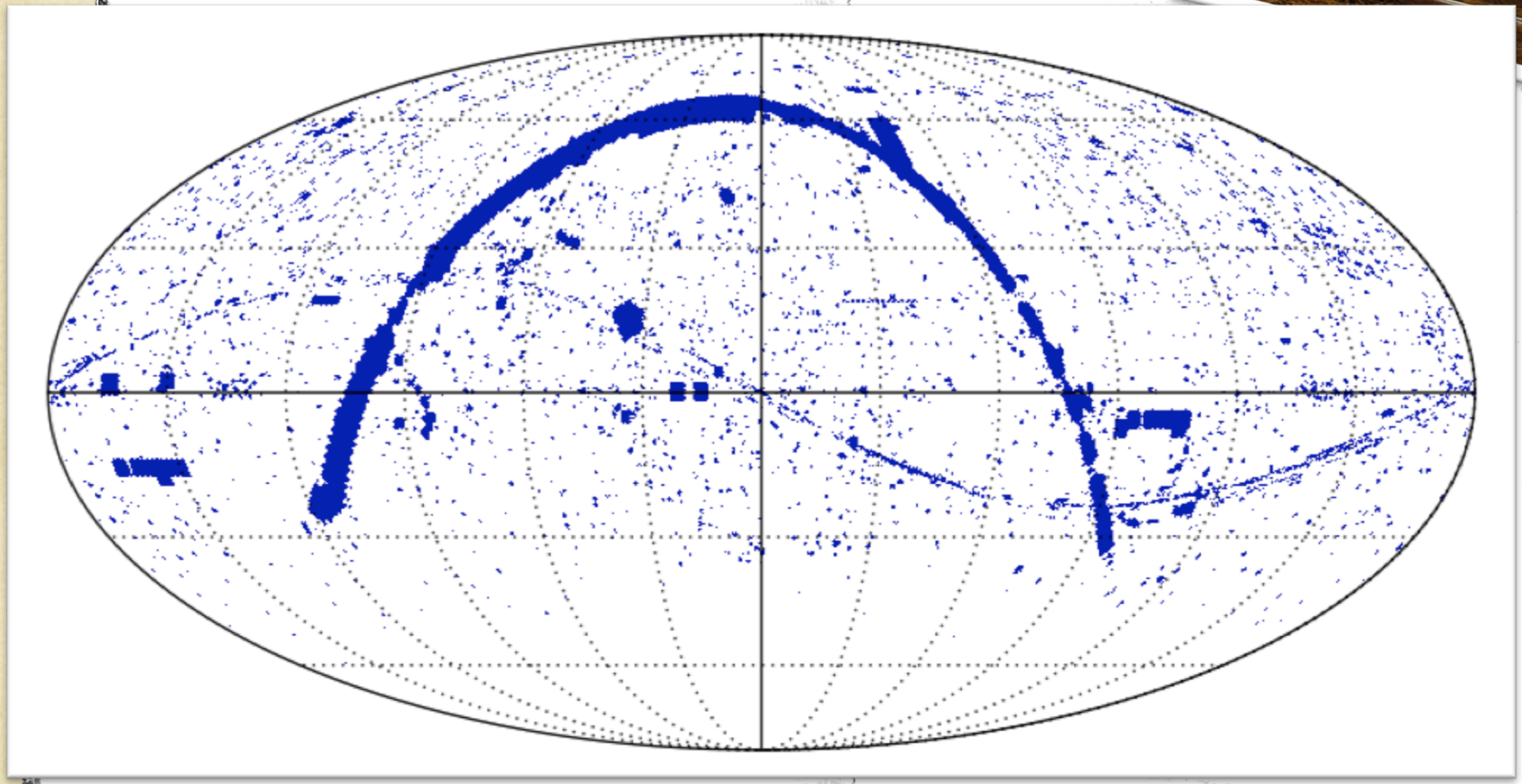
Does data already exist?
http://www3.cadc-ccda.hia-iha.nrc-cnrc.gc.ca/en/jcmt/

Source availability:
http://www.eaobservatory.org/jcmt/proposals/checklist/

Weather conditions:
http://www.eaobservatory.org/jcmt/observing/weather-bands/

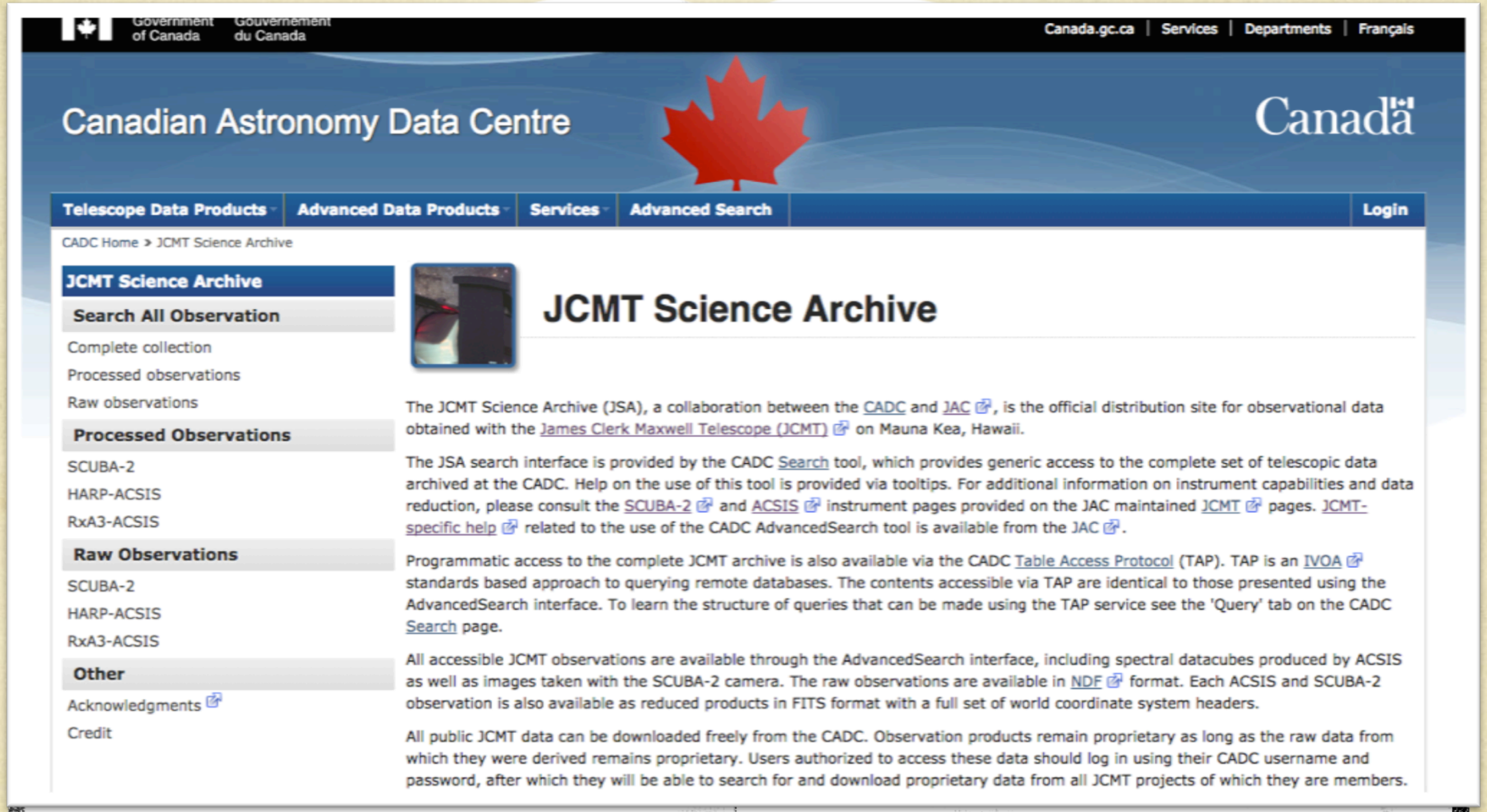
Instrumentation:
http://www.eaobservatory.org/jcmt/instrumentation/

JCMT Science Archive:



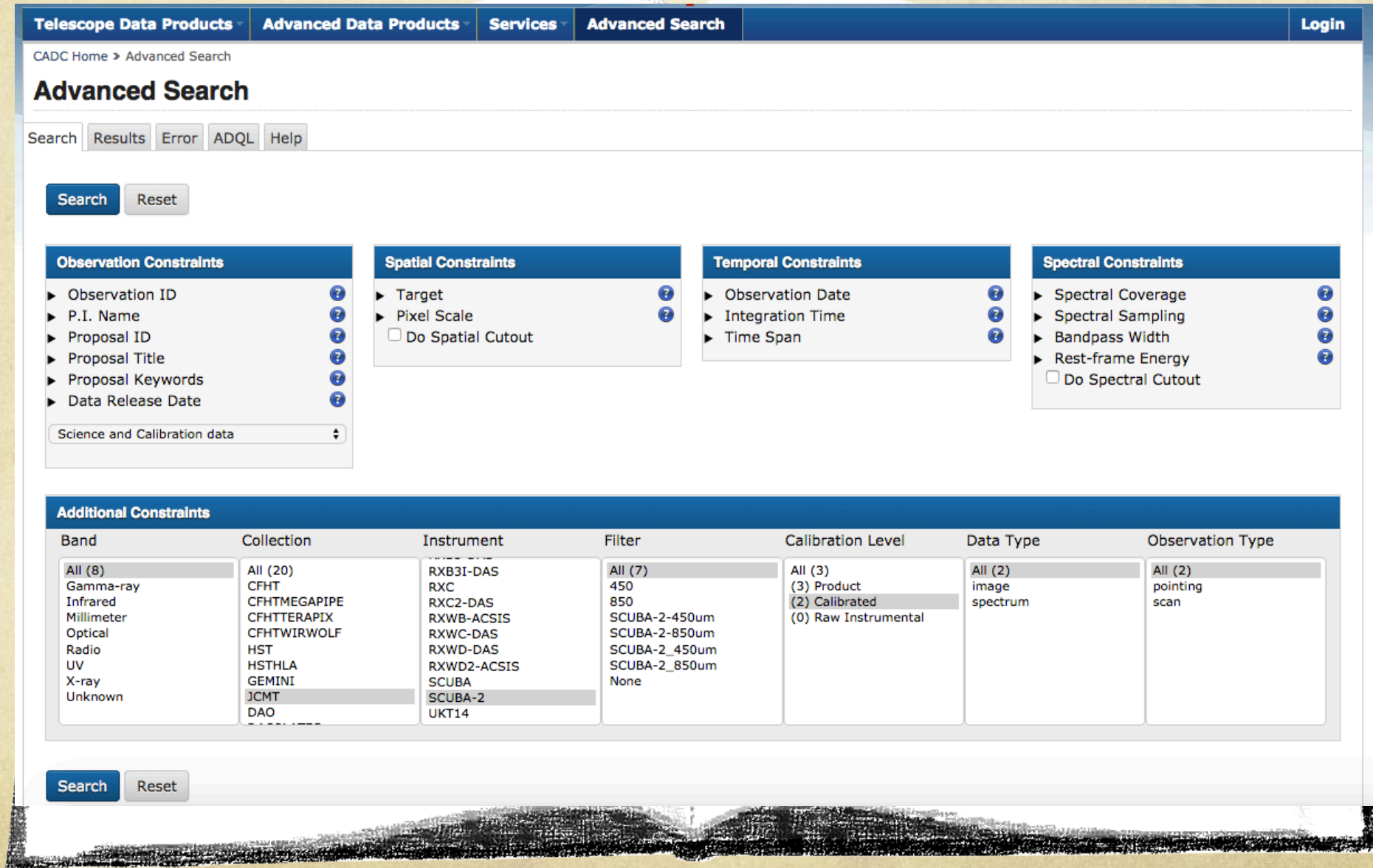
www.eaobservatory.org/jcmt/science/archive/

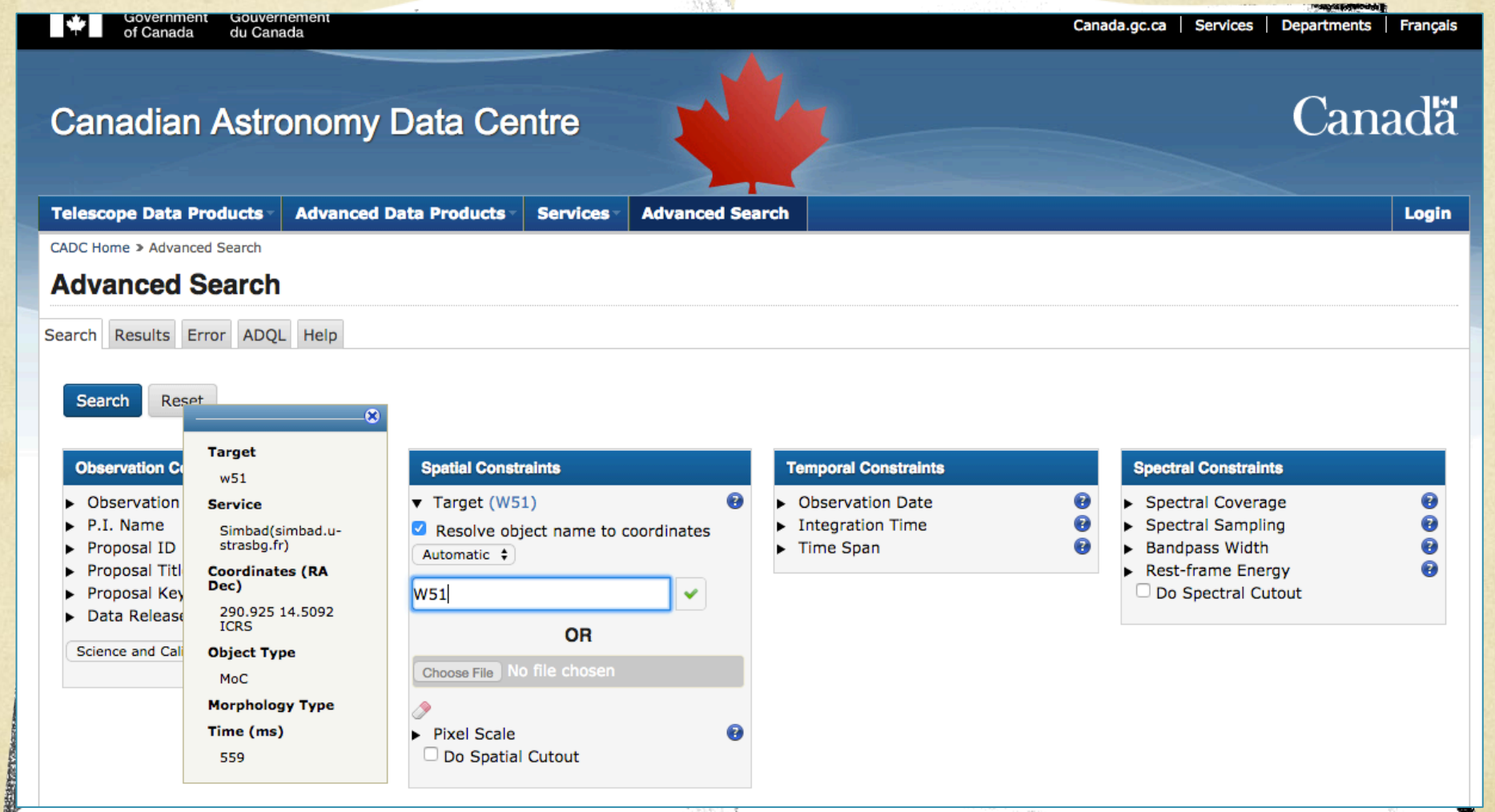
JCMT Science Archive:

