Using the NOEMA Interferometer

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IRAM, Grenoble

Ninth IRAM Millimeter Interferometry School, 10-14 Oct. 2016

x12 NOEMA project

iram Institut de Radioastronomie Millimétrique

Why should you use NOEMA?

Because the signal is weak…
… and NOEMA is sensitive!

Well,….. Yes.
But now there's ALMA!

NOEMA is on the northern hemisphere…
and
the pressure factor is only about 3!

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Point source sensitivity

$$\delta S = \frac{2k}{\eta_a A \cdot \eta_j \eta_C} \cdot \frac{\langle T_{sys} \rangle}{\eta_p \sqrt{N(N-1)} \sqrt{\delta\nu\, t_{\rm on}}} \cdot \frac{1}{\sqrt{N_{\rm pol}}}$$

A	collecting area of a single antenna (176.7m^2)
η_a	aperture efficiency (0.80 @ 3mm, 0.75 @ 2mm, 0.65 @ 1mm)
η_j	instrumental decorrelation $\eta_j = e^{-\sigma_j^2/2}$ (0.90 to 0.98)
η_C	correlator efficiency ($\eta_C = 0.88$ now, but $\eta_C \approx 1$ for Polyfix)
k	Boltzmann constant
$\langle T_{sys} \rangle$	average system temperature [K]
η_p	atmospheric decorrelation $\eta_p = e^{-\sigma_p^2/2}$ (0.6 to 0.98)
N	Number of antennas (currently 8)
$\delta\nu$	Spectral Bandwidth [Hz] (62.5 kHz to 15.6 GHz)
$t_{\rm on}$	On-source integration time [s], $t_{\rm obs} = 1.6\, t_{\rm on}$
$N_{\rm pol}$	Number of polarizations (1 or 2)
$\frac{2k}{\eta_a A \cdot \eta_j \eta_C}$	$= J_{pk}$: Conversion factor Kelvin to Jansky 22 Jy/K @ 3mm, 26 Jy/K @ 2mm, 35 Jy/K @ 1mm Will have to be adjusted (reduced) for Polyfix

Sensitivity (II)

Expected point source continuum sensitivities in one hour with Polyfix:
8 antennas

- @ 100 GHz in a FOV of 50”

$$\approx 22 \cdot \frac{90}{0.90 \cdot \sqrt{56 \cdot 15.6 \cdot 10^9 \cdot 3600}} \cdot \frac{1}{\sqrt{2}} \approx 0.03\,\mathrm{mJy/beam}$$

- @ 150 GHz in a FOV of 33”

$$\approx 26 \cdot \frac{130}{0.85 \cdot \sqrt{56 \cdot 15.6 \cdot 10^9 \cdot 3600}} \cdot \frac{1}{\sqrt{2}} \approx 0.05\,\mathrm{mJy/beam}$$

- @ 230 GHz in a FOV of 21”

$$\approx 35 \cdot \frac{200}{0.80 \cdot \sqrt{56 \cdot 15.6 \cdot 10^9 \cdot 3600}} \cdot \frac{1}{\sqrt{2}} \approx 0.11\,\mathrm{mJy/beam}$$

Brightness sensitivity (I)

The brightness sensitivity is related to the point source sensitivity by

$$\delta T = \frac{\lambda^2}{2\,k\,\Omega} \cdot \delta S = \rho \frac{\lambda^2}{\Theta_1 \Theta_2} \cdot \delta S$$

δT	brightness sensitivity [K]
λ	observing wavelength [mm]
k	Boltzmann constant
Ω	synthesized beam solid angle [sr]
ρ	≈ 15 [K Jy $^{-1}$ (arcsec/mm)$^{-2}$] for untapered maps and natural weighting
Θ_1, Θ_2	axes of synthesized beam [arcsec]

Brightness sensitivity depends on angular resolution!

Brightness sensitivity (II)

Expected line brightness sensitivities in 8 hours (12h track)

1km/s bandwidth, dual polarization:

- @ 100 GHz in a beam of $1'' \times 1''$: $\delta T \approx 318\,\mathrm{mK}$
  $5'' \times 5''$: $\delta T \approx 13\,\mathrm{mK}$
- @ 150 GHz in a beam of $0.6'' \times 0.6''$: $\delta T \approx 581\,\mathrm{mK}$
  $3.3'' \times 3.3''$: $\delta T \approx 19\,\mathrm{mK}$
- @ 230 GHz in a beam of $0.3'' \times 0.3''$: $\delta T \approx 1600\,\mathrm{mK}$
  $2.2'' \times 2.2''$: $\delta T \approx 29\,\mathrm{mK}$

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Receivers

	Band 1	Band 2	Band 3	Band 4
RF range [GHz]	76.5 - 116	130 - 178	202 - 274	277 - 371
Trec/[K] LSB	25 - 35	25 - 50	25 - 60	30 - 50
Trec/[K] USB	25 - 35	25 - 50	30 - 60	30 - 50
G_{im} [dB]	< -15	< -15	< -15	-20
RF LSB [GHz]	76.5 - 104	130 - 166	202 - 262	277 - 359
RF USB [GHz]	88.5 - 116	142 - 178	214 - 274	289 - 371

Band 4 suspended for the time being

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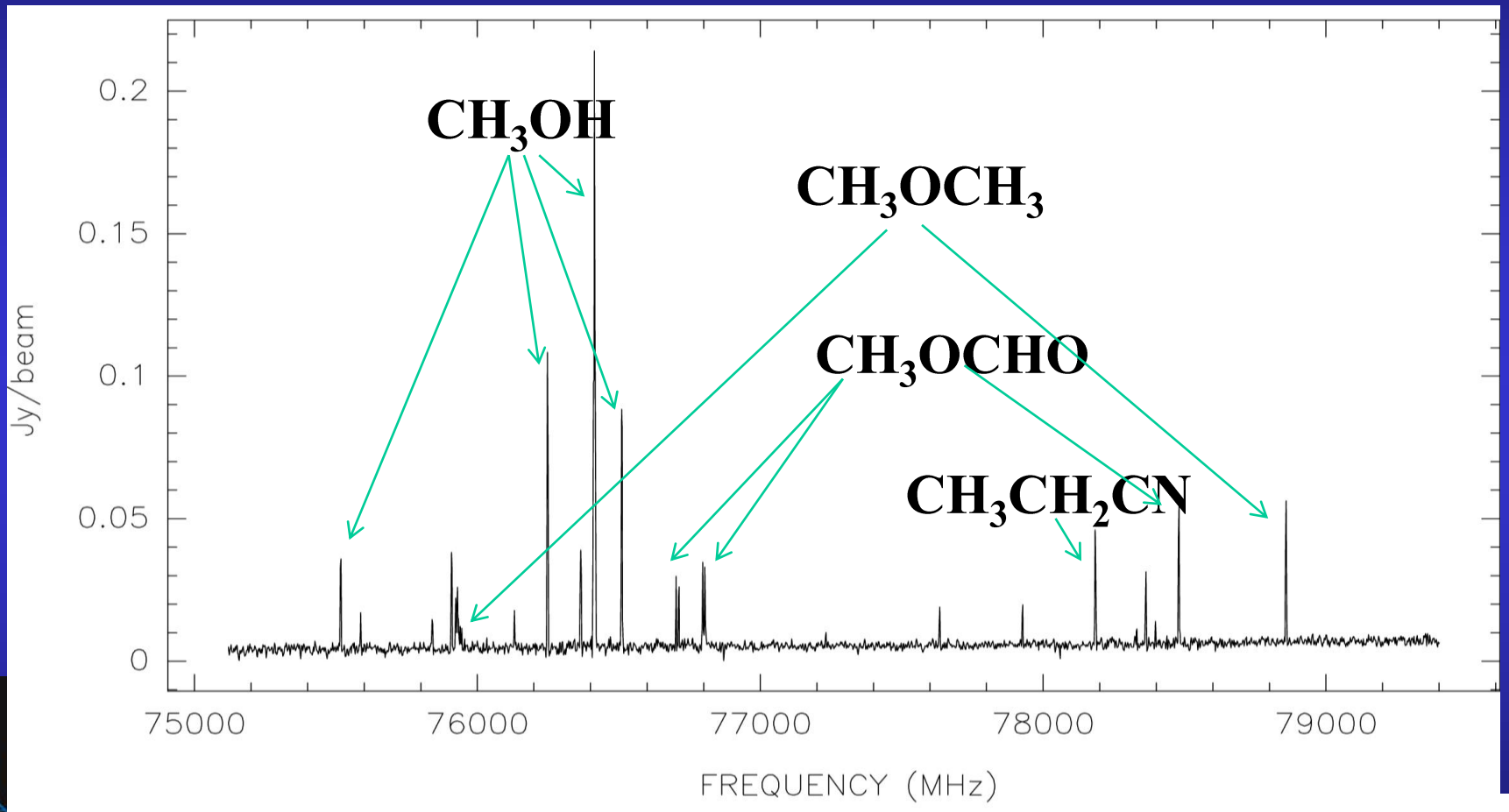
Extended tuning range: 76GHz

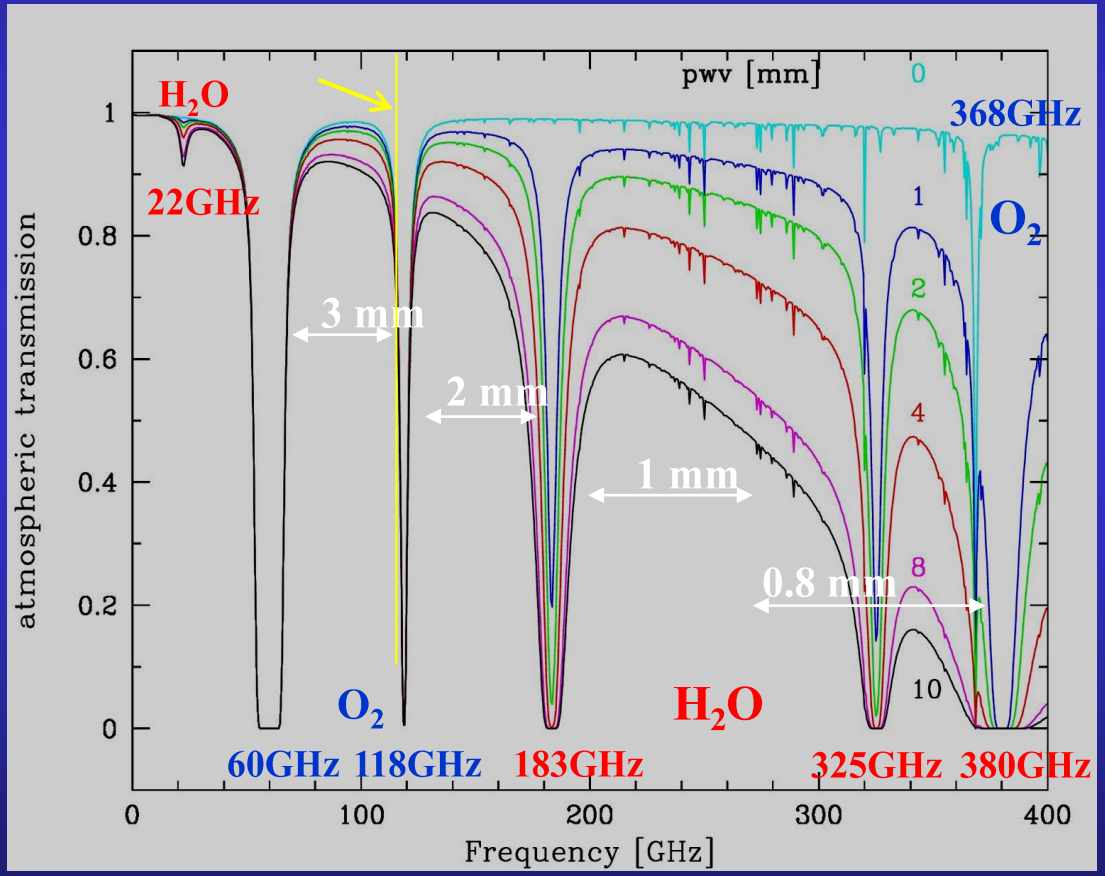
Ori A/IRc2



Sensitivity considerations (I)

- **Caution:**

  At 115GHz the atmospheric O_2 line degrades sensitivity by about 40% already in good observing conditions!



