

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



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(ergs/cm-/s)

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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:

and the anti-

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



SLS - consortium

C/2012 S1 (ISON)





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:



JCMT Science Archive:

of Canada du Canada

Canada.gc.ca Services Departments Français

Canadä Canadian Astronomy Data Centre **Telescope Data Products** Advanced Data Products Services Advanced Search Login CADC Home > 1CMT Science Archive **JCMT Science Archive** JCMT Science Archive Search All Observation Complete collection Processed observations Raw observations The JCMT Science Archive (JSA), a collaboration between the CADC and JAC @, is the official distribution site for observational data obtained with the James Clerk Maxwell Telescope (JCMT) @ on Mauna Kea, Hawaii. Processed Observations The JSA search interface is provided by the CADC Search tool, which provides generic access to the complete set of telescopic data SCUBA-2 archived at the CADC. Help on the use of this tool is provided via tooltips. For additional information on instrument capabilities and data HARP-ACSIS reduction, please consult the SCUBA-2 and ACSIS and ACSIS of instrument pages provided on the JAC maintained JCMT of pages. JCMT-RxA3-ACSIS specific help *i* related to the use of the CADC AdvancedSearch tool is available from the JAC *i*. Raw Observations Programmatic access to the complete JCMT archive is also available via the CADC Table Access Protocol (TAP). TAP is an IVOA @ standards based approach to querying remote databases. The contents accessible via TAP are identical to those presented using the SCUBA-2 AdvancedSearch interface. To learn the structure of queries that can be made using the TAP service see the 'Query' tab on the CADC HARP-ACSIS Search page. RxA3-ACSIS All accessible JCMT observations are available through the AdvancedSearch interface, including spectral datacubes produced by ACSIS Other as well as images taken with the SCUBA-2 camera. The raw observations are available in NDF 🔗 format. Each ACSIS and SCUBA-2 Acknowledgments observation is also available as reduced products in FITS format with a full set of world coordinate system headers. Credit All public JCMT data can be downloaded freely from the CADC. Observation products remain proprietary as long as the raw data from which they were derived remains proprietary. Users authorized to access these data should log in using their CADC username and password, after which they will be able to search for and download proprietary data from all JCMT projects of which they are members.

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

JCMT Science Archive:

Telescope Data Products	Advanced D	ata Products -	Services -	Advanced Se	arch				Login
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Advanced Search									
Search Results Error ADQ	L Help								
Search Reset									
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All (8)	All (20)	RXB3I-DAS	All (7)	All (3)	All (2)	All (2)
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Can it be done? (Source Availability)

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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?



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)

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

1. Map Size	2	. weathe	r Grade
This calculator presently supports only a pre-defined set of maps.	Provide to perfo	the <u>CSO 22</u> orm the calc	5 GHz Opacity ulation for.
• Tuno of man	Grade	opacity ^R	epresentative value
Daisy: ~3 arcmin map \$	1 2	< 0.05 0.05 - 0.08	0.045 0.065
3. Average Airmass	3	0.08 - 0.12	0.1
The average airmass will be	4	0.12 - 0.2	0.16
declination as	5	> 0.2	0.23
(dec-19.823))]	• 225	5 GHz Tau: [0	.065
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See notes below. Enter values and type resampling factors: O Use Matched Beam filter factors: • 450 µm: 8 • 850 µm: 5 O Use Regridding factors: • 450 µm: 4	Enter tl mJy/bea • 450 • 850 • 0b [m Note: If	ne 1-sigma r m) to be rea 0 μm: 0 μm: <u>1.83</u> serving Time in] only one tar	ms (in ached at [mJy/beam] [mJy/beam] e:
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	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)



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)



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Stare:

Single sample or a few samples required on a source.



Stare:

Single sample or a few samples required on a source.

Jiggle

ALL SHITTE

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.