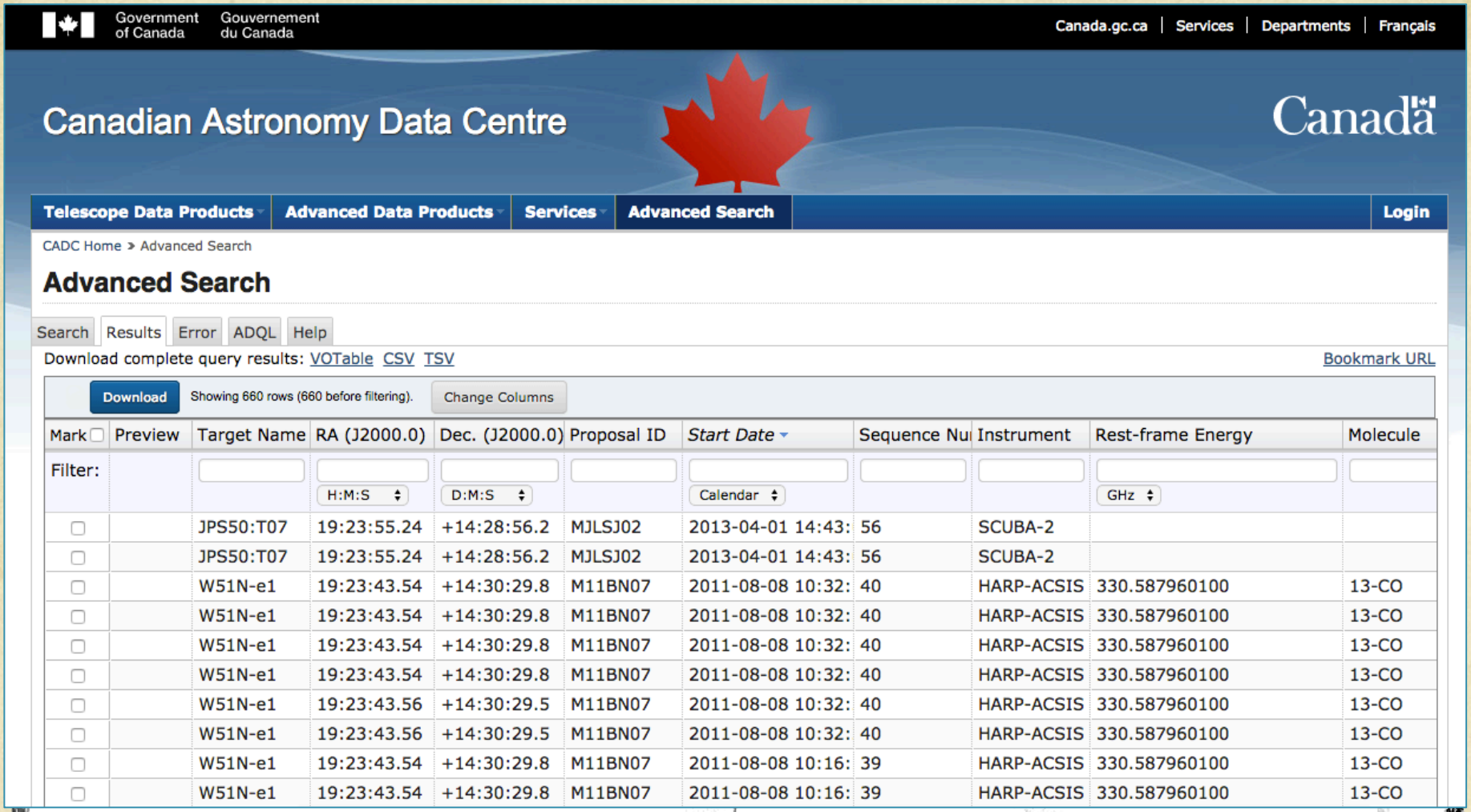


www.eaobservatory.org/jcmt/science/archive/

JCMT Science Archive:




Government of Canada
Gouvernement du Canada
Canada.gc.ca | Services | Departments | Français
Canadian Astronomy Data Centre
Canada
Telescope Data Products
Advanced Data Products
Services
Advanced Search
Login
CADC Home > Advanced Search
Advanced Search
Search
Results
Error
ADQL
Help
Search
Reset
Target
w51
Service
Simbad(simbad.u-strasbg.fr)
Coordinates (RA Dec)
290.925 14.5092 ICRS
Object Type
MoC
Morphology Type
Time (ms)
559
Spatial Constraints
Target (W51)
Resolve object name to coordinates
Automatic
W51
OR
Choose File
No file chosen
Pixel Scale
Do Spatial Cutout
Temporal Constraints
Observation Date
Integration Time
Time Span
Spectral Constraints
Spectral Coverage
Spectral Sampling
Bandpass Width
Rest-frame Energy
Do Spectral Cutout

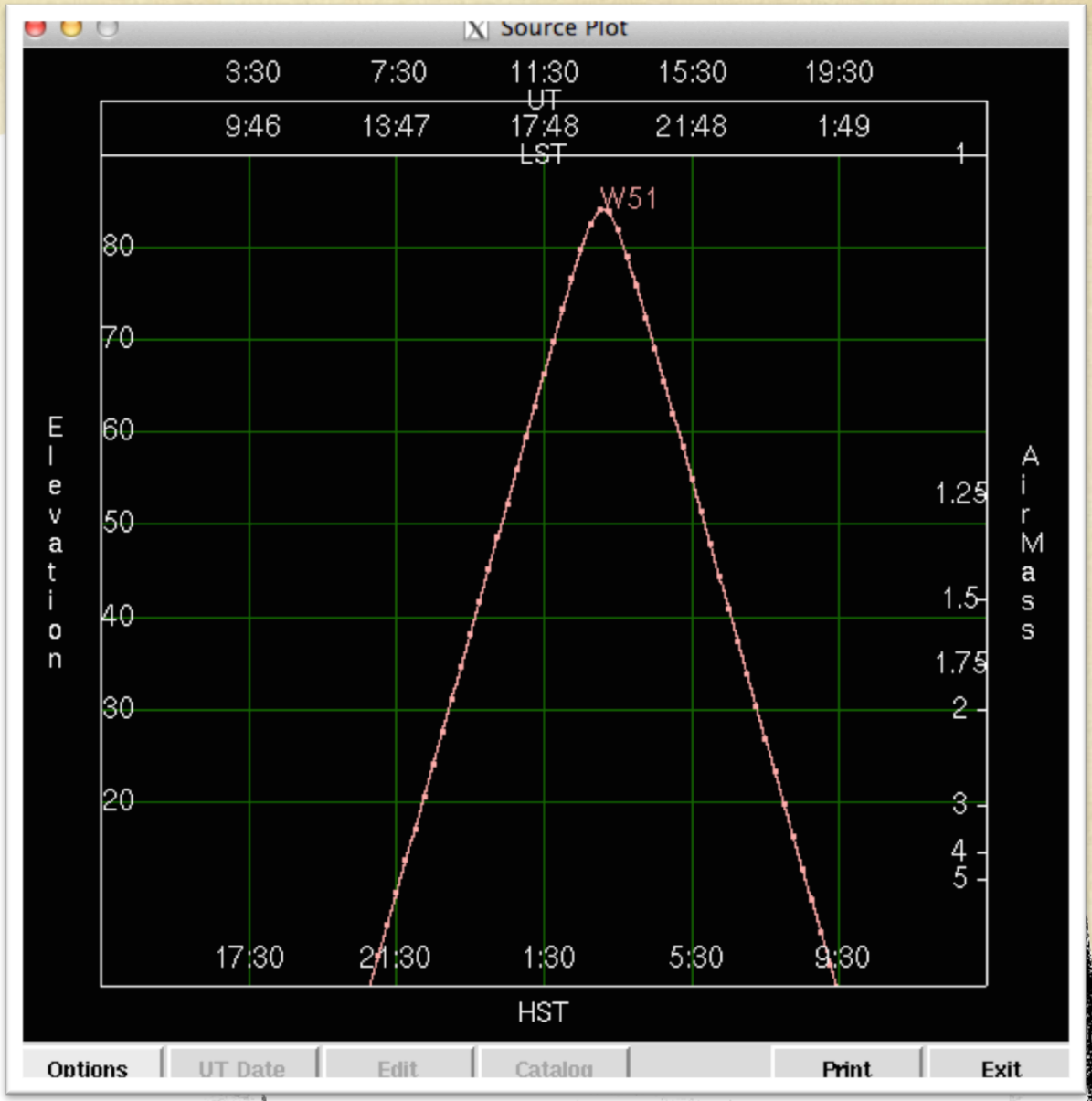

Government of Canada
Gouvernement du Canada
Canada.gc.ca | Services | Departments | Français
Canadian Astronomy Data Centre
Canada
Telescope Data Products
Advanced Data Products
Services
Advanced Search
Login
CADC Home » Advanced Search
Advanced Search
Search
Results
Error
ADQL
Help
Download complete query results: VOTable CSV TSV
Bookmark URL
Download
Showing 660 rows (660 before filtering).
Change Columns
Mark
Preview
Target Name
RA (J2000.0)
Dec. (J2000.0)
Proposal ID
Start Date
Sequence Nu
Instrument
Rest-frame Energy
Molecule
Filter:
H:M:S
D:M:S
Calendar
GHz
JPS50:T07 19:23:55.24 +14:28:56.2 MJLSJ02 2013-04-01 14:43: 56 SCUBA-2
JPS50:T07 19:23:55.24 +14:28:56.2 MJLSJ02 2013-04-01 14:43: 56 SCUBA-2
W51N-e1 19:23:43.54 +14:30:29.8 M11BN07 2011-08-08 10:32: 40 HARP-ACSIS 330.587960100 13-CO
W51N-e1 19:23:43.54 +14:30:29.8 M11BN07 2011-08-08 10:32: 40 HARP-ACSIS 330.587960100 13-CO
W51N-e1 19:23:43.54 +14:30:29.8 M11BN07 2011-08-08 10:32: 40 HARP-ACSIS 330.587960100 13-CO
W51N-e1 19:23:43.54 +14:30:29.8 M11BN07 2011-08-08 10:32: 40 HARP-ACSIS 330.587960100 13-CO
W51N-e1 19:23:43.56 +14:30:29.5 M11BN07 2011-08-08 10:32: 40 HARP-ACSIS 330.587960100 13-CO
W51N-e1 19:23:43.56 +14:30:29.5 M11BN07 2011-08-08 10:32: 40 HARP-ACSIS 330.587960100 13-CO
W51N-e1 19:23:43.54 +14:30:29.8 M11BN07 2011-08-08 10:16: 39 HARP-ACSIS 330.587960100 13-CO
W51N-e1 19:23:43.54 +14:30:29.8 M11BN07 2011-08-08 10:16: 39 HARP-ACSIS 330.587960100 13-CO

Can it be done?
(Source Availability)

Check with your favorite tool if your object will be visible during the time available:

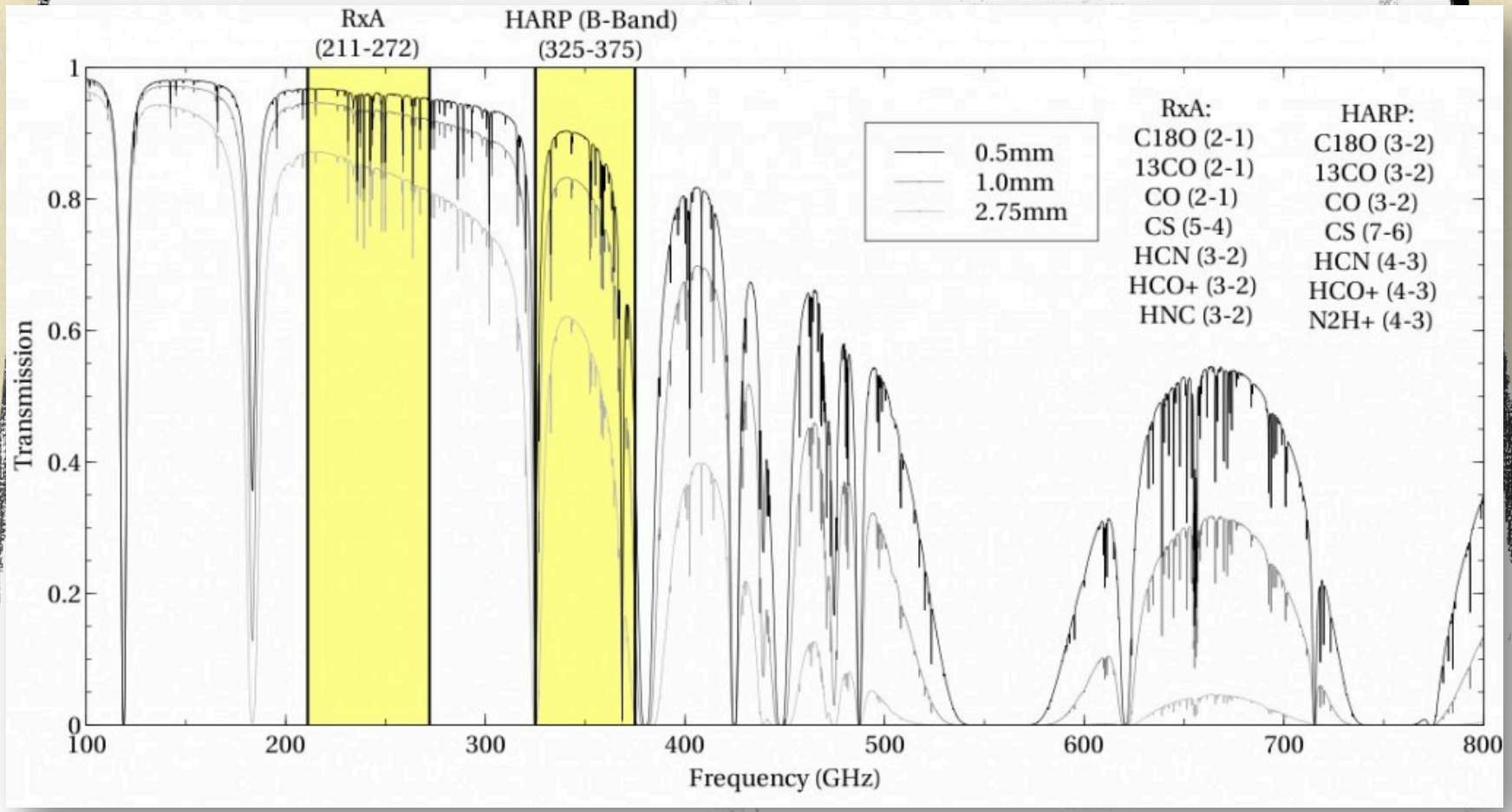
>> sourceplot

Comes as part of the STARLINK software package.