Sensitivity considerations (II)

- **Request a configuration for mapping**
  e.g. CD configuration = 2 tracks (8hrs each)
  … but evaluate the sensitivity as well!

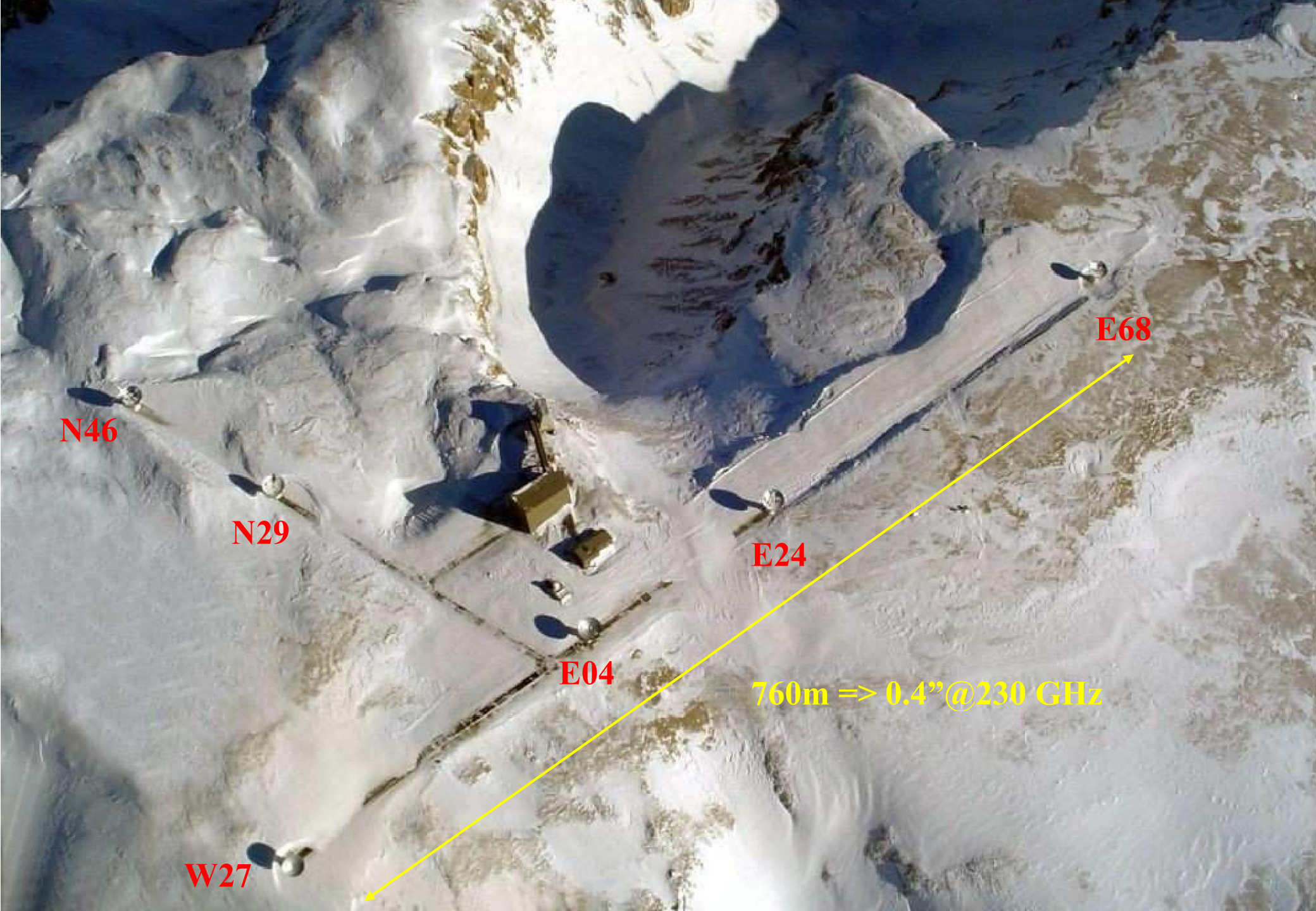
- **Request a point source sensitivity for detection**
  … but evaluate the integration time as well!

Configurations

- **Three configurations are needed to take properly into account baseline range and operation with > 8 antennas**

Configuration	Stations
8D	W12 W08 W05 E04 E10 N02 N09 N13
8C	W23 W20 W05 E04 E16 E23 N13 N20
8A	W27 W09 E12 E23 E68 N20 N29 N46

- **The A configuration is scheduled during the winter period only**

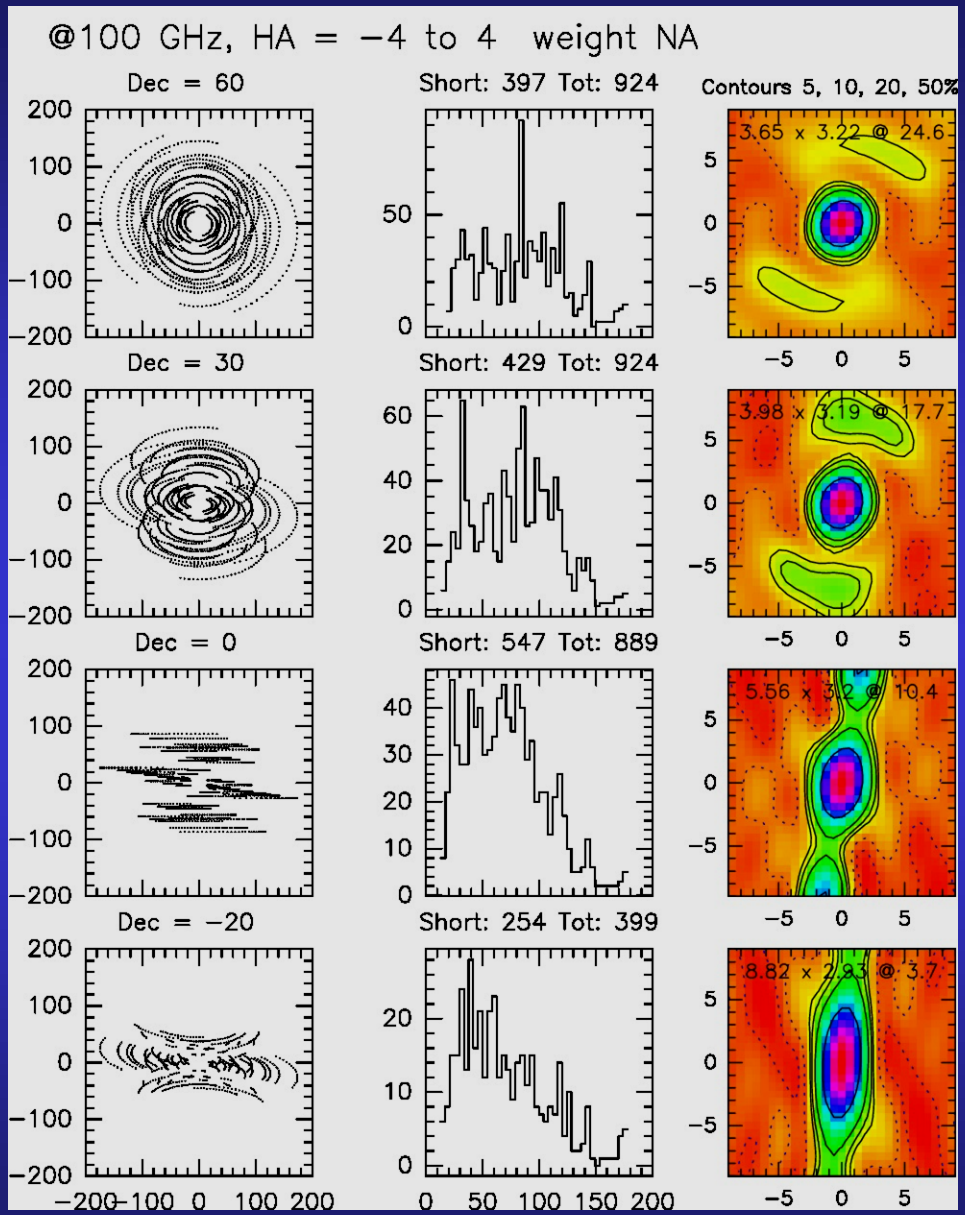

E68
N46
N29
E24
E04
760m => 0.4”@230 GHz
W27

Which configuration is appropriate?

Standard sets of configurations are:

Set	Purpose
D	3.7” @ 100 GHz detection/lowest resolution
CD	2.6” @ 100 GHz low resolution mapping
C	1.9” @ 100 GHz detection at low declination
ACD	2.0” @ 100 GHz mapping
AC	1.4” @ 100 GHz mapping
A	0.9” @ 100 GHz high resolution mapping