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





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 (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		



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/

Welcome to NorthStar at JCMT

at ASTRON as part

Password forgotten?

hstar application has be

Register as new user

Password

Send Questions/Problems

let project

Help

NorthStar – Proposal Submission





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	? Help Index
JCMT Proposal	International Community: Category:regular Semester:TEST01
Applicants Justification Observing Request Additional issues	
You must specify targets/observation setup here. Specify a new target/observation	? Help
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 <u>http://www.jach.hawaii.edu/JCMT/observing/calls/</u>	
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 O No overall scheduling requirements :	
overall scheduling preferences :	
Save and Continue Save and Preview	↓ ♥ Quit without save

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Applicants Justification	Observing Request Additional issue	posal	Radio NeL	Phelp Index International Community: Community Category:regular Semester:TEST01
	Information about all Students involved Are there linked proposals submitted to Are there linked proposals submitted to of Are there relevant previous a Addition	d : Add New Student o this TAC? : O Yes O No ther TACs? : O Yes O No allocations? : O Yes O No al Remarks :		2 Help
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EMPTY

Abstract

EMPTY

Requested time per weather grade (hours)

Very dry	Dry	Medium	Wet	Very wet
NOT SPECIFIED				

Requested time per receiver (hours)

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

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No code

Applicants

Name		Affiliation	Email		Country		Potentia observer
Dr Harriet Parso	ins	EAO	h.parsons@jach	hawaii.edu	USA	Pi	3
Contact Aut	hor						
Title	Dr		Institute	EAO			
Name	Harriet Parsons		Department				
Email	h.parsons@jach.	hawaii.edu	Address	660 N Aoh	oku Place		
Phone(first)	808		Zipcode	96720			
Phone(second)		City	Hilo			
Fax			State	Hawaii			
			Country	LISA			

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		

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

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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.

Parso

No Sci

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M08AU006

Figures

Thompsor Technical Re

We are proposing to ¹³CO and C¹⁸O. Th map. This area is ap and encompasses al image of Fig. 1 and

We will split this an require 24 of these r axis, in order to elim size of the raster ma a typical sample tim

The following time The ¹²CO map will I In order to detect tl Sanders 1998, Koo time for each basket weather and so we v basket-weaved raste

We will obtain the the edge of the atm the desired noise lev depletion in W51 (t identify warm dense deeper maps to iden the 13 CO J=1–0 ma in a 0.5 km s⁻¹ char × 900" maps taking pairs are required to W51 is then 5 × 8



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 photonionisation by nearby OB stars. The grey rectangle is the 1 × 1.5° area that we propose to map with HARP.





w51_harp_figs.pdf uploaded on 2007/09/17 20:22 UTC

AU006

id evolution to edded location be understood ly all OB stars by the massive high-mass and in the question l, W51, W49A rocess and the Crowther 2004,

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	Thompson A	HARP census of molecular clumps in W51 M08AU006	Thompson	A HARP census of molecular clumps in WS1 M08AU006	Thompson A HARP
	Applicants Name Dr Mark Thompson Dr Simon Clark	Affiliation Email Ocurity Peterstell University of Current for Associations (UK P) Yes Antonia Research Antonia Research	Scientific Justificative The formation and why low of the main sequence, the ionization within the disease interfaced and in the interfaced in any theory of maximis staff of form within a mainter staff of the	On maximize the sequence of the scambination of many reasons: their rapid evolutions to not their extended incasion of their extended incasion of their extended incasion of Grant Minicular Clouds. One of the additional complication that must be understand market on the environment within which the massive stars form. Extending 31 (08 stars 16 (48) Virt at 31 (2003) and the possibility and stars and stars and stars and the massive stars (stars 16).	Figures
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Ubstract The formation of massive stars is closely linked to their environment, git massive stars is closely linked to their environment, git massive stars is the start of material and closely and closely started to their environment, git massive started by the start of	ven the roles that dar formation. Gleet sociale mode of star notecular map of the unraps and determine SCUBA-2 OTHER	Interface Reveaue stabil Adverse 1:15:20:30 0000	nangoni wilj perkum the data reduction and analysis. The data will use the set of perpendies at late of damage in the state of the data will be derived by the state of the	In the field of the more signed are denoted in the set of the set	The second seco
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A HARP census of molecular clumps in W51

W51 region, showing the complexity of the star formation within tinetion features that indicate the presence of infrared-dark clouds gregions and height arcs suggestive of photonionisation by nearby iat we propose to map with HARP.

M08AU006



longitude

it zero map of the W51 region, again showing the region that we a will include the major known features of CO emission in W51,

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Applicants Ju	ustification	Observing Request	Additional issues			
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Recap:

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