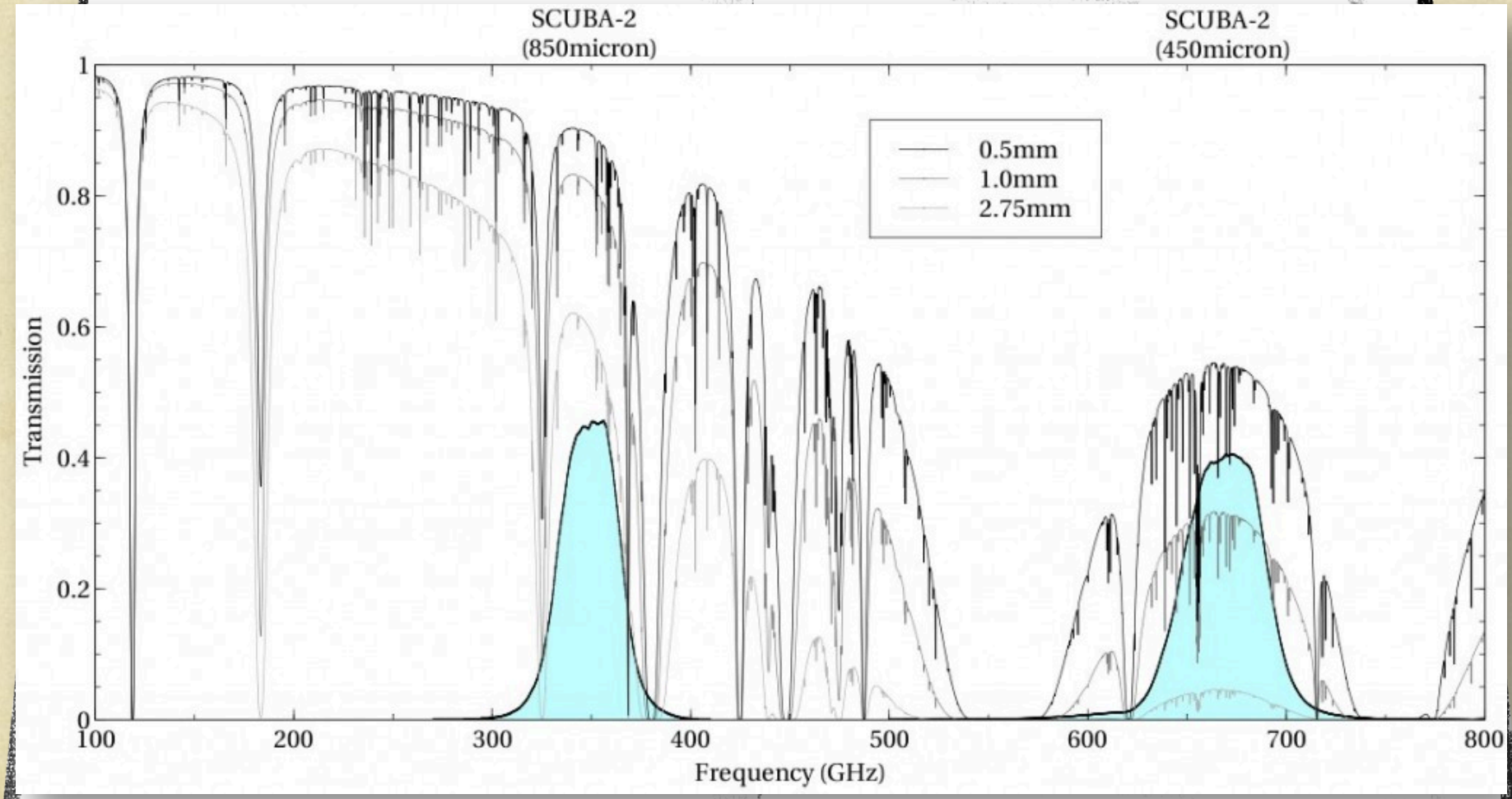
Can it be done?

(Instrumentation)



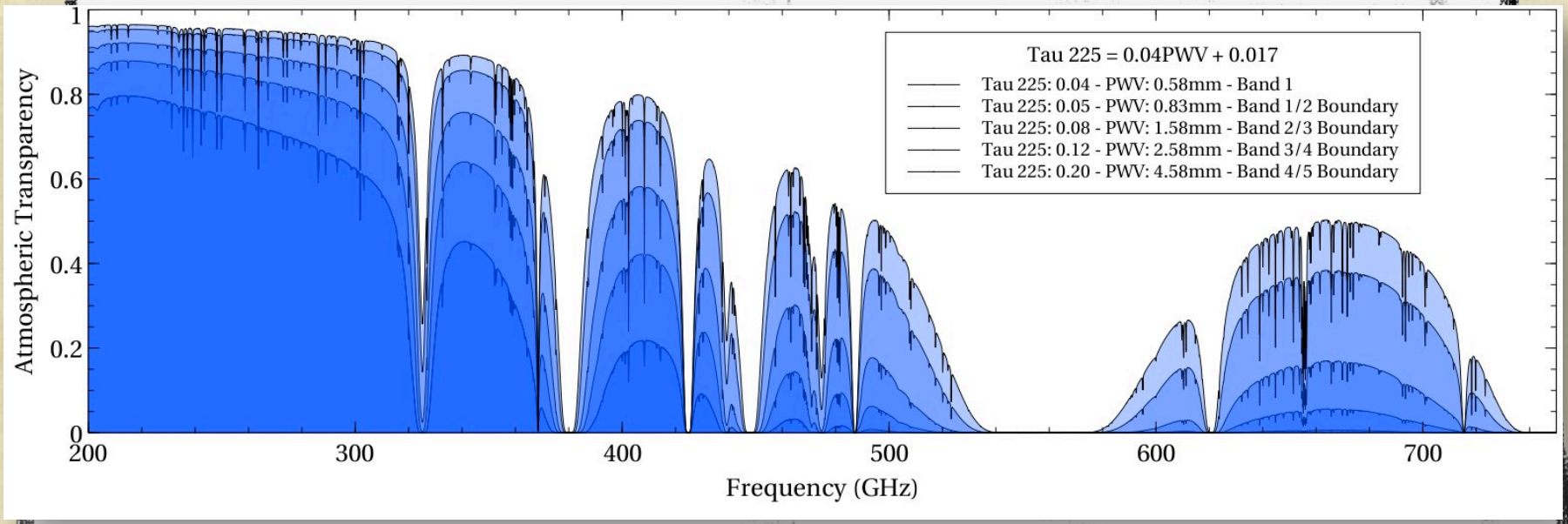
Can it be done?

(Instrumentation)

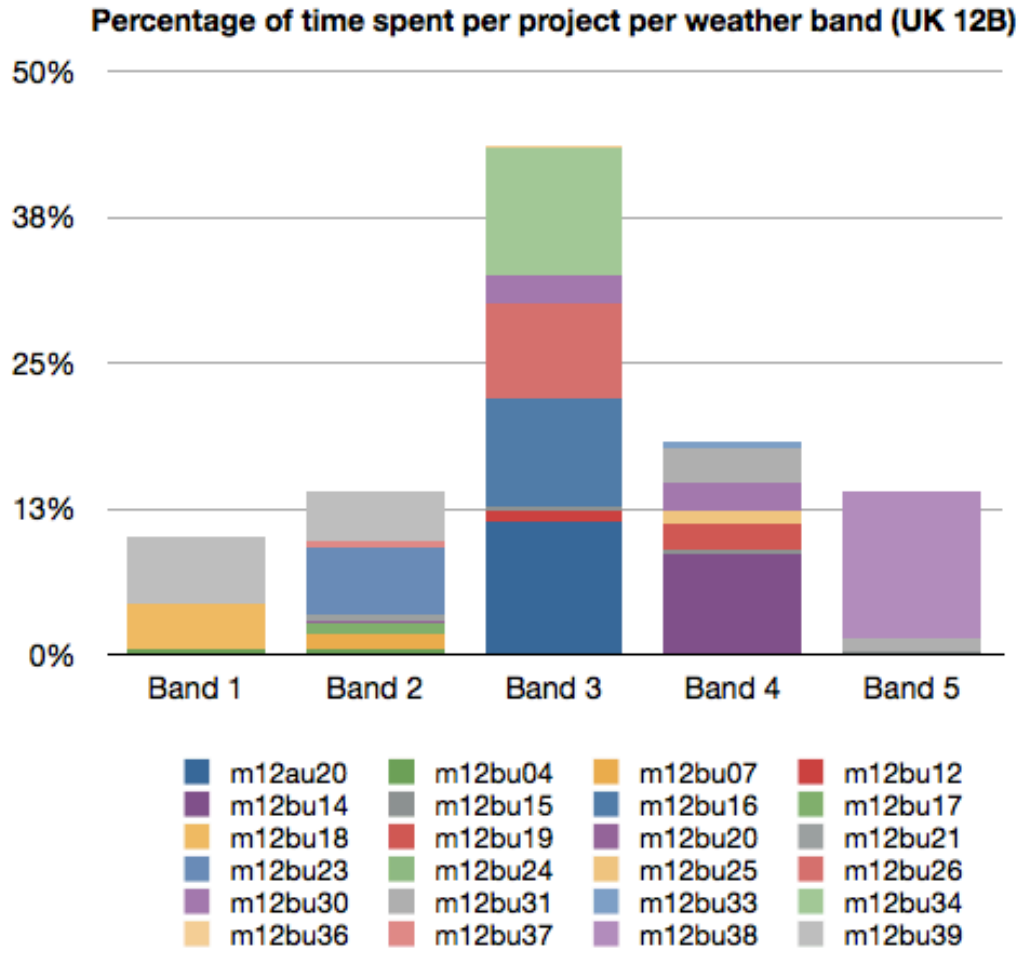


Can it be done - in poor weather?

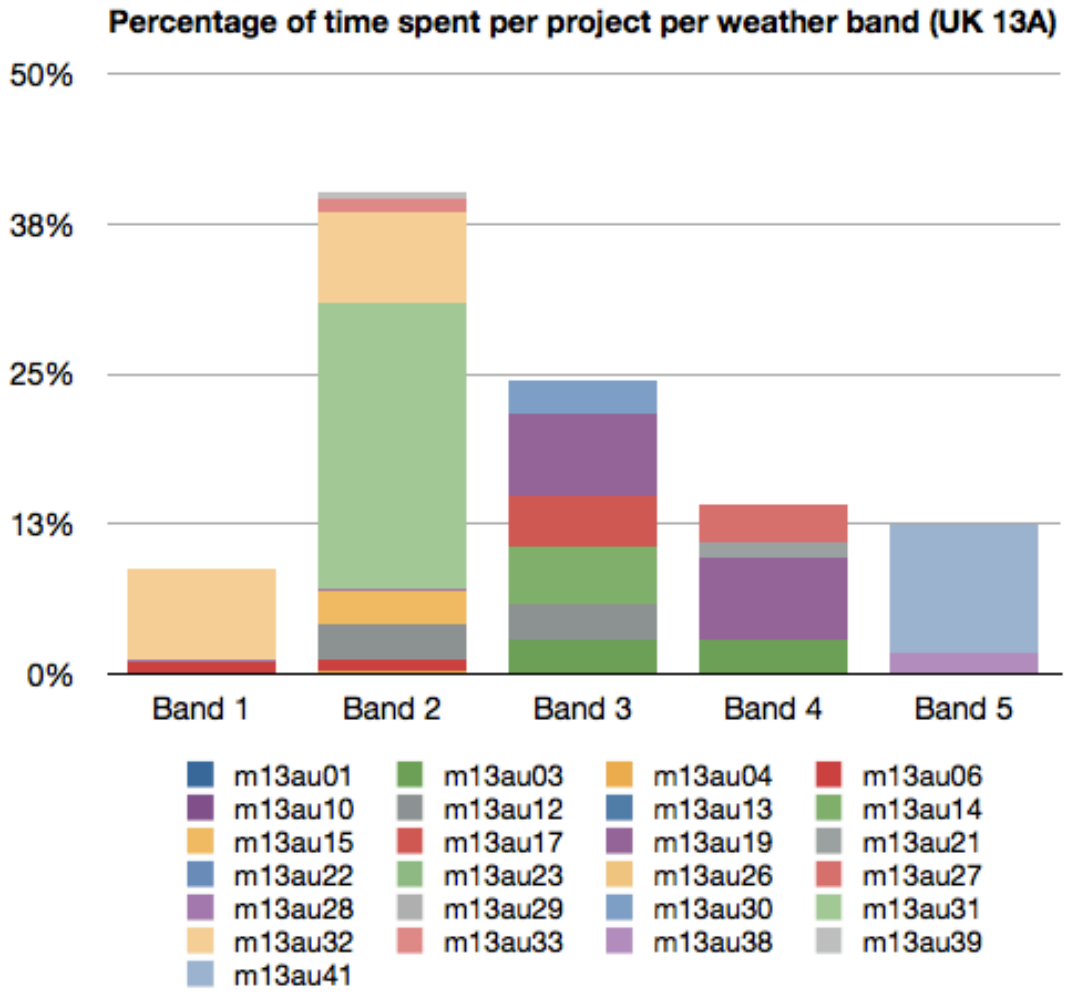
Weather – determined by sky opacity at 225GHz