D configuration



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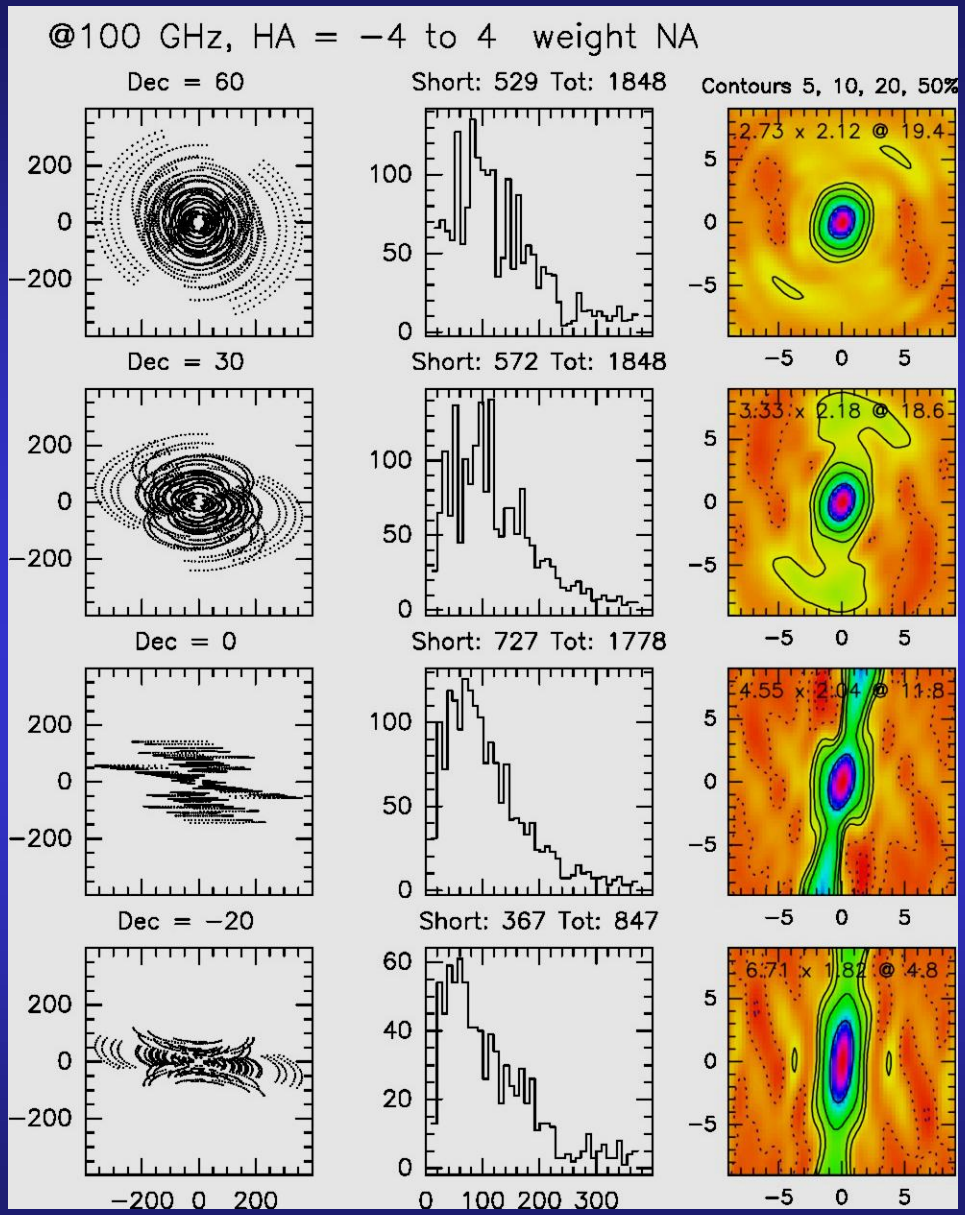
CD configuration



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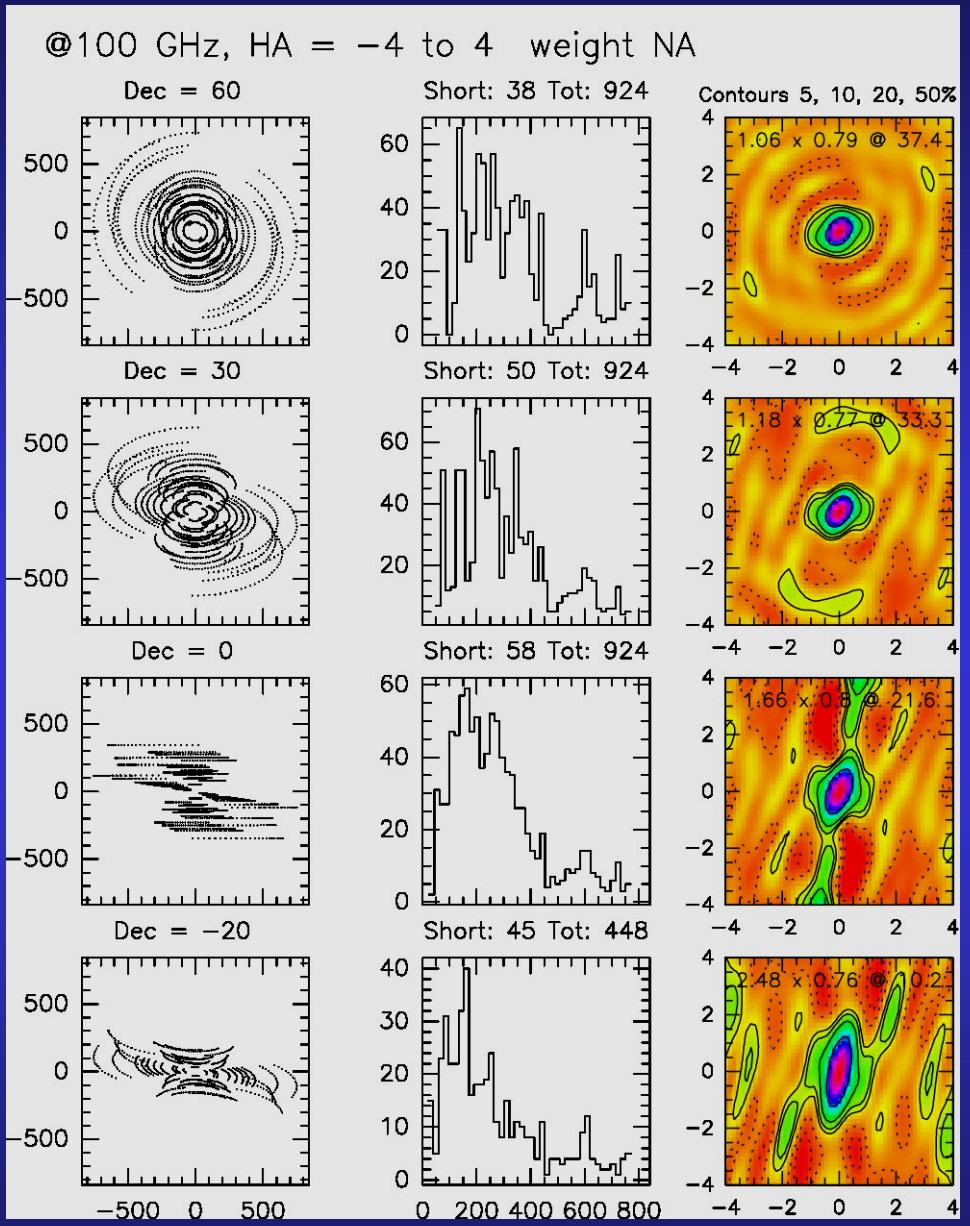
A configuration



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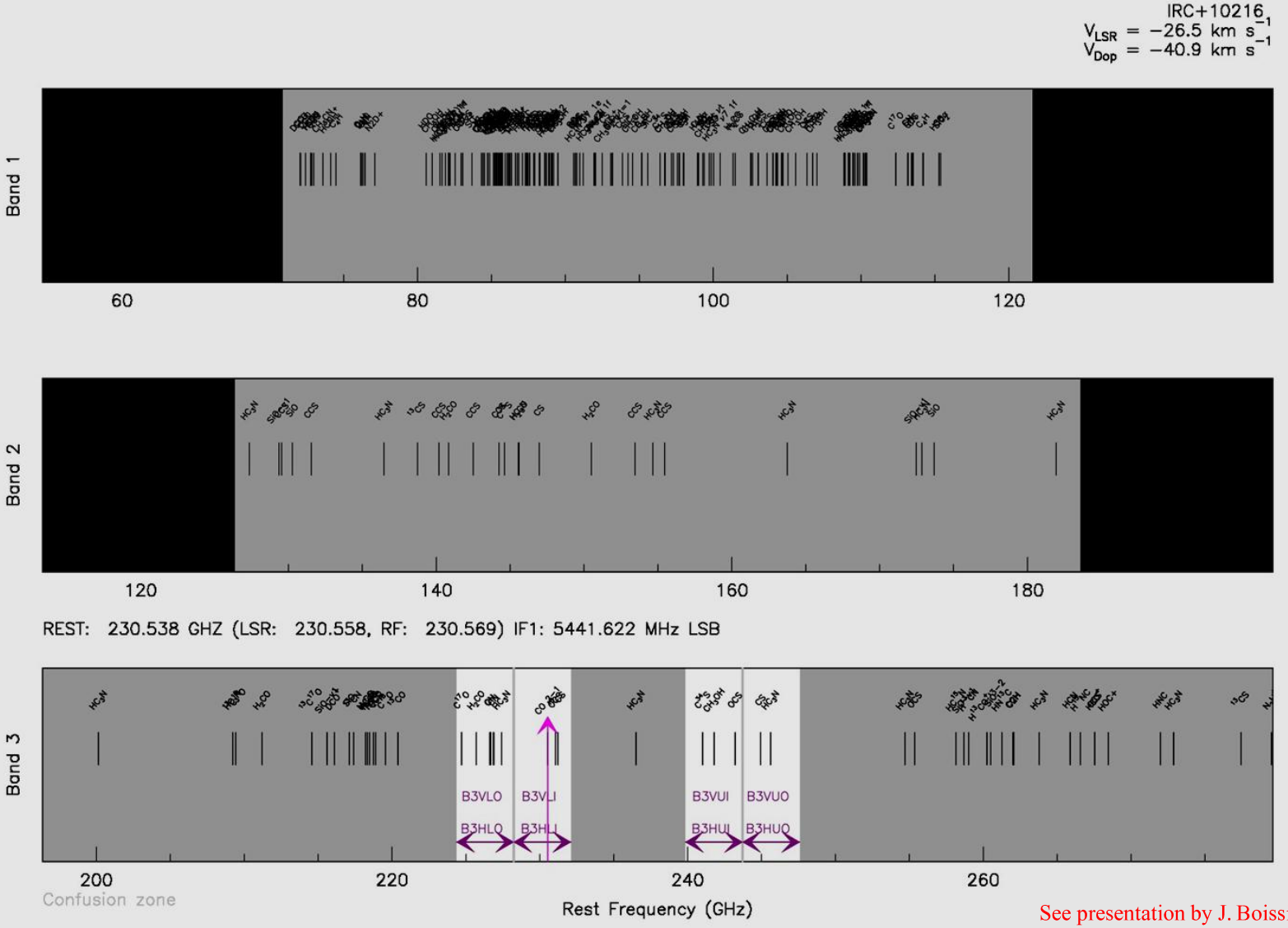
Spectral settings (I)

•Use the ASTRO command TUNING:

ASTRO> TUNING 230.538 lsb 5300

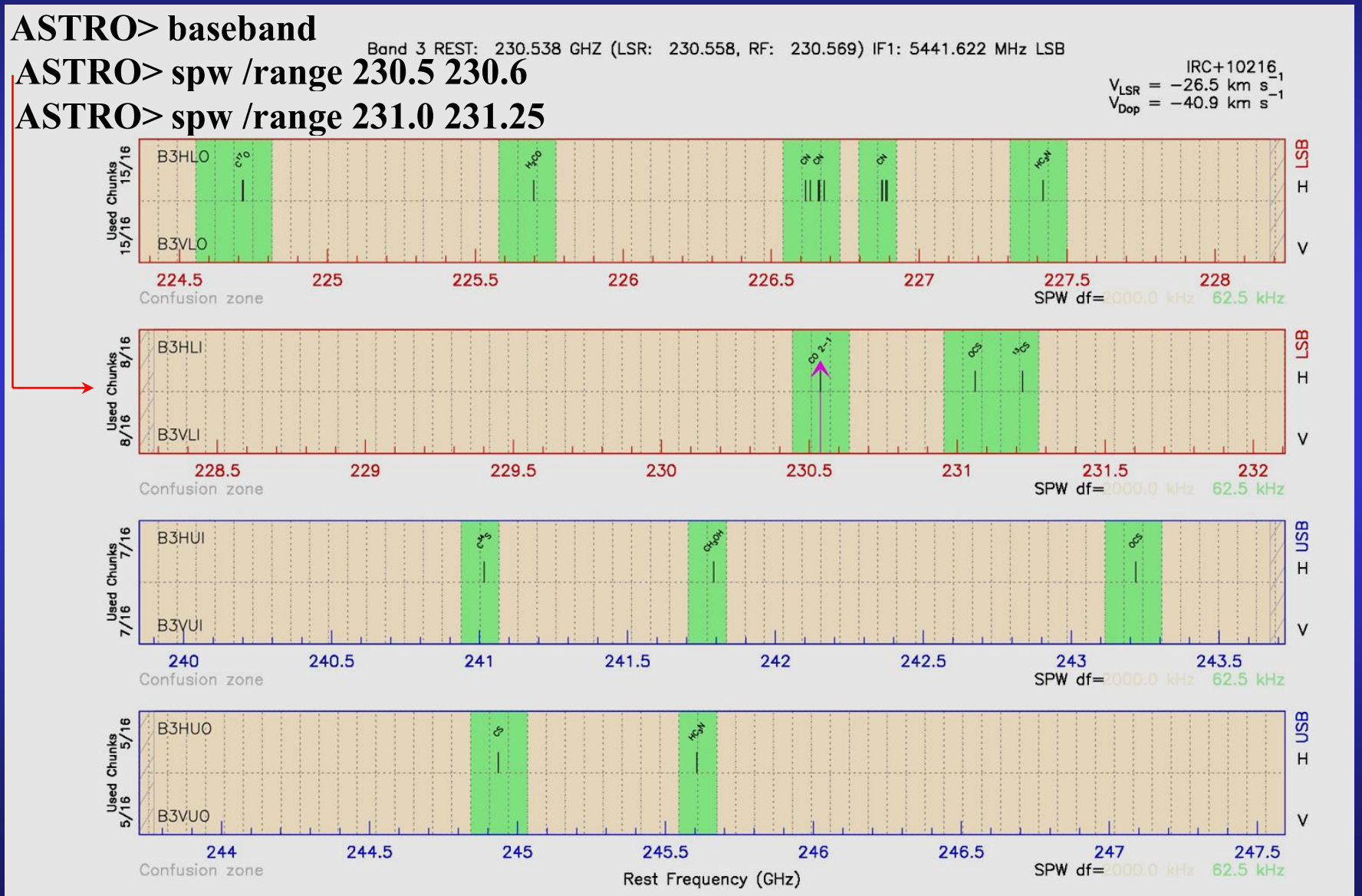


See presentation by J. Boissier on correlator modes for more details

Spectral settings (II)

Select high resolution windows (up to 16 chunks of 64MHz per baseband)

ASTRO> baseband
ASTRO> spw /range 230.5 230.6
ASTRO> spw /range 231.0 231.25



Has my object already been observed?

- **Consult the CDS (Strasbourg)**
- **Consult the Science Operation Group (SOG; sog@iram.fr)**
- **The raw data can be requested starting in December 2016**
  (for details see Science users -> *Proposals* -> *Data policy* on the IRAM web)

30m telescope
NOEMA interferometer
ARC NODE
Proposals
- Call for proposals
- Large Program policy
- Director's discretionary time proposals
- Guidelines for observing time
- Data policy
- Proposal templates
- Preparing proposal submission
- Submitting proposals
- Program committee recommendations

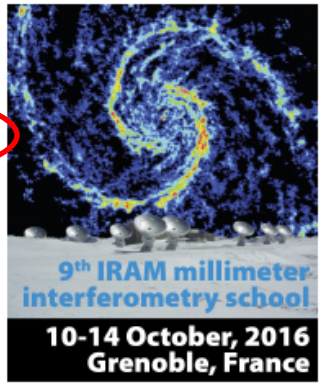
Large Programs
Results, Reports and Archives
News
Events

The IRAM data policy is as follows:

- IRAM organizes storage of raw and online calibrated data for the 30m telescope and storage of raw data for NOEMA/PdB on unlimited time scales.
- Header information of PdB/NOEMA observations later than 1991 can be found at the CDS (*Centre de Données astronomiques de Strasbourg)*: http://vizier.u-strasbg.fr/viz-bin/VizieR-3?-source=B/iram/pdbi
- Header information of 30m observations later than 2009 can be found at the CDS: http://vizier.u-strasbg.fr/viz-bin/VizieR-3?-source=B/iram/30m
- Observing programs are distinguished between normal programs and large programs. Data from large programs are public in reduced format after an 18 month proprietary period (counting from the end of the last semester of observations) and are accessible through the IRAM Large Program archive.
- Data from normal programs so far had indefinite proprietary time. Following a decision of the IRAM partners in June 2015 the following changes are introduced:
  Raw data from NOEMA/PdB or online calibrated data from the 30m telescope of individual normal programs may be provided by IRAM after a three year proprietary period (again counting from the end of the last semester of observations) and depending on directors decision. Multiple large scale requests are excluded.
  This policy applies to future programs and to programs terminated during the winter semester 2013/14 or later. Data from programs finished before this date can be requested after December 2016.

IRAM does not provide support for data reduction of such retrieved data. Referencing of these data should follow the standard IRAM reference (see the Data publication policies) and in addition include at least one reference to publications of the PI team, or the program number in case the data have not yet been published.

Further practical details will be made available in the course of the summer semester.



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VizieR - Mozilla Firefox

Observing schedule | Plateau de Bure Sche... | VizieR | NOEMA Issue tracker | Betelgeuse Worksho...

vizier.u-strasbg.fr/cgi-bin/VizieR

Most Visited | Scientific Linux | Distros | phpMyAdmin 2.11.4 | Neobeo | IPP | PMS | NOEMA Issue tracker | Welcome to AgileTi... | Holographies: index

CDS Portal | Simbad | VizieR | Aladin | X-Match | Other | Help

VizieR Service

VizieR home . Photometry viewer . Query VizieR using TAP . X-match tables . Query images/spectra

Search Criteria

Preferences

max: 50

HTML Table

All columns

Compute

Mirrors

CDS, France

Find catalogs among 14599 available

Clear | iram | Find...

Expand search

Catalog, author's name, word(s) from title, description, etc. e.g.: AGN, Veron, I/239, or bibcodes...

Search for catalogs by column descriptions *(UCD)*

Search for catalogs containing additional data

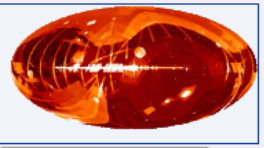
Wavelength	Mission	Astronomy
Radio	AKARI	Abundances
IR	ANS	Ages
optical	ASCA	AGN
UV	BeppoSAX	Associations
EUV	CGRO	Atomic_Data
X-ray	Chandra	Binaries:cataclysmic
Gamma-ray	COBE	Binaries:eclipsing

Search by Position across 16029 tables

Target Name (resolved by Sesame) or **Position**:

Clear | J2000 | Target dimension: 2 arcmin | Go!

Radius / Box size



More about VizieR

~ 2 matching catalogs | Find Catalogs

Tools related to VizieR

- **Photometry viewer** : Plot photometry (sed) including all VizieR
- **TAP VizieR** : query VizieR using ADQL (a SQL extension dedicated for astronomy)
- **CDS cross-match service** : fast cross-identification between any 2 tables, including VizieR catalogues, SIMBAD

→ Thanks for acknowledging the VizieR Service

→ Rules of usage of VizieR data

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Contact

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Catalog Selection Page

2 catalogs found

Search Criteria

Keywords
- iram

Tables Add
- VIII/66
- ..list
- B/iram
- ..pdbi
- ..30m

Enlarge

Preferences
max: 50
HTML Table
All columns
Compute

Mirrors
CDS, France

	VIII/66	IRAM observations in pre-star forming regions (Falgarone+ 1998-2001)	ReadMe+ftp cube/fits Similar Catalogs 1998A&A...331..669F
☐	VIII/66/list	(c) List of data *(40 rows)*	
	B/iram	IRAM Observation Logs (IRAM 1991-2015)	Similar Catalogs ReadMe+ftp
☑	B/iram/pdbi	(c) The Plateau de Bure Interferometer Observation Log between 1991-12-01 and 2013-03-31 *(19689 rows)*	
☐	B/iram/30m	(c) List of observations at 30m instrument between 2009-09-30 and 2014-06-30 *(calibration observations not included) (382351 rows)*	
☐	B/iram/pdbi_pi	List of PI investigators of PdBI instrument *(2898 rows)*	
☐	B/iram/30m_pi	List of PI investigators of 30m instrument *(776 rows)*	

ALL ☐ Reset All — Query selected Tables — Join selected Tables

(c) indicates tables which contain celestial coordinates

the VizieR Service
data

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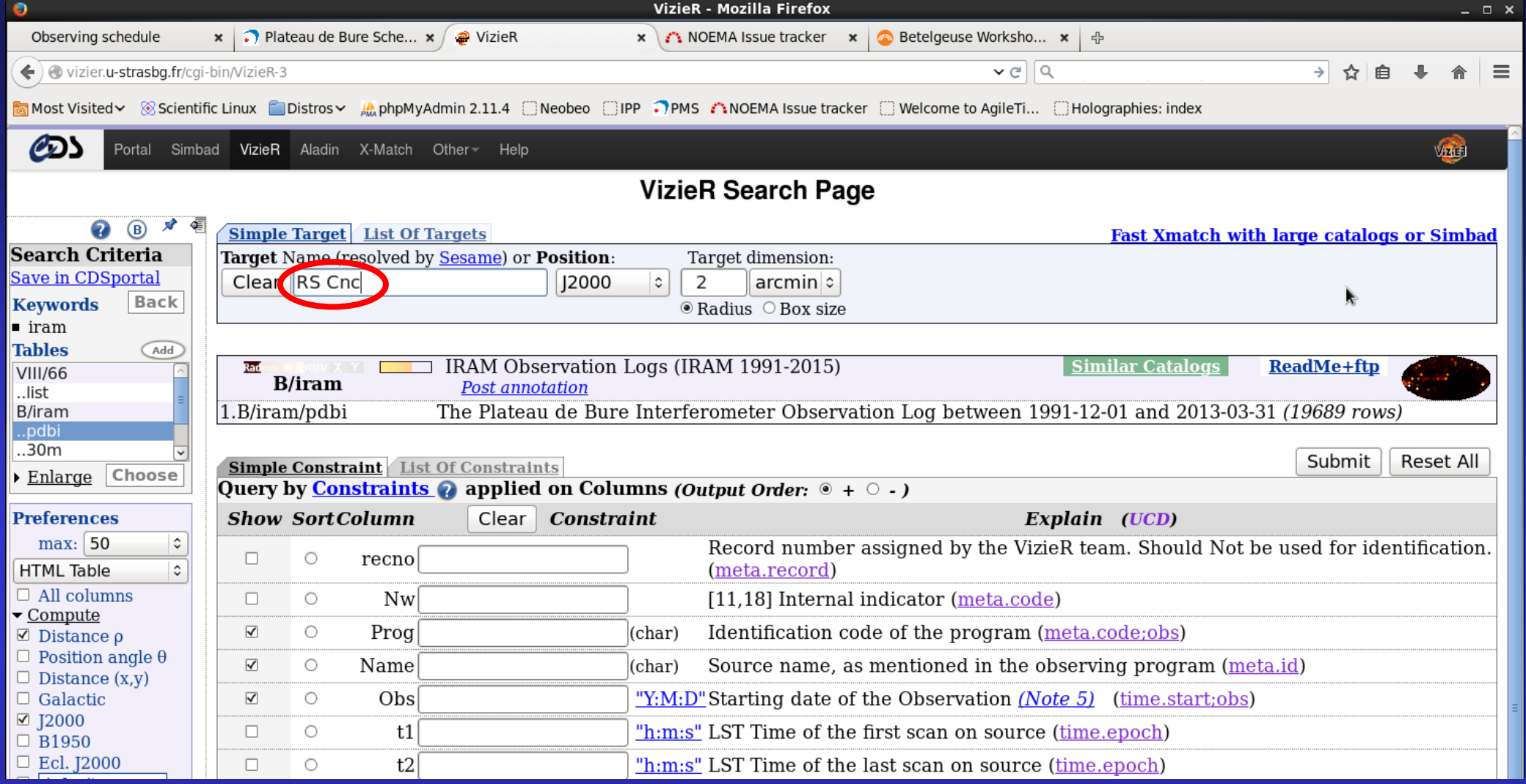
Contact