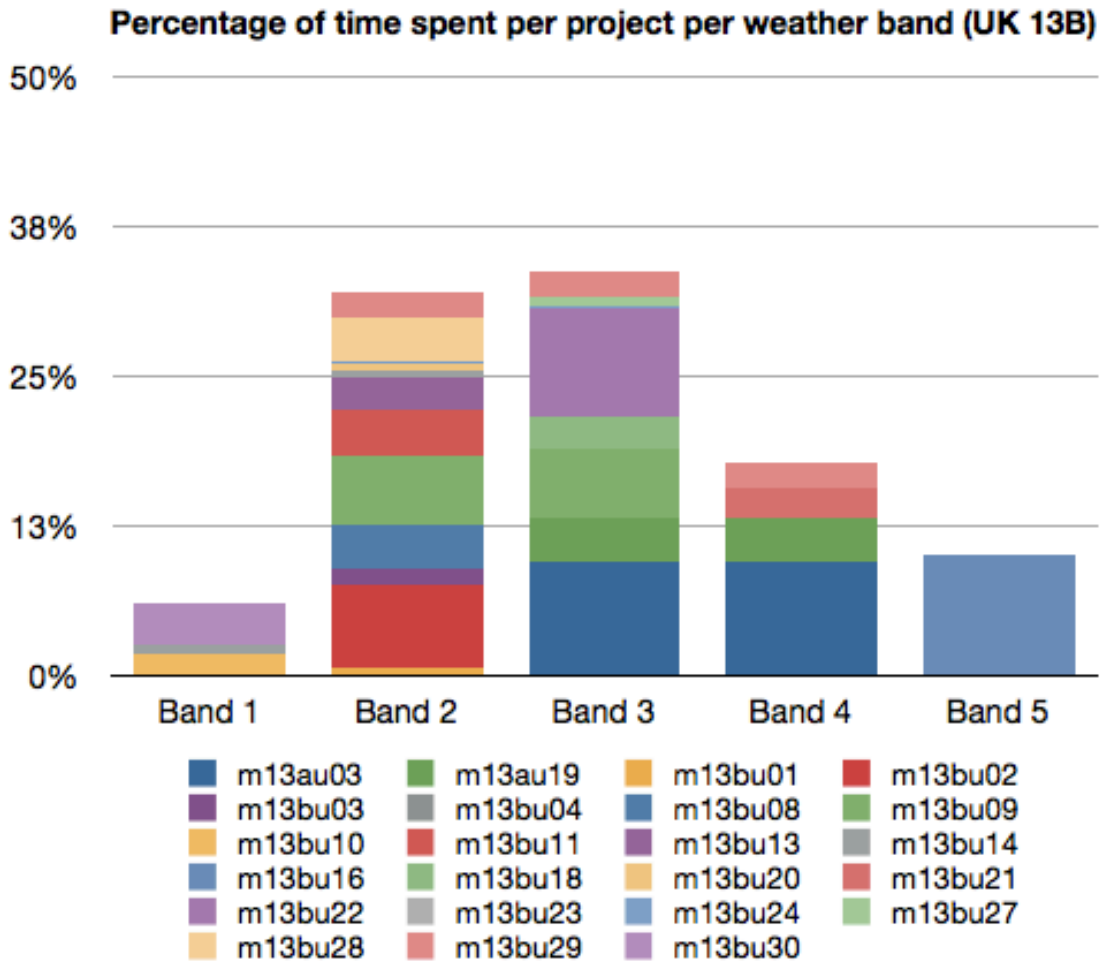
Can it be done– tips from the past



Can it be done– tips from the past

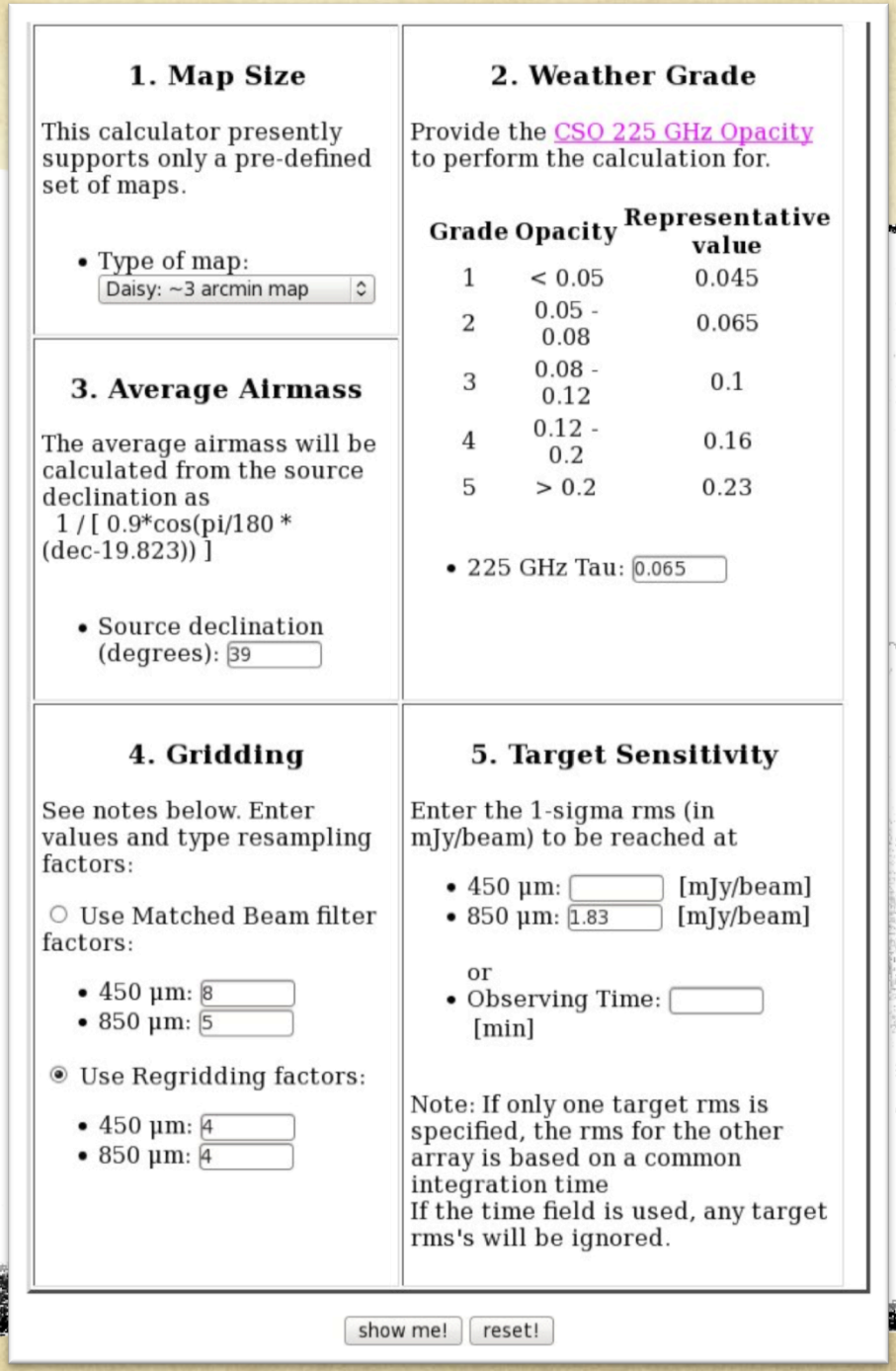


Can it be done– tips from the past



What do I need?
(SCUBA-2)

www.eaobservatory.org/jcmt/instrumentation/continuum/scuba-2/scuba-2-itc/



1. Map Size

This calculator presently supports only a pre-defined set of maps.

- Type of map: Daisy: ~3 arcmin map

2. Weather Grade

Provide the CSO 225 GHz Opacity to perform the calculation for.

Grade	Opacity	Representative value
1	< 0.05	0.045
2	0.05 - 0.08	0.065
3	0.08 - 0.12	0.1
4	0.12 - 0.2	0.16
5	> 0.2	0.23

- 225 GHz Tau: 0.065

3. Average Airmass

The average airmass will be calculated from the source declination as
1 / [0.9*cos(pi/180 * (dec-19.823))]

- Source declination (degrees): 39

4. Gridding

See notes below. Enter values and type resampling factors:

○ Use Matched Beam filter factors:

- 450 μm: 8
- 850 μm: 5

◉ Use Regridding factors:

- 450 μm: 4
- 850 μm: 4

5. Target Sensitivity

Enter the 1-sigma rms (in mJy/beam) to be reached at

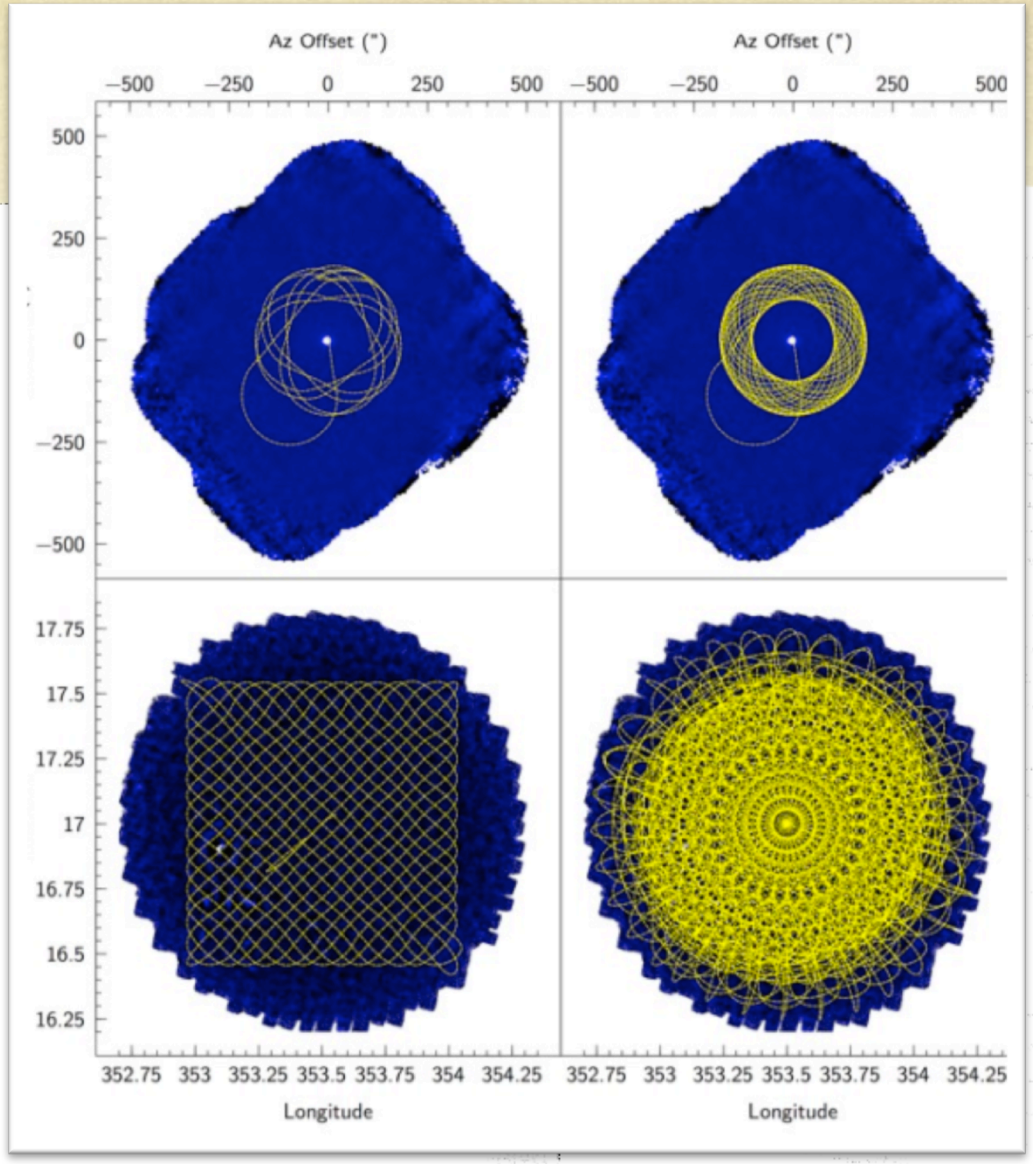
- 450 μm: [mJy/beam]
- 850 μm: 1.83 [mJy/beam]

or

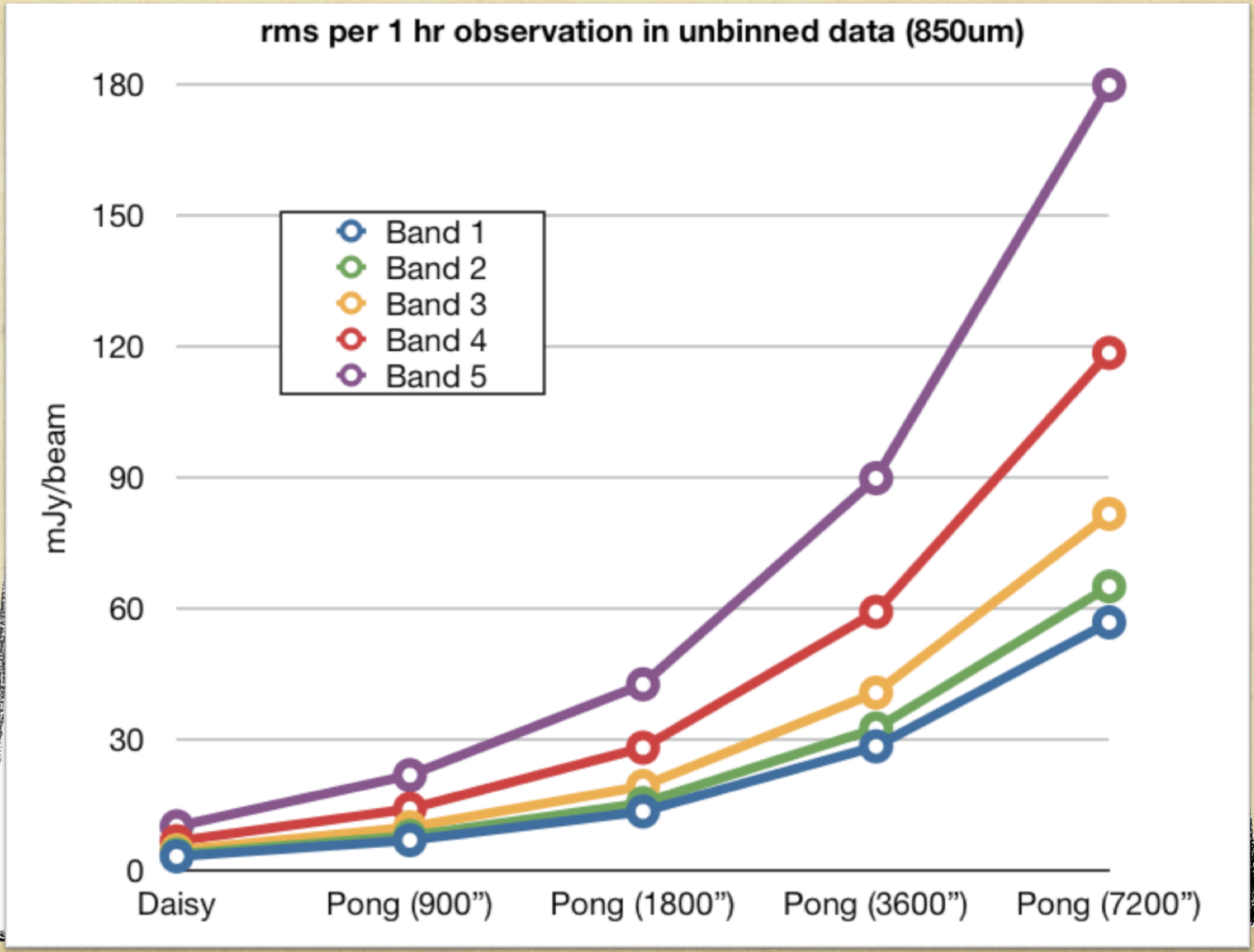
- Observing Time: [min]