VizieR - Mozilla Firefox
Observing schedule
Plateau de Bure Sche...
VizieR
NOEMA Issue tracker
Betelgeuse Worksho...
vizier.u-strasbg.fr/cgi-bin/VizieR-3
Most Visited
Scientific Linux
Distros
phpMyAdmin 2.11.4
Neobeo
IPP
PMS
NOEMA Issue tracker
Welcome to AgileTi...
Holographies: index
Portal
Simbad
VizieR
Aladin
X-Match
Other
Help
VizieR Search Page
Simple Target
List Of Targets
Fast Xmatch with large catalogs or Simbad
Target Name (resolved by Sesame) or Position:
Clear
RS Cnc
J2000
Target dimension:
2
arcmin
Radius
Box size
Search Criteria
Save in CDSportal
Keywords
Back
iram
Tables
Add
VIII/66
..list
B/iram
..pdbi
..30m
Enlarge
Choose
Preferences
max:
50
HTML Table
All columns
Compute
Distance ρ
Position angle θ
Distance (x,y)
Galactic
J2000
B1950
Ecl. J2000
B/iram
IRAM Observation Logs (IRAM 1991-2015)
Post annotation
Similar Catalogs
ReadMe+ftp
1.B/iram/pdbi
The Plateau de Bure Interferometer Observation Log between 1991-12-01 and 2013-03-31 (19689 rows)
Simple Constraint
List Of Constraints
Submit
Reset All
Query by Constraints applied on Columns (Output Order: + -)
Show
Sort
Column
Clear
Constraint
Explain (UCD)
recno
Record number assigned by the VizieR team. Should Not be used for identification. (meta.record)
Nw
[11,18] Internal indicator (meta.code)
Prog
(char)
Identification code of the program (meta.code;obs)
Name
(char)
Source name, as mentioned in the observing program (meta.id)
Obs
"Y:M:D"
Starting date of the Observation (Note 5) (time.start;obs)
t1
"h:m:s"
LST Time of the first scan on source (time.epoch)
t2
"h:m:s"
LST Time of the last scan on source (time.epoch)

VizieR - Mozilla Firefox

Observing schedule | Plateau de Bure Sche... | VizieR | NOEMA Issue tracker | Betelgeuse Worksho...

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VizieR Result Page

Send to VO tools

Show the target form
Show constraint information

The 3 columns in ***color*** are computed by VizieR, and are ***not part of the original data***.

Search Criteria
Save in CDSportal
Keywords Back
- iram

Tables Add
VIII/66
..list
B/iram
..pdbi
..30m

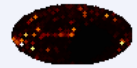
Enlarge Choose

Constraints
- *RS Cnc (arcmin 2)*

Modify Query

Preferences
max: 50
HTML Table
All columns
Compute
Submit

B/iram/pdbi IRAM Observation Logs (IRAM 1991-2015) ReadMe+ftp
Post annotation The Plateau de Bure Interferometer Observation Log between 1991-12-01 and 2013-03-31 *(19689 rows)*



start AladinLite

Full	_r arcmin	_RAJ2000 "h:m:s"	_DEJ2000 "d:m:s"	Prog	Name	Obs "Y:M:D"	tos s	Type	Vel km/s	n_	Flow MHz	n_	Fhigh MHz	n_	Conf	RAJ2000 "h:m:s"	DEJ2000 "d:m:s"
1	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2004-11-22	1200	MAP	7.0	L	115271	U	230538	L	6Cp	09:10:38.80	+30:57:47.3
2	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2004-11-23	18000	MAP	7.0	L	115271	U	230538	L	6Cp	09:10:38.80	+30:57:47.3
3	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-02-22	6900	MAP	7.0	L	115271	U	230538	L	6Bp	09:10:38.80	+30:57:47.3
4	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-02-23	5100	MAP	7.0	L	115271	U	230538	L	6Bp	09:10:38.80	+30:57:47.3
5	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-03-07	6000	MAP	7.0	L	115271	U	230538	L	6Bp	09:10:38.80	+30:57:47.3
6	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-03-16	12000	MAP	7.0	L	115271	U	230538	L	6Cp	09:10:38.80	+30:57:47.3
7	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-03-17	2400	MAP	7.0	L	115271	U	230538	L	6Cp	09:10:38.80	+30:57:47.3
8	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-04-26	19200	MAP	7.0	L	115271	U	230538	L	6Dp	09:10:38.80	+30:57:47.3
9	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-01-10	2070	MAP	7.0	L	114973	U	115568	U	6Bq	09:10:38.80	+30:57:47.3
10	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-01-11	14310	MAP	7.0	L	114973	U	115567	U	6Bq	09:10:38.80	+30:57:47.3
11	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-01-15	6750	MAP	7.0	L		U	115567	U	6Bq	09:10:38.80	+30:57:47.3
12	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-01-17	4635	MAP	7.0	L	114973	U	115567	U	6Bq	09:10:38.80	+30:57:47.3
13	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-01-18	3465	MAP	7.0	L	114974	U	115568	U	6Bq	09:10:38.80	+30:57:47.3
14	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-02-08	14175	MAP	7.0	L	114973	U	115568	U	6Bq	09:10:38.80	+30:57:47.3

VizieR - Mozilla Firefox

VizieR Correlated Data from <B><FONT COLOR='#000000'>B/iram/pdbi_pi</FOI

vizier.u-strasbg.fr/cgi-bin/VizieR?-6N&-out.form=H0&//*&-source%3DB/iram/pdbi_pi&Prog%3DU075

VizieR Correlated Data from
B/iram/pdbi_pi

[Back] · [Forwd] · [Print] · [Close]

B/iram/pdbi_pi IRAM Observation Logs (IRAM 1991-2015)
List of PI investigators of PdBI instrument *(2898 rows)* ReadMe+ftp

Prog **PI** ***Obs***

U075 Y.LIBERT Obs

Send to VO tools

f the original data.

ReadMe+ftp

og between 1991-12-01 and 2013-03-31 *(19689 rows)*

Search
Save in C
Keywor
■ iram
Tables
VIII/66
..list
B/iram
..pdbi
..30m
Enlarge
Constraints
■ *RS Cnc (arcmin 2)*
Modify Query
Preferences
max: 50
HTML Table
All columns
Compute
Submit

									Type	Vel km/s	n_	Flow MHz	n_	Fhigh MHz	n_	Conf	RAJ2000 "h:m:s"	DEJ2000 "d:m:s"
									MAP	7.0	L	115271	U	230538	L	6Cp	09:10:38.80	+30:57:47.3
									MAP	7.0	L	115271	U	230538	L	6Cp	09:10:38.80	+30:57:47.3
3	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-02-22	6900	MAP	7.0	L	115271	U	230538	L	6Bp	09:10:38.80	+30:57:47.3
4	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-02-23	5100	MAP	7.0	L	115271	U	230538	L	6Bp	09:10:38.80	+30:57:47.3
5	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-03-07	6000	MAP	7.0	L	115271	U	230538	L	6Bp	09:10:38.80	+30:57:47.3
6	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-03-16	12000	MAP	7.0	L	115271	U	230538	L	6Cp	09:10:38.80	+30:57:47.3
7	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-03-17	2400	MAP	7.0	L	115271	U	230538	L	6Cp	09:10:38.80	+30:57:47.3
8	0.0005	09:10:38.80	+30:57:47.3	O04D	RSCNC	2005-04-26	19200	MAP	7.0	L	115271	U	230538	L	6Dp	09:10:38.80	+30:57:47.3
9	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-01-10	2070	MAP	7.0	L	114973	U	115568	U	6Bq	09:10:38.80	+30:57:47.3
10	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-01-11	14310	MAP	7.0	L	114973	U	115567	U	6Bq	09:10:38.80	+30:57:47.3
11	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-01-15	6750	MAP	7.0	L		U	115567	U	6Bq	09:10:38.80	+30:57:47.3
12	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-01-17	4635	MAP	7.0	L	114973	U	115567	U	6Bq	09:10:38.80	+30:57:47.3
13	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-01-18	3465	MAP	7.0	L	114974	U	115568	U	6Bq	09:10:38.80	+30:57:47.3
14	0.0005	09:10:38.80	+30:57:47.3	U075	RSCNC	2011-02-08	14175	MAP	7.0	L	114973	U	115568	U	6Bq	09:10:38.80	+30:57:47.3

x12 NOEMA project

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When?