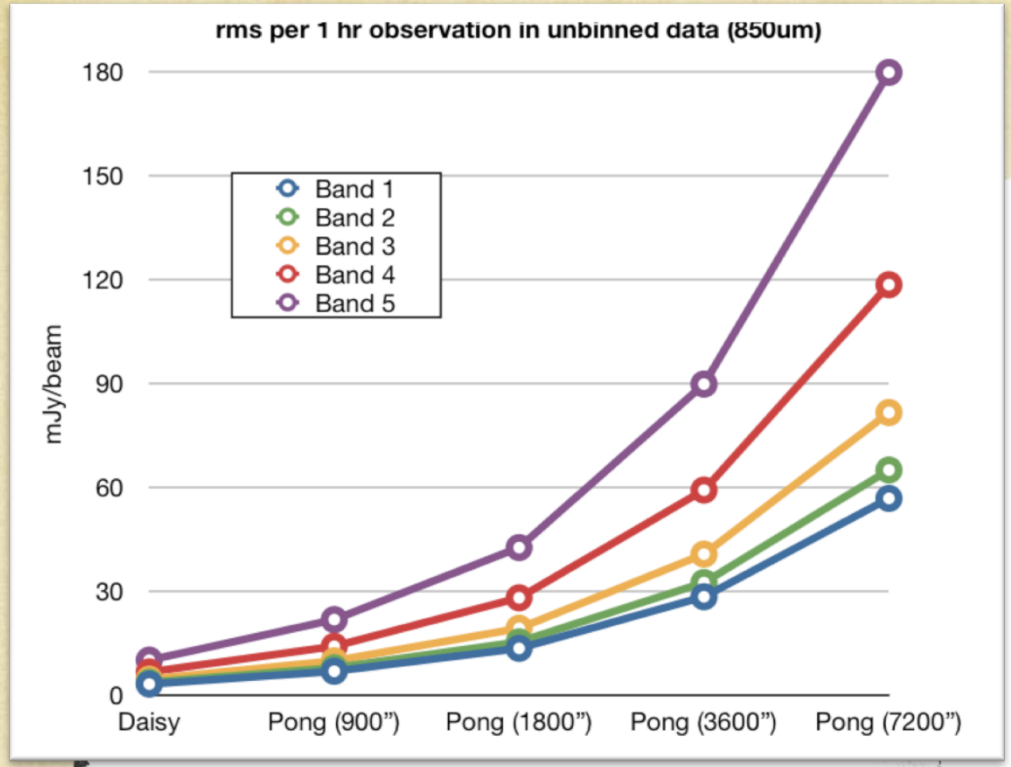
Note: If only one target rms is specified, the rms for the other array is based on a common integration time
If the time field is used, any target rms's will be ignored.

show me! reset!



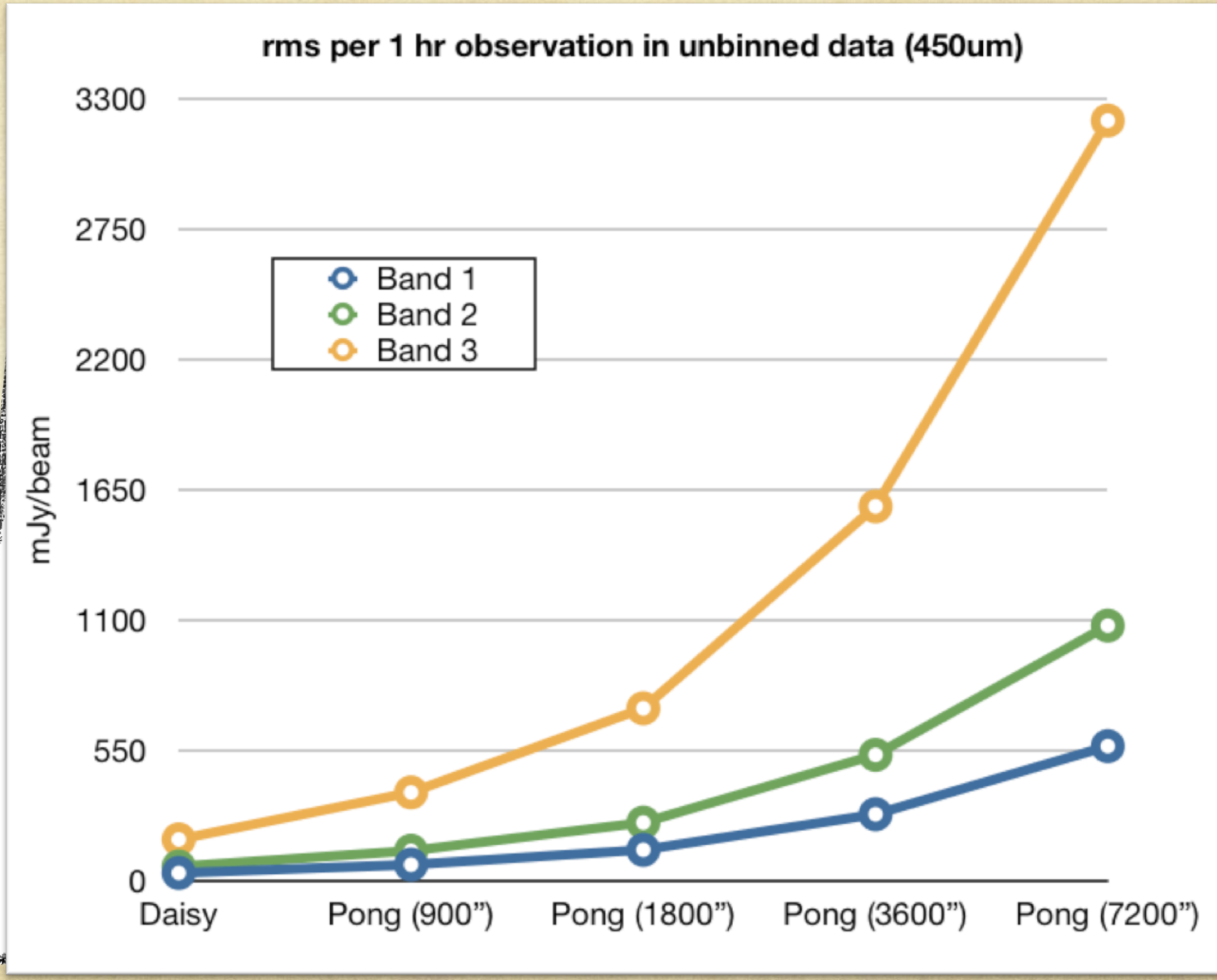
www.eaobservatory.org/jcmt/instrumentation/continuum/scuba-2/observing-modes/

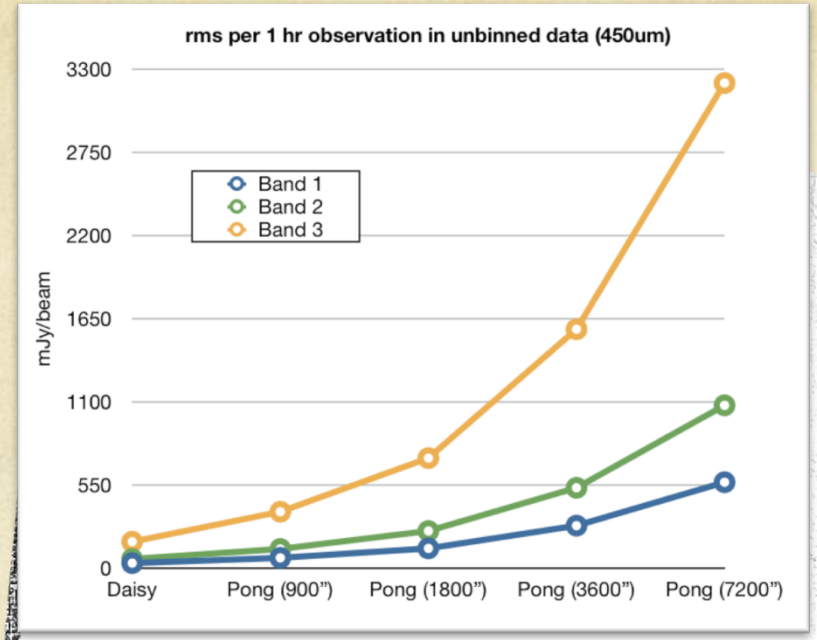

rms per 1 hr observation in unbinned data (850um)
180
150
120
90
60
30
0
mJy/beam
Band 1
Band 2
Band 3
Band 4
Band 5
Daisy
Pong (900")
Pong (1800")
Pong (3600")
Pong (7200")



rms (mJy/beam) achieved in 1hour integration time.

	Band 1	Band 2	Band 3	Band 4	Band 5
Daisy	3	4	5	7	10
Pong (900")	7	8	10	14	22
Pong (1800")	14	15	19	28	43
Pong (3600")	28	33	41	59	90
Pong (7200")	57	65	82	119	180


rms per 1 hr observation in unbinned data (450um)
3300
2750
2200
1650
1100
550
0
mJy/beam
Band 1
Band 2
Band 3
Daisy
Pong (900")
Pong (1800")
Pong (3600")
Pong (7200")

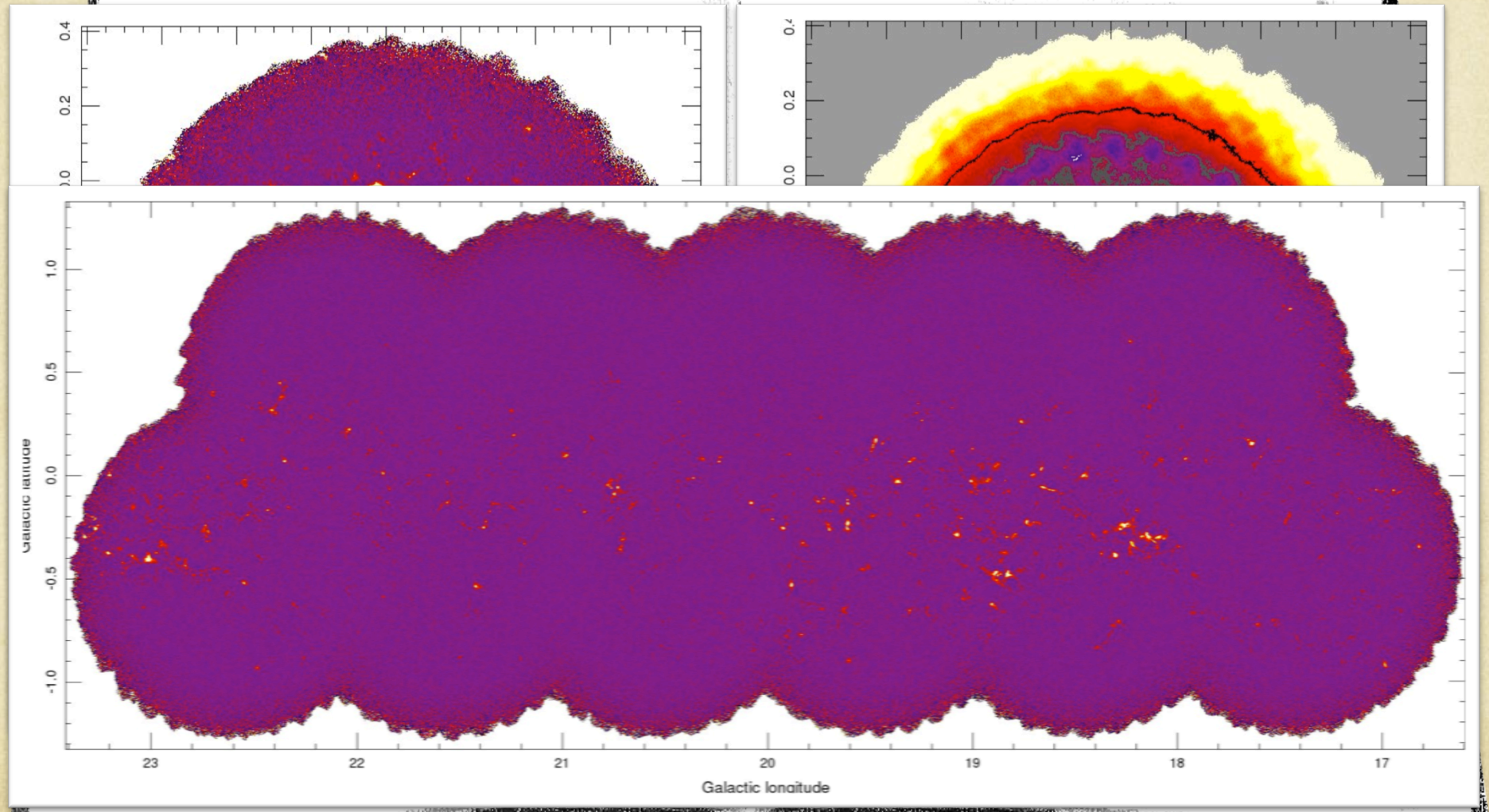


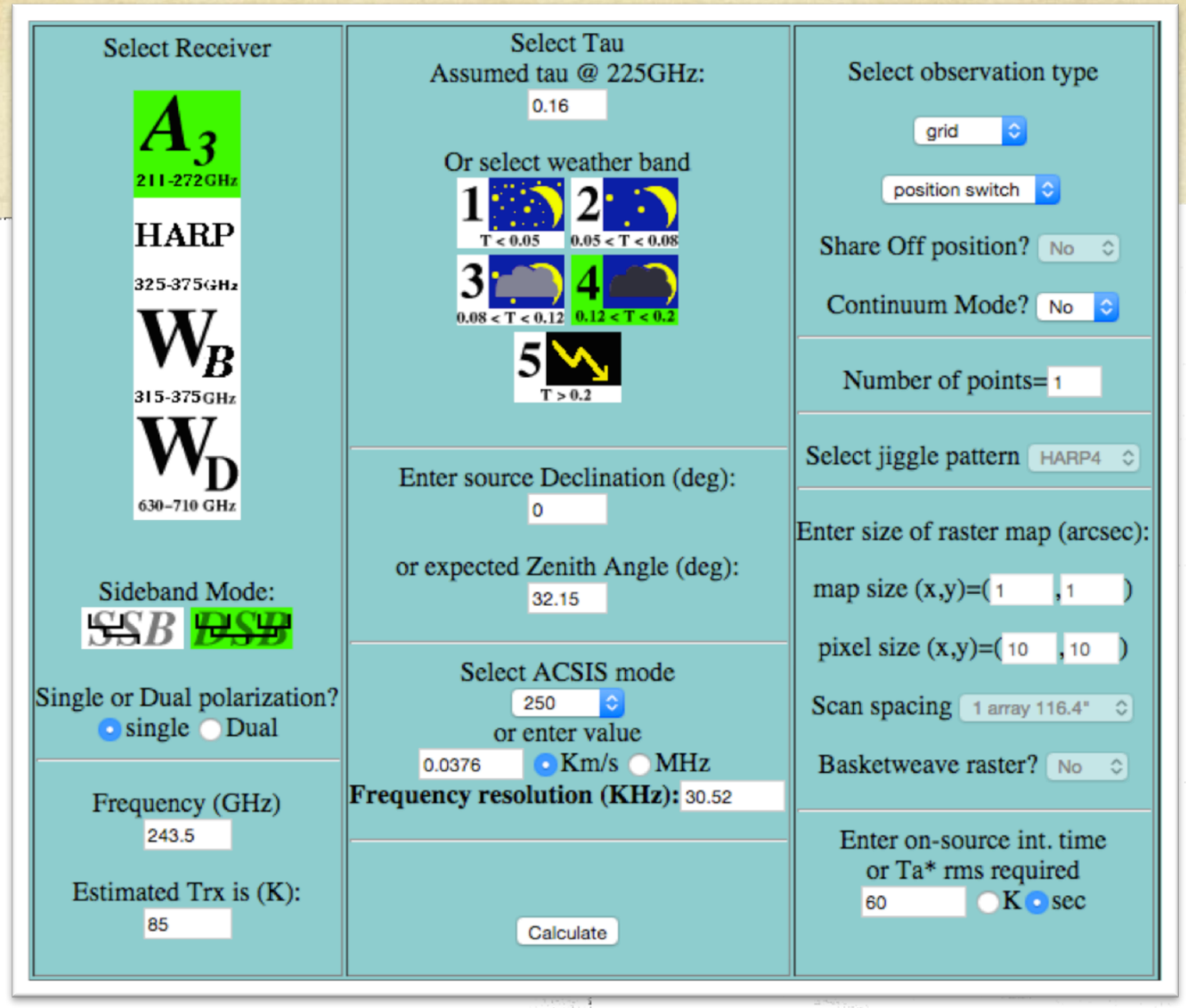
rms (mJy/beam) achieved in 1hour integration time.

	Band 1	Band 2	Band 3
Daisy	30	58	172
Pong (900")	65	124	370
Pong (1800")	128	243	725
Pong (3600")	278	529	1577
Pong (7200")	565	1074	3205

Can it be done?

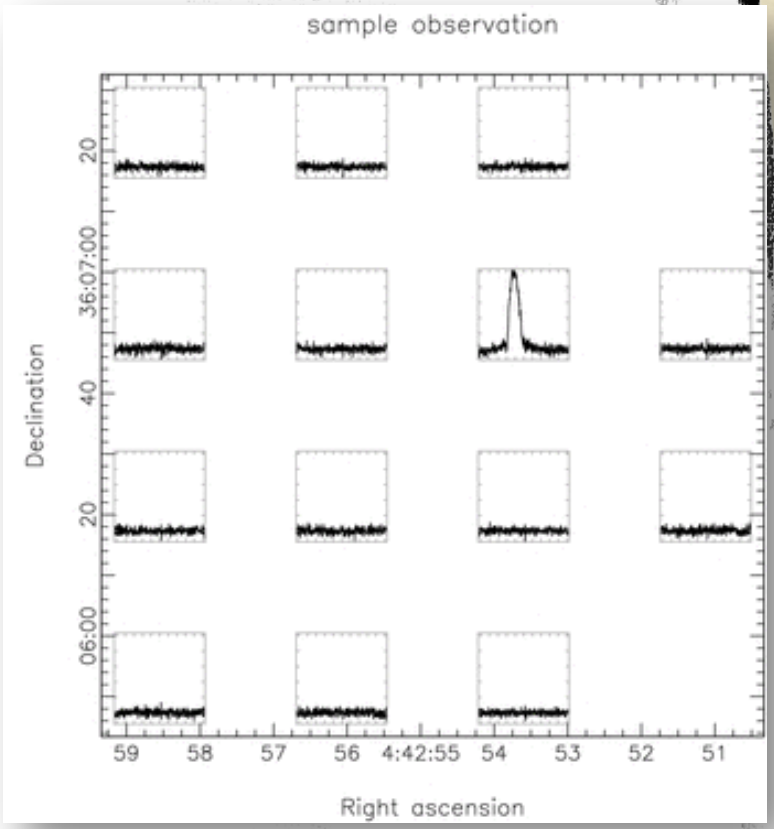
(SCUBA-2 example)





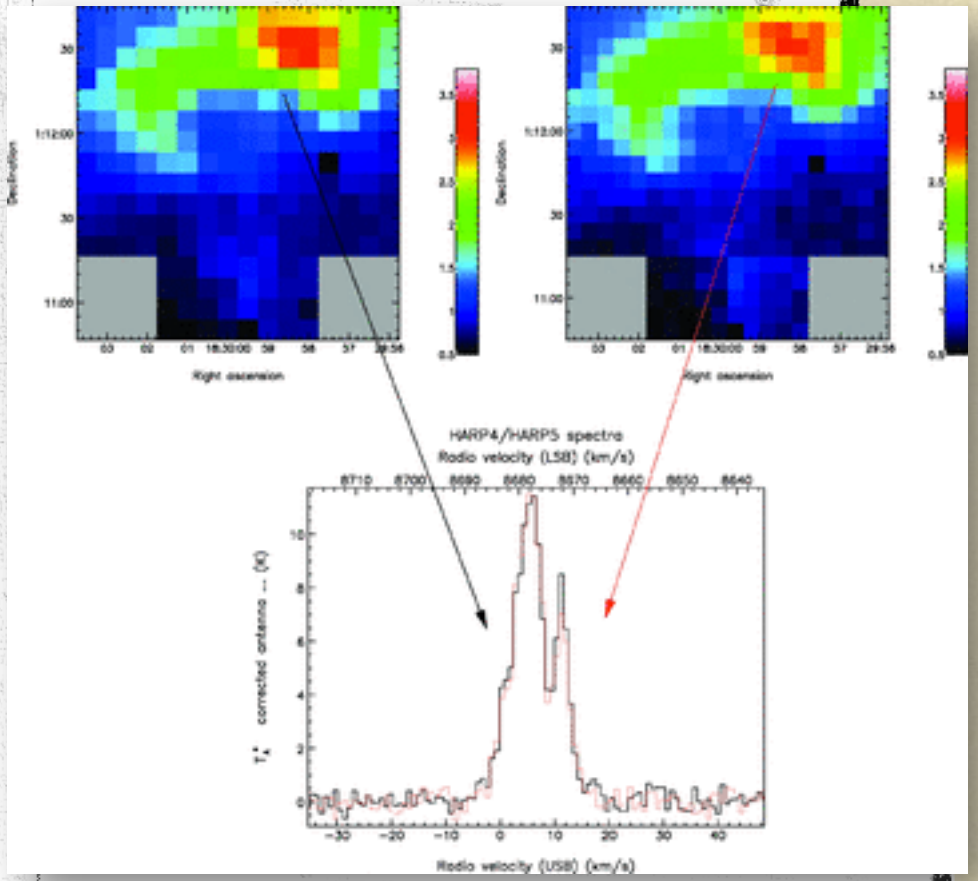
www.eaobservatory.org/jcmt/instrumentation/heterodyne/itc/

Stare:
Single sample or a few samples required on a source.



Stare:
Single sample or a few samples required on a source.

Jiggle
If an object needs to be fully sampled and is less than 2' in extent then jiggle is recommended

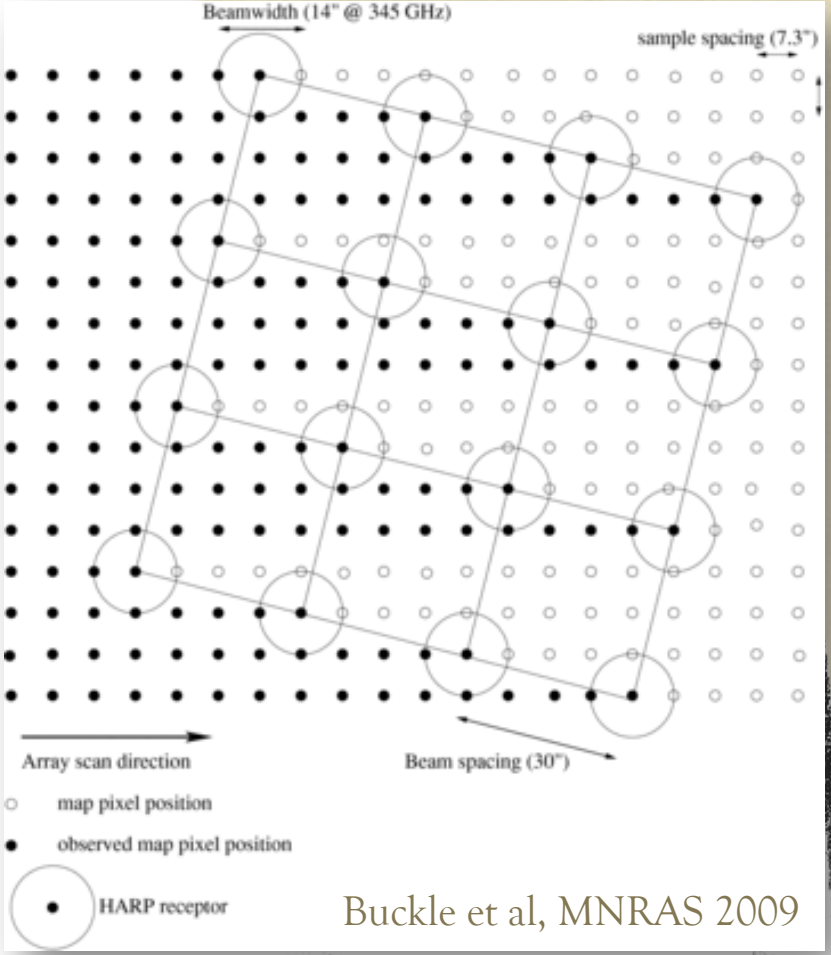


Buckle et al, MNRAS 2009

Stare:
Single sample or a few samples required on a source.

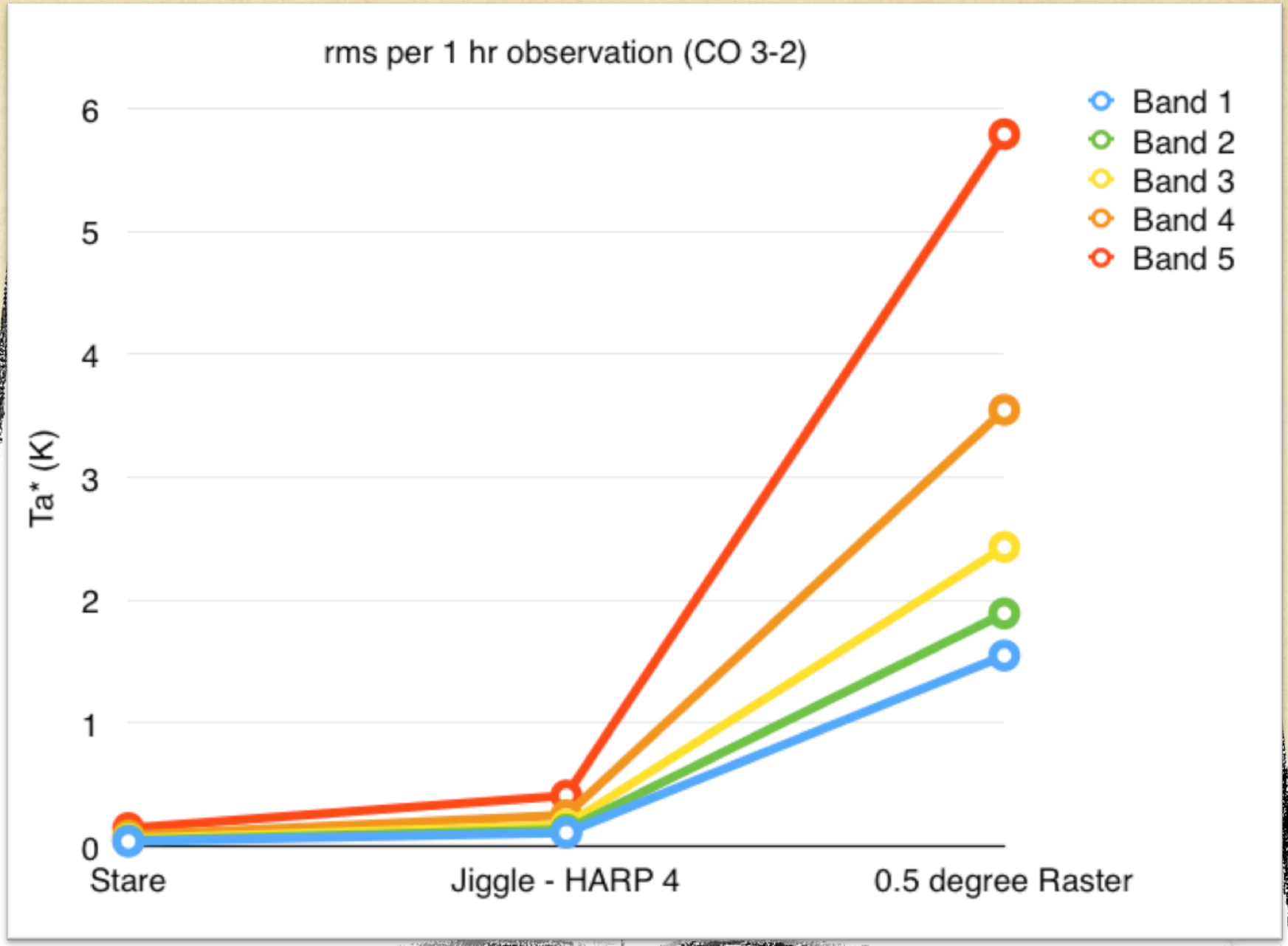
Jiggle
If an object needs to be fully sampled and is less than 2' in extent then jiggle is recommended

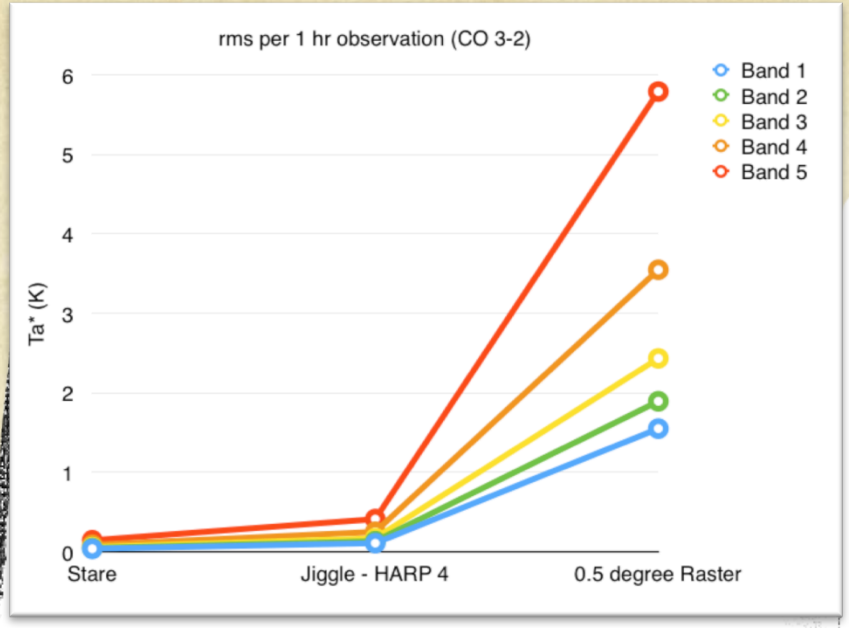
Raster
Good for regions >2' up to a degree or so in extent. Basket weave (two repeats in orthogonal directions) reduce sky and system uncertainties.