- **Summer:**
  compact configurations (C and D)
  => Low resolution studies, detection experiments
  at 3mm and 2mm,
  only N-1 antennas available in D-configuration from
  May to September/October

- **Winter offers best observing conditions:**
  Best atmosphere (transparency, phase stability)
  All three configurations (compact to extended)
  All antennas available

- **Observations at 1.3mm:** only possible from September to April
- [**Observations at 0.8mm:** 2-4 weeks, most likely in Jan/Feb]

Can my object be observed at any time? (I)

- Check the IRAM Web for the submission deadlines

  - March deadline: June 1 to November 30
    Committee meets 2nd half of April

  - September deadline: December 1 to May 31
    Committee meets 2nd half of October

  - Big? Submit a Large Program
    (>100h, up to 6 semesters)

  - Urgent? Submit ToO/DDT proposal

Can my object be observed at any time? (II)

- Watch out for sun avoidance period (32^0 sun distance)

  ASTRO> catalogue mysource.sou
  ASTRO> horizon /sou
  IRC+10216 Sun distance 54.2 Avoidance 14-JUL-2016 to 20-SEP-2016

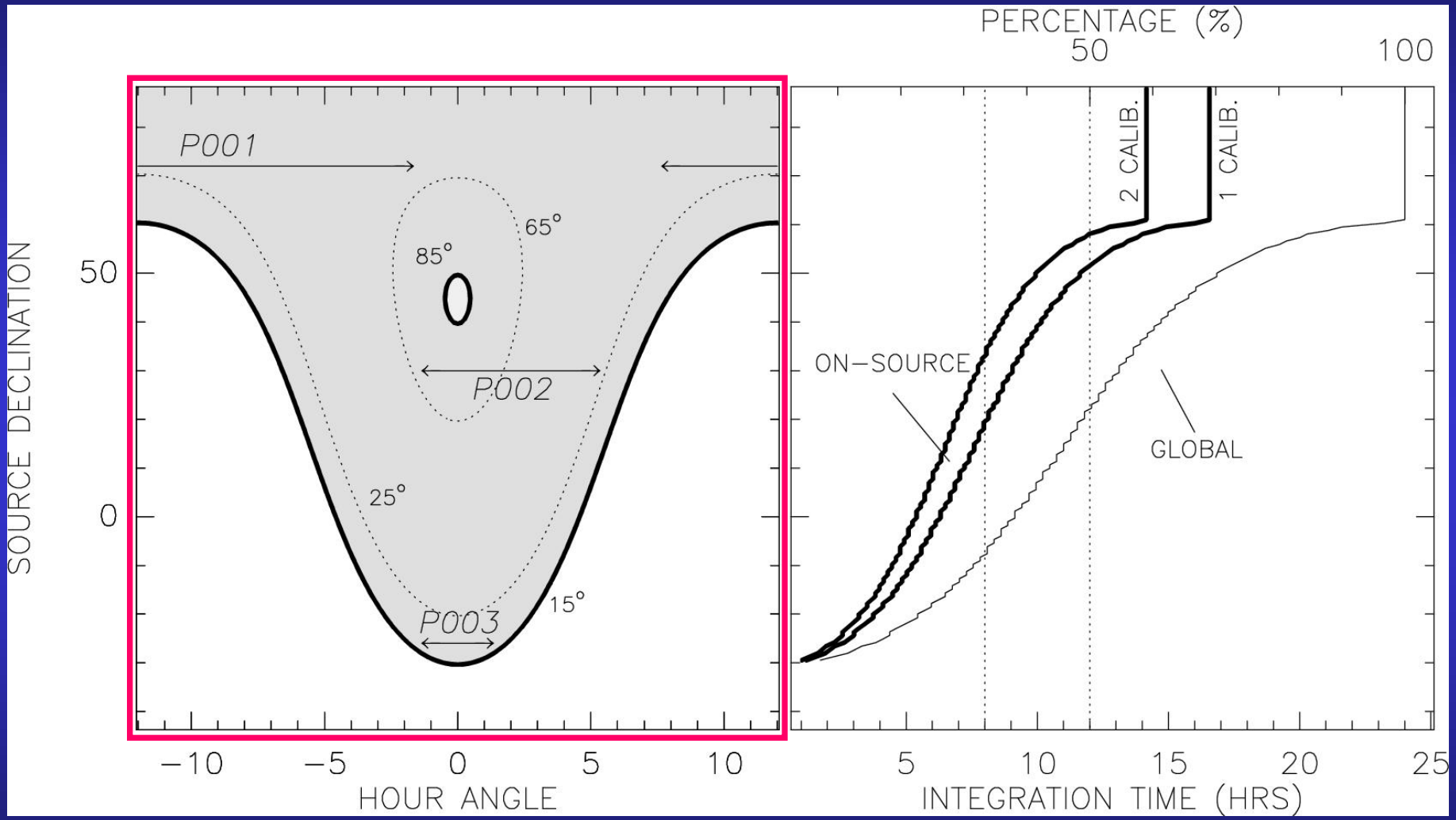
- Auto-calibration on strong (~150mJy and more) continuum feasible? Ideal time filler for periods where the atmospheric phase stability is poor!

- Self-calibration feasible? (continuum > ~20-50mJy): Can gain a lot if observed with mediocre phase stability

- Check declination of the object:

  Galactic center is at the very limit
  Take into account increased Tsys at low declination => increased t_{on} for given sensitivity

Observing time



(standard) Observing sequence

Calibrator 1

Bandpass	2x5sec
Auto	1x4sec
Cali	2(3)x5sec
Corr	3x45sec
Focus	5x5sec
Point	2x30sec

~3min (Bandpass, Auto, Cali, Corr) ~5min (all)

Calibrator 2

Bandpass	2x5sec
Auto	1x4sec
Cali	2x5sec
Corr	3x45sec

~3min

Source 1

Bandpass	2x5sec
Auto	1x4sec
Cali	2x5sec
Corr	30x45sec

~23min

Track sharing:
Sources share the same calibrators
=>

- reduce overheads
- improve uv coverage
- identify artifacts

Requirements:

- same tuning
- same correlator setup
- sources closer than ~20^{deg} on the sky

Track sharing:

Source 1: ~(30/Nsources)x45sec
Source 2: ~(30/Nsources)x45sec
Source 3: ~(30/Nsources)x45sec
•
•
•
Source N: ~(30/Nsources)x45sec

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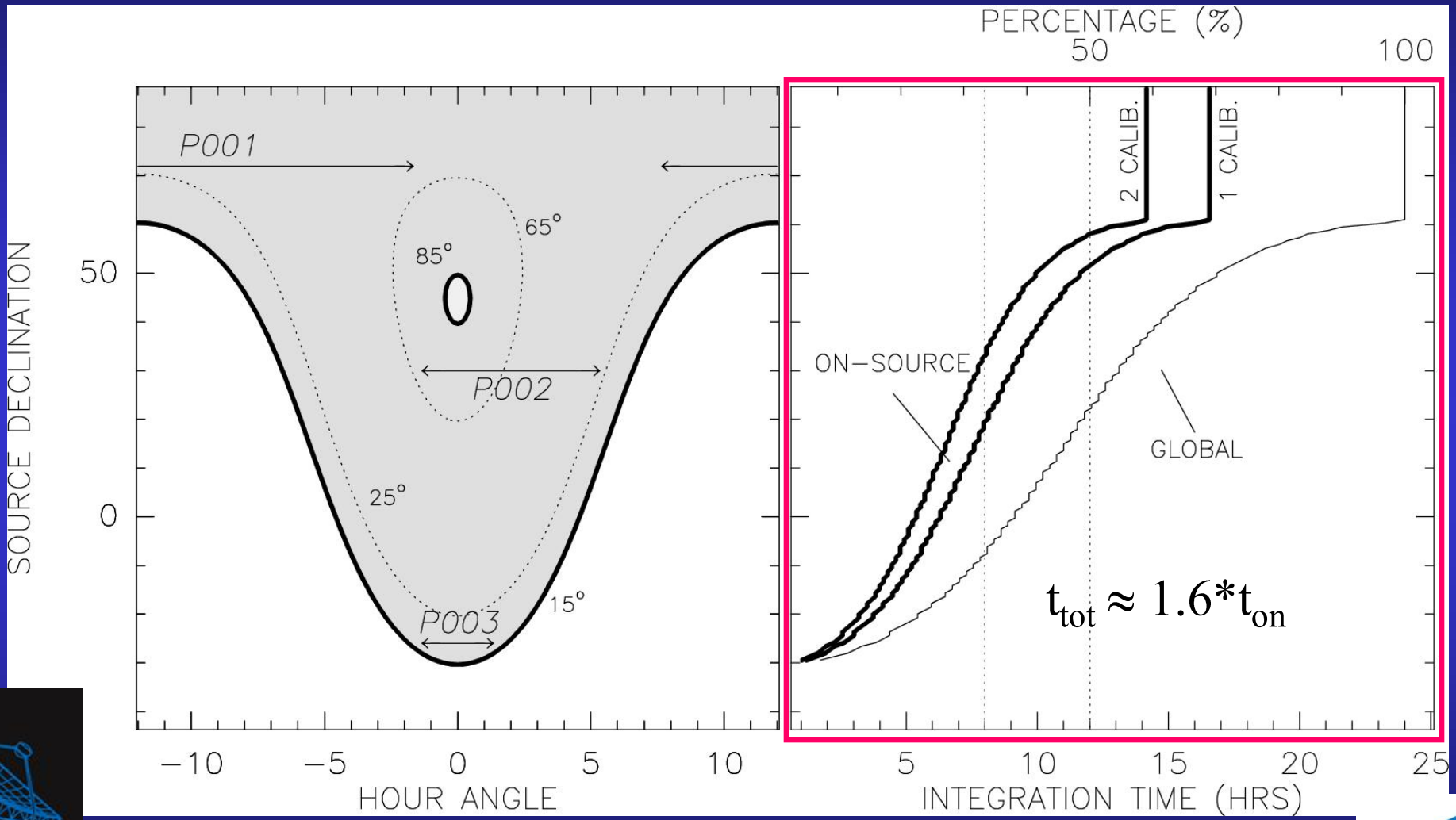
Observing time



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Detection

- Choose compact configuration

  - lower phase noise
  - source is unresolved: no flux is lost, all baselines are used

  - if you have a detection, do not over-interpret it. A 5σ detection is not a map; CLEANing is not helpful

  - weak line on a strong continuum: request an excellent RF bandpass calibration!

    Limitation with previous receivers was
    line/continuum > 3% (for a 5σ detection)
    Will be better now, but has to be assessed

Mapping/Imaging

- **Single field:**
  - **Do not forget to correct for primary beam attenuation when comparing maps**

- **Mosaics:**
  - **Fully sample the mosaic to be sensitive to large scales**

- **Adding short spacings:**
  - **good calibration required at single dish**
  - **good sensitivity**
  - **should cover about twice the field mapped by the interferometer**

(see IRAM Memo 2008-2 by Rodríguez-Fernández, Pety & Gueth)

Other observations

- **Size measurements:**
  - **Requires good SNR, not a 5σ detection**
  - **Compare to point source (calibrator)**

- **Position measurements:**
  - **absolute astrometric precision < 0.3” in D configuration, but can be much better in C and A config**

30m telescope
NOEMA interferometer
ARC NODE
Proposals
Large Programs
Results, Reports and Archives
News
Events

Science users

July 28, 2016

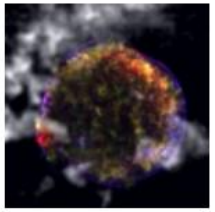
IRAM Call for Proposals - Winter 2016/2017

The new call for proposals for the winter 2016/2017 is available. A detailed description of the observing capabilities of the 30m telescope and the current status of the NOEMA interferometer are given...

Read More

July 21, 2016

Expanding molecular bubble unveiling the mysterious origin of Tycho's supernova remnant

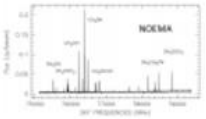


An international team of astronomers from China, UK, and Canada has discovered an expanding molecular gas bubble surrounding the remnant of Tycho's supernova with the IRAM 30-meter telescope. This is the very first unambiguous detection of an expanding bubble driven by the progenitor star of a Type Ia supernova, and an important clue to understanding the mysterious origin of this historical supernova and its remnant.

Read More

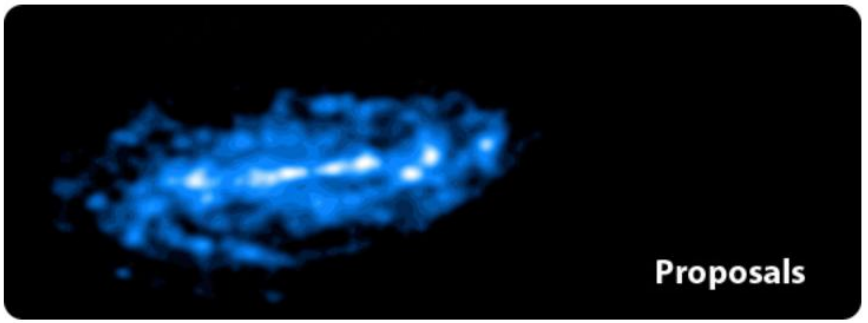
June 21, 2016

IRAM opens a new spectral window on the Universe



The spectral range from 71 to 80 GHz is of fundamental importance for a number of questions in the extragalactic and galactic research areas but, despite of this, is one of the few spectral windows that remained inaccessible to interferometers. While the IRAM 30m telescope started in the winter semester 2015/2016, after the EMIR upgrade offering the possibility to observe in this spectral window,

Read More



Proposals for observations with the IRAM telescopes may be submitted twice per year through the Proposal Management System PMS. The submission period starts about three weeks before a deadline. Submission deadlines are currently around mid-March and mid-September each year for the summer (01 June - 30 November) and winter (01 December - 31 May) scheduling periods. Exact dates and all other relevant information are given in a separate Call for proposals published on the web by mid-February for the summer deadline and by mid-August for the winter deadline. In case of problems, please contact the IRAM scientific secretary Cathy Berjaud. Additional detailed technical information can be found on the web pages for the NOEMA interferometer and for the 30m telescope.

Calendar

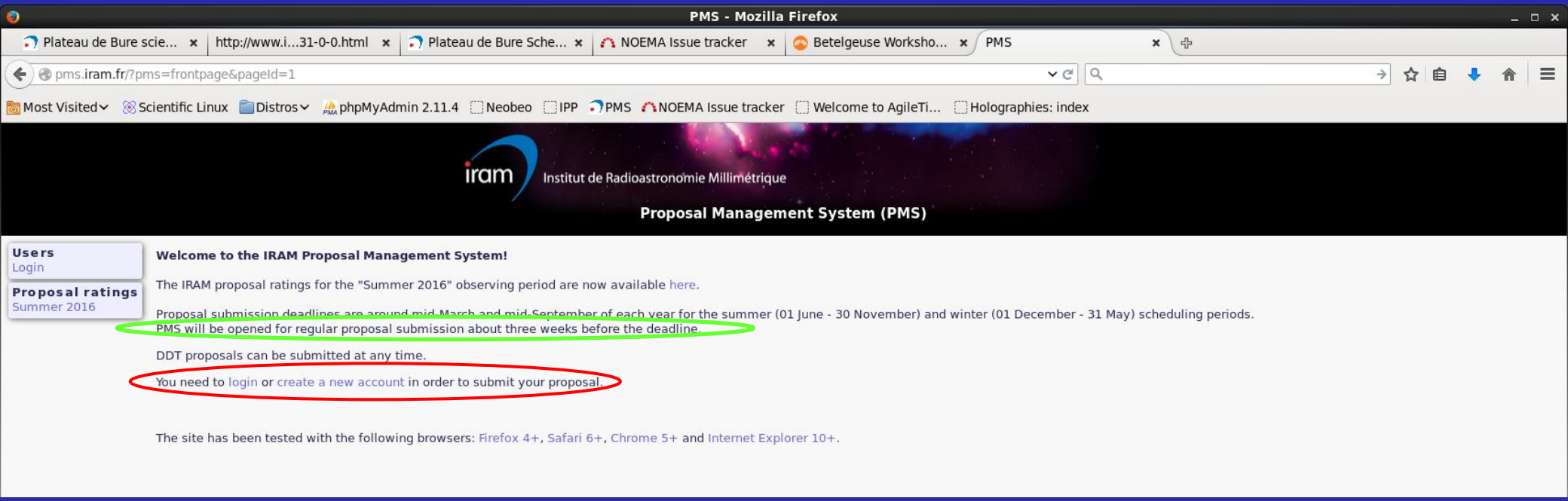
Semester: 01 December 2016 - 31 May 2017

Submission deadline	15 September 2016 17:00 CET (UT+2h)
Opening of proposal submission period	25 August 2016
Program committee meeting	19/20 October 2016
Publication of PC grades	end October 2016

Proposal Management System (PMS)

pms.iram.fr

WEB based tool to
submit (interaction with PI) and rate (interaction with PC)
proposals for IRAM telescopes



See presentation by C. Lefevre for more details

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Edit Proposal: D293897 - Mozilla Firefox

Plateau de Bure scie... | http://www.i...31-0-0.html | Plateau de Bure Sche... | NOEMA Issue tracker | Betelgeuse Worksho... | Edit Proposal: D293897

pms.iram.fr/?pms=editproposal/_=-O-293897&pageId=5

Most Visited | Scientific Linux | Distros | phpMyAdmin 2.11.4 | Neobeo | IPP | PMS | NOEMA Issue tracker | Welcome to AgileTi... | Holographies: index

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Proposal Management System (PMS)

Proposal ratings
Summer 2016

User
coordBure
Home
Logout

Proposal submission
Author invitations
Pending invitations
Pending proposals
Submit a proposal
Submit a DDT proposal
My current proposals
Check coordinates

Proposal rating
Submitted proposals
All comments

Administration
Check emails
Export data for stats
Assessors
PC categories
Create a new session
Show TNA status
Show logs

Database cleaning
Show duplicated institutes
Show duplicated authors

Browse
All sessions
Institutes
All authors
All user authors
Observatories
Countries

Previous | Next | Check source overlap

PROPOSAL NOT SUBMITTED

Proposal D293897

Session: DDT 2016 - NOEMA

Title:

Proposal category: DDT/TOO

Scientific category: -Select-

Abstract[?]:

Total requested time: 0.0

Request for 30m short spacings:

Old proposals

Resubmission: Select a proposal

Continuation: Select a proposal

Proposal history[?]:

Authors

For a proposal to be complete, PMS requires that all authors validate their identity (e-mail and affiliation) and their participation to the proposal. Proposers will have to **send invitations** to authors through PMS by clicking on "Invite co-authors" button (It is clickable on a saved proposal with at least a title and some authors not already invited).

Invite co-authors

PIs: Select authors

Full name	Current institute	Edit[?]	Email[?]	Status[?]		
Jan Martin Winters (NOEMA coordinator)	Institut de Radioastronomie Millimétrique			✓	make CoI	remove

CoIs: Select authors

Sources and setups

Sources[?]: -Select-

Technical sheets: Add TechSheet

PMS user: coordBure

Sessions:
- **NOEMA (ddt16)**
- 30m (ddt16)
- VLBI (s16)
- NOEMA (s16)
- 30m (s16)

Panels:

Proposals: D293897

Current state: Opened (DDT)

Search:

Go

x12 NOEMA project

Ninth IRAM Millimeter Interferometry School, 10-14 Oct. 2016

iram Institut de Radioastronomie Millimétrique

Edit Proposal: D293897 - Mozilla Firefox

Plateau de Bure scie... | IRAM Plateau de Bur... | Plateau de Bure Sche... | Edit Proposal: D293897 | BACKEND - Issue #5...

pms.iram.fr/?pms=editproposal/_=-O-293897&pageId=5

Most Visited | Scientific Linux | Distros | phpMyAdmin 2.11.4 | Neobeo | IPP | PMS | NOEMA Issue tracker | Welcome to AgileTi... | Holographies: index | Noema Pareto Man...

iram Institut de Radioastronomie Millimétrique

Proposal Management System (PMS)

User
coordBure
Home
Logout

Proposal submission
Author invitations
Pending invitations
Pending proposals
Submit a proposal
Submit a DDT proposal
My current proposals
Check coordinates

Proposal rating
Submitted proposals
All comments

Administration
Check emails
Export data for stats
Assessors
PC categories
Create a new session
Show TNA status
Show logs

Database cleaning
Show duplicated institutes
Show duplicated authors

Browse
All sessions
Institutes
All authors
All user authors
Observatories
Countries
Country categories
Categories
Home pages

Add an institute
Add an author
Add a country
Add a category

About
Contact us
Contributors

Previous | Next | Check source overlap

PROPOSAL NOT SUBMITTED

Proposal D293897

Session: DDT 2016 - NOEMA

Title: Testing the current status of PMS evolution

Proposal category: DDT/TOO

Scientific category: -Select-

Abstract[?]:

Total requested time: 0.0

Request for 30m short spacings:

Old proposals

Resubmission: Select a proposal

Continuation: Select a proposal

Proposal history[?]:

Authors

For a proposal to be complete, PMS requires that all authors validate their identity (e-mail and affiliation) and their participation to the proposal. Proposers will have to **send invitations** to authors through PMS by clicking on "Invite co-authors" button (It is clickable on a saved proposal with at least **a title** and some authors not already invited).

Invite co-authors | Validate invitations

PIs: Select authors

Full name	Current institute	Edit[?]	Email[?]	Status[?]		
Jan Martin Winters (NOEMA coordinator)	Institut de Radioastronomie Millimétrique			✓	make CoI	remove

CoIs: Select authors

Full name	Current institute	Edit[?]	Email[?]	Status[?]		
Thibaut Le Bertre	LERMA, Observatoire de Paris	☐		✗ not invited	make PI	remove
Michael Bremer	Institut de Radioastronomie Millimétrique	☑		✓ valid	make PI	

Sources and setups

Sources[?]: -Select-

Technical sheets: Add TechSheet

	Id^	Technical sheet	
✗	1	**Type:** Mapping **Settings**	edit/duplicate/delete

PI note[?]:

PMS user: coordBure

Sessions:
- **NOEMA (ddt16)**
- 30m (ddt16)
- NOEMA (w16)
- 30m (w16)
- VLBI (w16)

Panels:

Proposals: D293897

Current state: Opened (DDT)