Buckle et al, MNRAS 2009

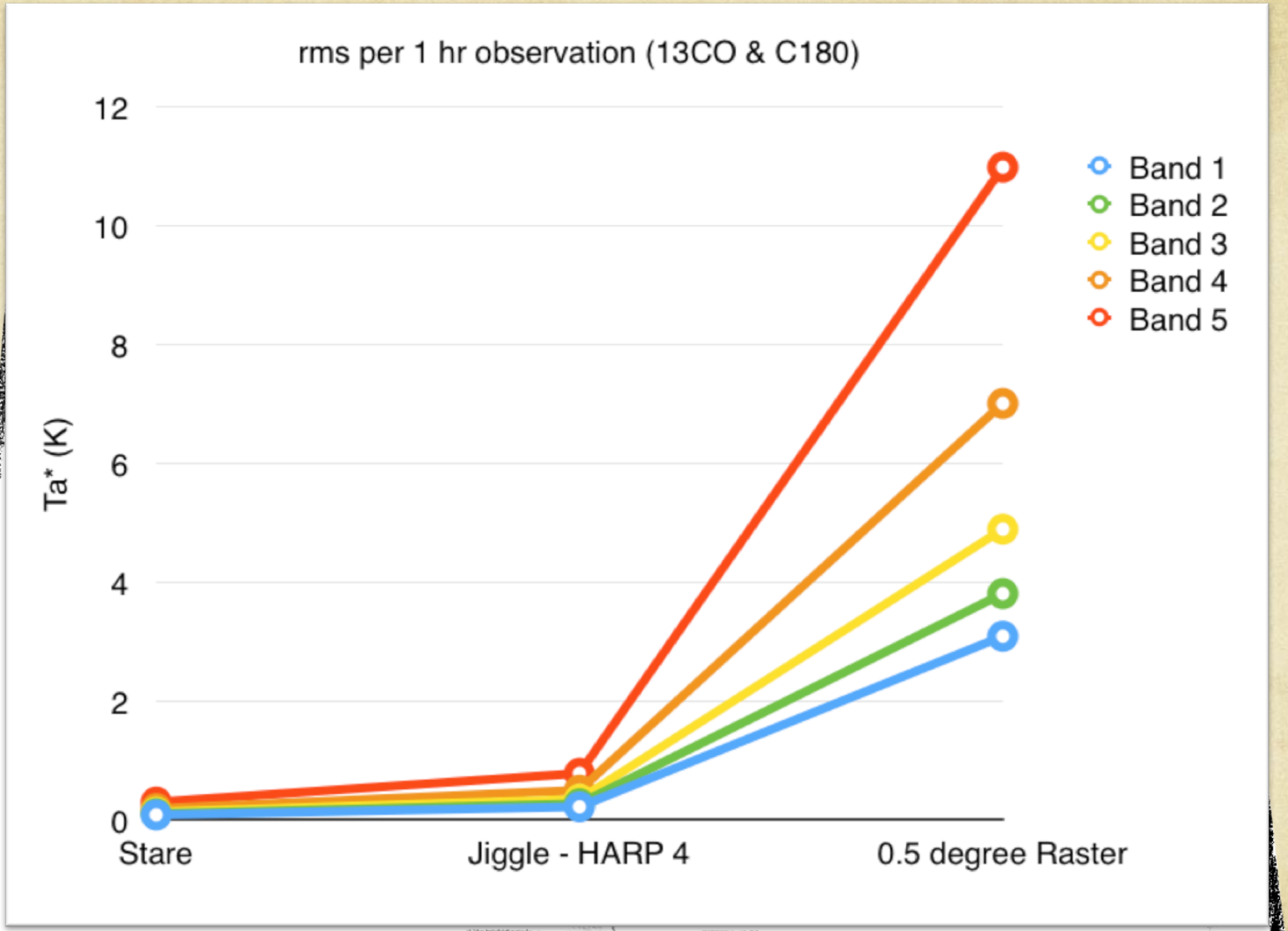
www.eaobservatory.org/jcmt/instrumentation/heterodyne/observing-modes/

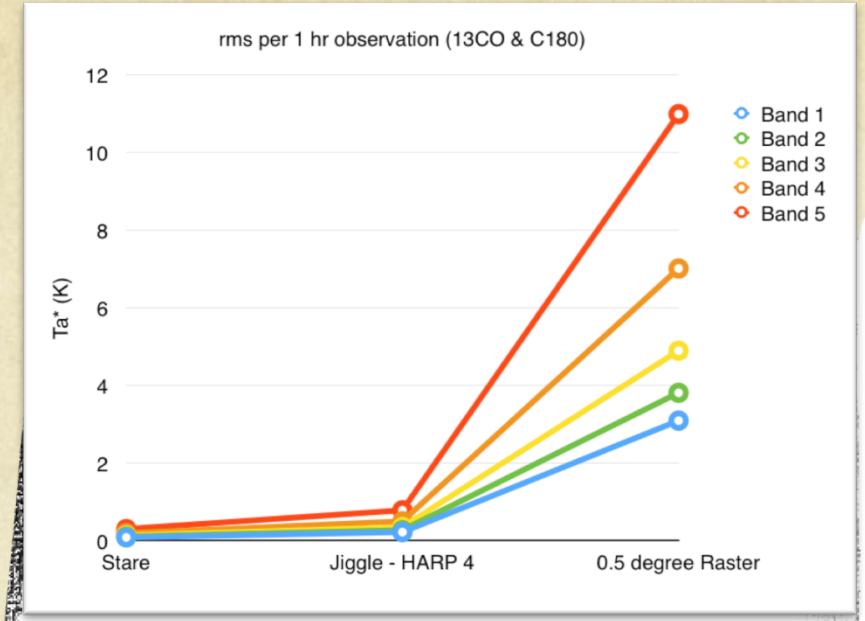

rms per 1 hr observation (CO 3-2)
Band 1
Band 2
Band 3
Band 4
Band 5
Ta* (K)
6
5
4
3
2
1
0
Stare
Jiggle - HARP 4
0.5 degree Raster



rms (Ta*) achieved in 1hour integration time.

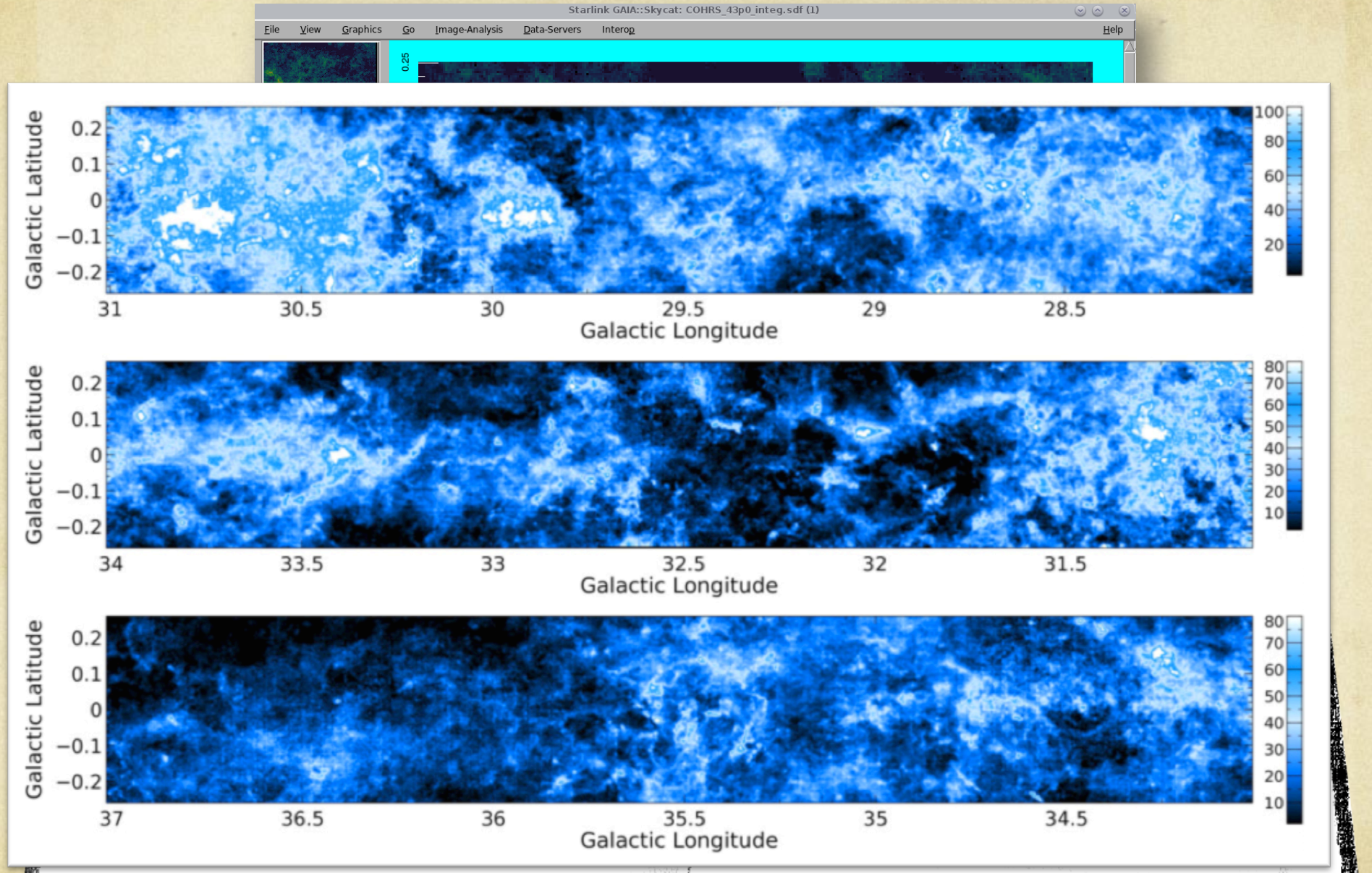
	CO (3-2)				
	Band 1	**Band 2**	**Band 3**	**Band 4**	**Band 5**
Stare	0.04	0.05	0.06	0.09	0.15
Jiggle - HARP 4	0.11	0.14	0.17	0.25	0.41
0.5 degree Raster	1.55	1.90	2.44	3.55	5.79


rms per 1 hr observation (13CO & C180)
12
10
8
6
4
2
0
Ta* (K)
Stare
Jiggle - HARP 4
0.5 degree Raster
Band 1
Band 2
Band 3
Band 4
Band 5



rms (Ta*) achieved in 1hour integration time.

	13CO & C180				
	Band 1	**Band 2**	**Band 3**	**Band 4**	**Band 5**
Stare	0.09	0.11	0.13	0.19	0.30
Jiggle - HARP 4	0.22	0.27	0.35	0.50	0.78
0.5 degree Raster	3.09	3.81	4.89	7.01	10.98


Starlink GAIA::Skycat: COHRS_43p0_integ.sdf (1)
File View Graphics Go Image-Analysis Data-Servers Interop Help
Galactic Latitude
Galactic Longitude
0.2
0.1
0
−0.1
−0.2
31 30.5 30 29.5 29 28.5
100 80 60 40 20
34 33.5 33 32.5 32 31.5
80 70 60 50 40 30 20 10
37 36.5 36 35.5 35 34.5

Checklist for proposal:

- ✓ **Who**
  - PI/Co–I's
- ✓ **What**
  - Instrument
  - Sensitivity
  - Observing mode
  - Weather band
- ✓ **How**
  - Integration time
- ✓ **Why**
  - Science justification
  - Technical justification
- ✓ When
  - Best time to schedule

http://www.eaobservatory.org/jcmt/proposals/checklist/

NorthStar – Proposal Submission

www.eaobservatory.org/jcmt/proposals/northstar-proposal-submission-system/

Proposal List

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This version of NorthStar is offered exclusively for applicants eligible to submit proposals to the Dutch, UK, Canadian, and International queues for the JCMT.

For UK, Canadian, International proposals on JCMT more information can be found on the ***JCMT Website***.

NEWS:

08 Aug 2008:

- Northstar hosted for the first time at JCMT

Read me first! | Help

Telescopes : ☑ JCMT

Show reviewed proposals : ○ Yes ◉ No

- Currently there are no proposals in preparation -

Create new proposa

Click to start creating a new proposal.

NorthStar version v3.2.8 (2008-07-25)

JCMT Proposal

Help Index

Community: **International Community**
Category: **regular**
Semester: **TEST01**

Applicants | Justification | Observing Request | Additional issues

Help

Active Participant	Contact Author	PI	Name	Affiliation	Country	Email	Potential Observer
yes	◉	◉	Dr Harriet Parsons	EAO	USA	h.parsons@jach.hawaii.edu	☐

Add applicant

Save and Continue | Save and Preview | Save and Exit | Save and Submit | Quit without saving

JCMT Proposal

Help Index

Community: International Community
Category: regular
Semester: TEST01

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Help

Title (Max characters: 150) : (Characters entered: 0)*

Abstract (Max words: 100) : (Words entered: 0)*

Justification File(s): Instructions for preparation

First Justification File (mandatory) : None uploaded * Upload
Uploaded :

Second Justification File (optional) : None uploaded Upload
Uploaded :

Figure(s) File (optional) : None uploaded Upload
Uploaded :

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You must specify targets/observation setup here.

Specify a new target/observation | Upload target list

Requested time per weather grade (hours) : *

New in Semester 10B:
Calibrations will no longer be charged to science projects.
Your requested times should not include them.
For exceptions and further info. see Call for Proposals
http://www.jach.hawaii.edu/JCMT/observing/calls/

total time specified for targets in list: 0 hours

1) Very dry: 2) Dry: 3) Medium: 4) Wet: 5) Very Wet:

Indicate time per receiver (hours) : *

A-Band: B-Band RxW: B-Band HARP: D-Band: SCUBA-2: OTHER:

Ancillary instrumentation : ☐ SCUBA-2 polarimeter ☐ SCUBA-2 FTS

Flexible scheduling? : ◉ Yes ○ No

overall scheduling requirements :

overall scheduling preferences :

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JCMT Proposal

RadioNet ASTRON

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Information about all Students involved :

Add New Student

Are there linked proposals submitted to this TAC? : ○ Yes ◉ No

Are there linked proposals submitted to other TACs? : ○ Yes ◉ No

Are there relevant previous allocations? : ○ Yes ◉ No

Additional Remarks :

Save and Continue | Save and Preview | Save and Exit | Save and Submit | Quit without saving

JCMT Proposal

Parsons

No code

EMPTY

Abstract

EMPTY

Requested time per weather grade (hours)

Very dry	Dry	Medium	Wet	Very wet
NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED

Requested time per receiver (hours)

A-Band	B-Band RxW	B-Band HARP	D-Band	SCUBA-2	OTHER
NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED

JCMT Proposal

Thompson **M08AU006**

A HARP census of molecular clumps in W51

Abstract

The formation of massive stars is closely linked to their environment, given the roles that massive stars play in the destruction of molecular clouds and triggered star formation. Giant HII regions such as W51 are ideal laboratories to study these effects. W51 is foremost amongst these regions with its high star formation efficiency and starburst-like mode of star formation. We propose to make the first high angular resolution (<45") molecular map of the entire W51 complex to provide a census of warm, dense star-forming clumps and determine the star formation history of W51 on local and global scales.

Requested time per weather grade (hours)

Very dry	Dry	Medium	Wet	Very wet
	60	12		

Requested time per receiver (hours)

A-Band	B-Band RxW	B-Band HARP	D-Band	SCUBA-2	OTHER
		72			

Parsons

EMPTY

No code

Applicants

Name	Affiliation	Email	Country		Potential observer
Dr Harriet Parsons	EAO	h.parsons@jach.hawaii.edu	USA	Pi	

Contact Author

Title	Dr	***Institute***	EAO
Name	Harriet Parsons	***Department***	
Email	h.parsons@jach.hawaii.edu	***Address***	660 N Aohoku Place
Phone(first)	808	***Zipcode***	96720
Phone(second)		***City***	Hilo
Fax		***State***	Hawaii
		Country	USA

Summary of observations

No details given

Flexible scheduling: Yes

No overall scheduling requirements

No overall scheduling preferences

No PhD Students involved

Linked proposal submitted to this TAC: No

Linked proposal submitted to other TACs: No

Relevant previous Allocations: No

No additional remarks

Parsons EMPTY No code

Applicants

Name	Affiliation	Email	Country		Potential observer

Summary of observations

Field	RA	Dec	Epoch	Exposure (min.)	Priority
W51	19:23:42.00	+14:30:33.0	J2000		

Flexible scheduling: Yes

Overall scheduling requirements

Please note that our time request is for grade 1/2 weather not just grade 2

No overall scheduling preferences

Linked proposals: No

No related proposals approved or submitted for other facilities

List allocations on this telescope in the previous 3 years

(program id; number or hours/days;status of observations and data analysis;and publications.)

M07BU14 - 24 hours (Pillai PI) - Observations just completed, data reduction ongoing
M07BU20 - 30 hours (Redman PI) - Observations just completed, data reduction ongoing
M07AU20 - 48 hours - Half of sample observed, reapplying in 08A to complete, data reduction ongoing
M05BU17 - 48 hours - Data reduction complete, paper in prep
M05BU72 - 40 hours - Data reduction & analysis ongoing

Parsons EMPTY No code

No Scientific Justification File uploaded

Thompson **A HARP census of molecular clumps in W51** **M08AU006**

Related publications

Moore, T.J.T, et al, 2007, MNRAS 379, 663
Thompson, M.A. et al, 2006, A&A 453, 1003
Clark, J.S, et al, 2005, A&A 434, 949
Clark, J.S, Porter, J.M., 2004, A&A 427, 839

Discussion of data analysis plan

Harriet Parsons & Mark Thompson will perform the data reduction and analysis. The data will form part of Harriet's thesis.

From the reduced datacubes we will compile a list of clumps in W51 using clump detection software such as clumpfind, determine their physical properties using standard LTE methods, cross correlate the clump catalogues against our IR catalogues (UKIDSS & GLIMPSE). The IR work will be led by Clark and Messineo. We will compare the stellar masses determined from the IR to clump masses estimated from 13CO to determine the SFE vs clump FE on local and global scales. We will also determine the fraction of sterile gas traced by the 1--0 line against that of dense warm clumps traced by the 3--2 line. Trends in the properties of the molecular gas across W51 will be investigated, including the velocity dispersion, and compared with turbulent star formation models.

These results will be written up as series of publications with Harriet Parsons leading the CO work.

Figures

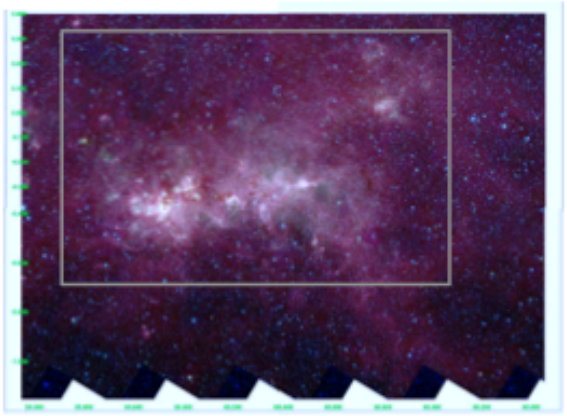


Figure 1: 3 colour GLIMPSE mid-IR mosaic of the W51 region, showing the complexity of the star formation within the Giant HII region. There are a number of dark extinction features that indicate the presence of infrared-dark clouds (IRDCs), hot spots representing massive star forming regions and bright arcs suggestive of photoionisation by nearby OB stars. The grey rectangle is the 1 × 1.5° area that we propose to map with HARP.

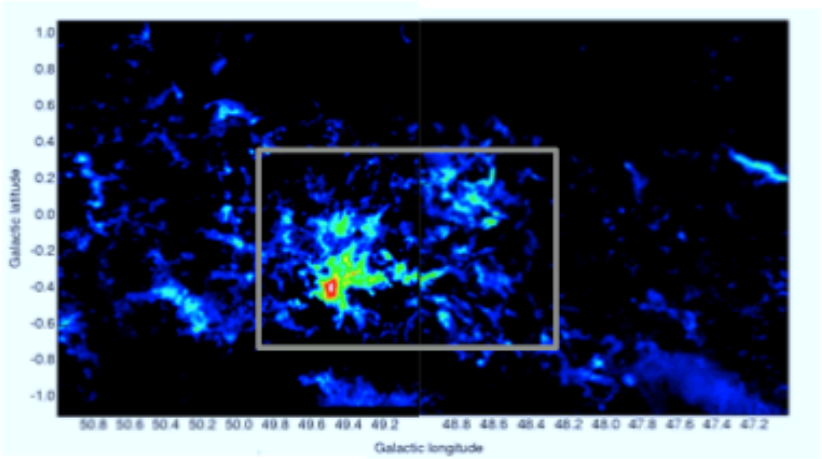


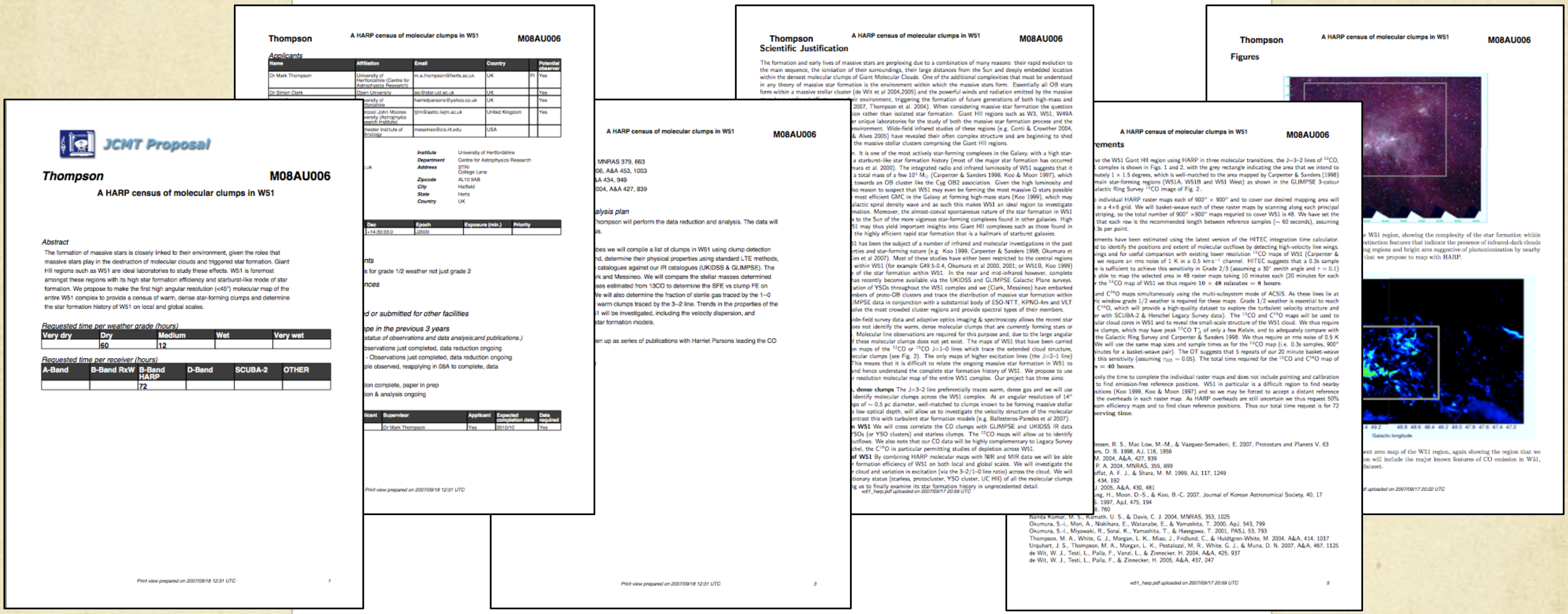
Figure 2: Galactic Ring Survey ^{13}CO J=1–0 moment zero map of the W51 region, again showing the region that we intend to map outlined in grey. Our mapped region will include the major known features of CO emission in W51, but at 3 times the angular resolution of the GRS dataset.

Parsons

EMPTY

No code

No Scientific Justification File uploaded



JCMT Proposal

Thompson **M08AU006**

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Abstract

The formation of massive stars is closely linked to their environment, given the roles that massive stars play in the destruction of molecular clouds and triggered star formation. Giant HII regions such as W51 are ideal laboratories to study these effects. W51 is foremost amongst these regions with its high star formation efficiency and starburst-like mode of star formation. We propose to make the first high angular resolution (<45") molecular map of the entire W51 complex to provide a census of warm, dense star-forming clumps and determine the star formation history of W51 on local and global scales.

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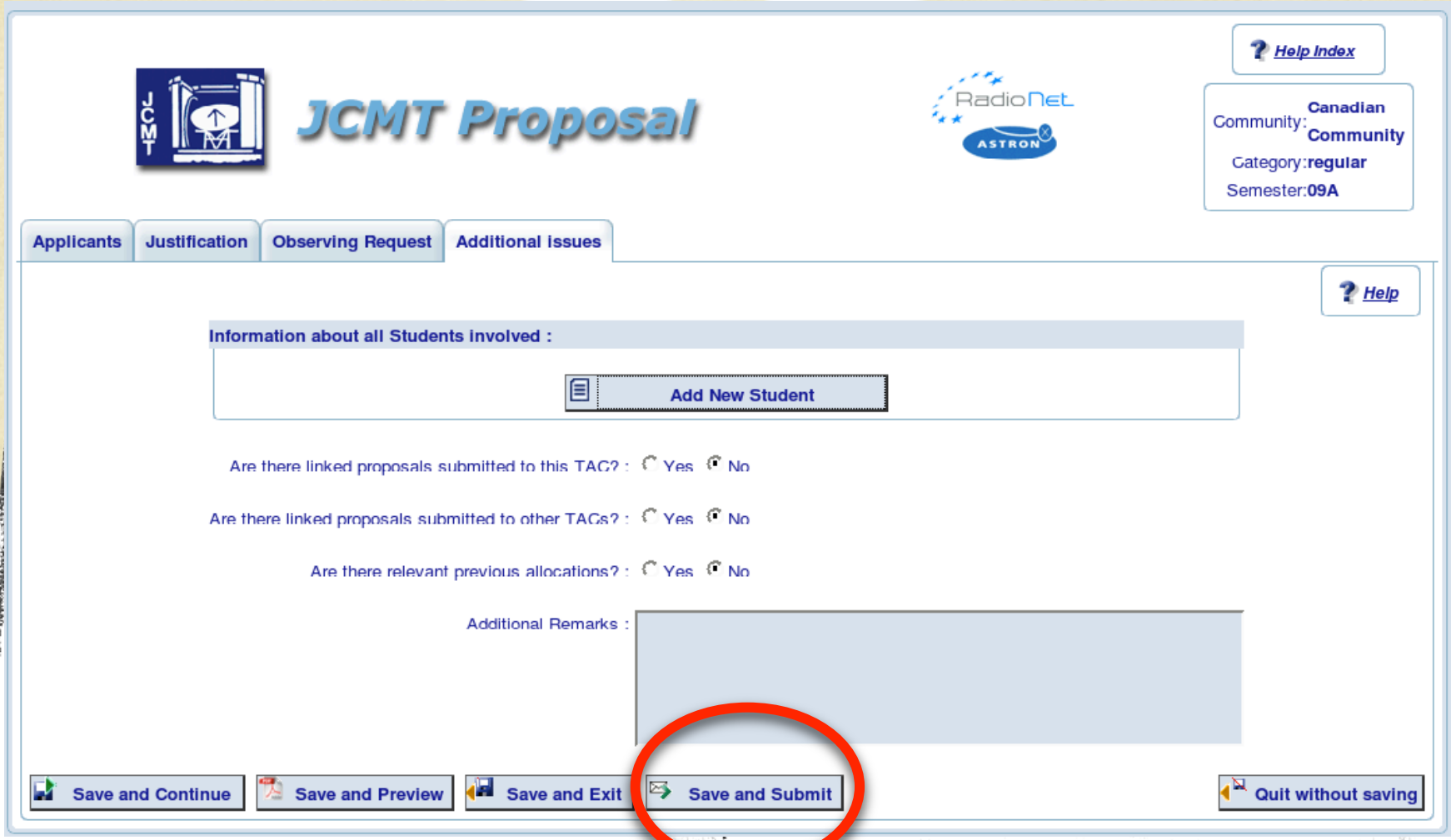
		72			

Thompson A HARP census of molecular clumps in W51 M08AU006

Scientific Justification

Thompson A HARP census of molecular clumps in W51 M08AU006

Figures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ASTRON
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Information about all Students involved :
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Are there relevant previous allocations? : Yes No
Additional Remarks :
Save and Continue
Save and Preview
Save and Exit
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Quit without saving

Recap:

Does data already exist?
www3.cadc-ccda.hia-iha.nrc-cnrc.gc.ca/en/jcmt/

Source availability:
www.eaobservatory.org/jcmt/proposals/checklist/

Instrumentation:
www.eaobservatory.org/jcmt/instrumentation/

Weather conditions:
www.eaobservatory.org/jcmt/observing/weather-bands/

SCUBA-2: ITC
www.eaobservatory.org/jcmt/instrumentation/continuum/scuba-2/scuba-2-itc/

Heterodyne: HiTEC
www.eaobservatory.org/jcmt/instrumentation/heterodyne/itc/

Northstar:
www.eaobservatory.org/jcmt/proposals/northstar-proposal-submission-system/

helpdesk@eaobservatory.org