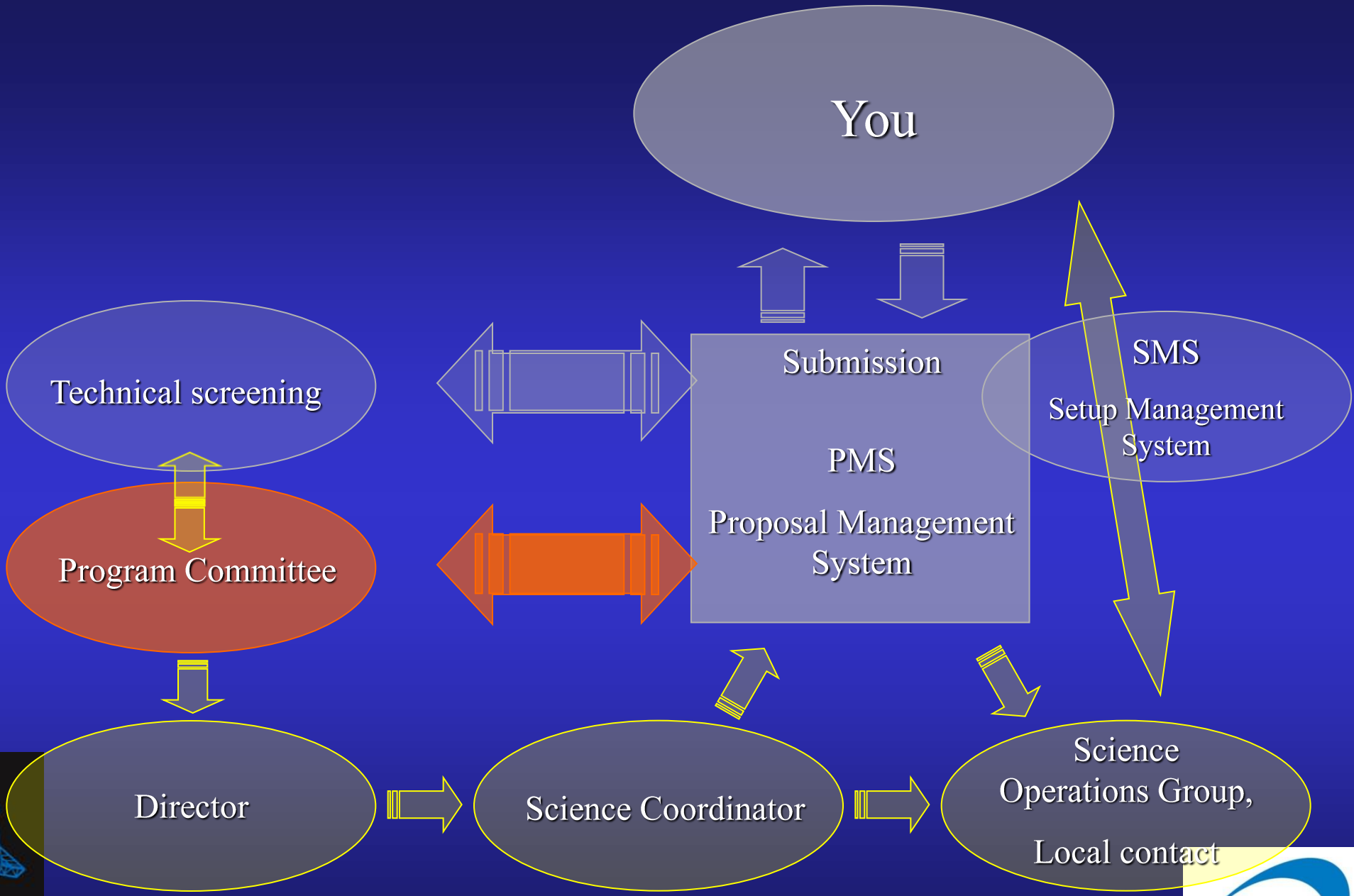
Search: Go

Who can apply for observing time?

- **Everyone!**
  Independent of country of affiliation

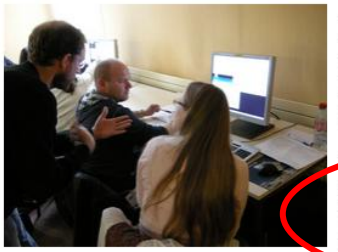
Up to 15% of the observing time may be invested into projects requested from non-IRAM partner countries

RadioNet4: travel support for European users from non-IRAM countries (2017)
=> data calibration in Grenoble


You
Technical screening
Program Committee
Submission
PMS
Proposal Management System
SMS
Setup Management System
Director
Science Coordinator
Science Operations Group,
Local contact

30m telescope
NOEMA interferometer
Observing schedule
CDS Archive
Data reduction
Visiting astronomers
Visitor Schedule
Travel to Grenoble
Financial support for visiting astronomers
Local contacts
Data publication policies
Data reduction and analysis software
Documentation
Contact the SOG
ARC NODE
Proposals
Large Programs
Results, Reports and Archives
News
Events

Local Contacts



An IRAM staff astronomer is appointed as Local Contact to every A and B rated project without IRAM internal collaborator. He/she will assist you from the beginning to the end of your project should no IRAM astronomer be collaborating with you. Feel free to contact him/her after you get the project report with the recommendations of the program committee.

The role of the local contact is to help you set up the observing procedures. You should check the source coordinates and offsets for mosaics, the source velocity, the spectral configuration of the correlator and the observing frequencies. The local contact also helps you to arrange your stay in Grenoble and **get started with data reduction**. He/she will keep an eye on the data reduction and verify the data quality. His/her and your feedback are very important to improve on the system.

Note also, that NOEMA is operated as a service instrument by the IRAM staff. Observations are in general carried out without your presence on the site (in absentee).

Local contacts for the current and previous periods are:

June 2016 - November 2016
December 2015 - May 2016
June 2015 - November 2015
December 2014 - May 2015
June 2014 - November 2014
December 2013 - May 2014
June 2013 - November 2013
December 2012 - May 2013
June 2012 - November 2012

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Program committee recommendations:

- **Grade A:**

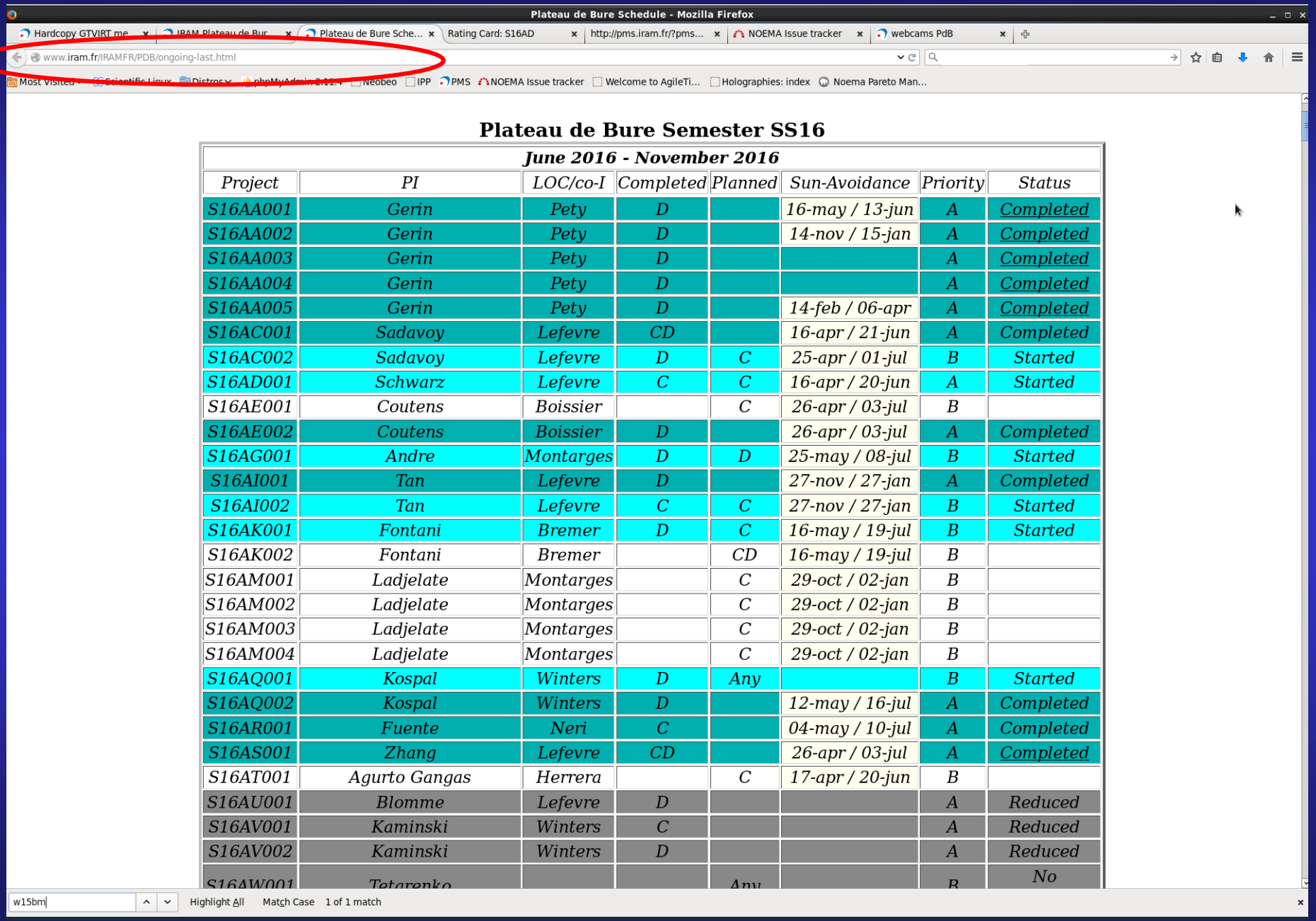
  will be observed

- **Grade B: "Backup"**

  will be observed, if further time becomes available, taking into account scientific merit, crowding in certain right ascension ranges and general aspects of balance (typically, about 50% of the B-rated programs get observed)
  once started, a B-rated (sub)project will be finished

Grade C:

rejected



Plateau de Bure Semester SS16

June 2016 - November 2016

Project	*PI*	*LOC/co-I*	*Completed*	*Planned*	*Sun-Avoidance*	*Priority*	*Status*
S16AA001	*Gerin*	*Pety*	*D*		*16-may / 13-jun*	*A*	*Completed*
S16AA002	*Gerin*	*Pety*	*D*		*14-nov / 15-jan*	*A*	*Completed*
S16AA003	*Gerin*	*Pety*	*D*			*A*	*Completed*
S16AA004	*Gerin*	*Pety*	*D*			*A*	*Completed*
S16AA005	*Gerin*	*Pety*	*D*		*14-feb / 06-apr*	*A*	*Completed*
S16AC001	*Sadavoy*	*Lefevre*	*CD*		*16-apr / 21-jun*	*A*	*Completed*
S16AC002	*Sadavoy*	*Lefevre*	*D*	*C*	*25-apr / 01-jul*	*B*	*Started*
S16AD001	*Schwarz*	*Lefevre*	*C*	*C*	*16-apr / 20-jun*	*A*	*Started*
S16AE001	*Coutens*	*Boissier*		*C*	*26-apr / 03-jul*	*B*	
S16AE002	*Coutens*	*Boissier*	*D*		*26-apr / 03-jul*	*A*	*Completed*
S16AG001	*Andre*	*Montarges*	*D*	*D*	*25-may / 08-jul*	*B*	*Started*
S16AI001	*Tan*	*Lefevre*	*D*		*27-nov / 27-jan*	*A*	*Completed*
S16AI002	*Tan*	*Lefevre*	*C*	*C*	*27-nov / 27-jan*	*B*	*Started*
S16AK001	*Fontani*	*Bremer*	*D*	*C*	*16-may / 19-jul*	*B*	*Started*
S16AK002	*Fontani*	*Bremer*		*CD*	*16-may / 19-jul*	*B*	
S16AM001	*Ladjelate*	*Montarges*		*C*	*29-oct / 02-jan*	*B*	
S16AM002	*Ladjelate*	*Montarges*		*C*	*29-oct / 02-jan*	*B*	
S16AM003	*Ladjelate*	*Montarges*		*C*	*29-oct / 02-jan*	*B*	
S16AM004	*Ladjelate*	*Montarges*		*C*	*29-oct / 02-jan*	*B*	
S16AQ001	*Kospal*	*Winters*	*D*	*Any*		*B*	*Started*
S16AQ002	*Kospal*	*Winters*	*D*		*12-may / 16-jul*	*A*	*Completed*
S16AR001	*Fuente*	*Neri*	*C*		*04-may / 10-jul*	*A*	*Completed*
S16AS001	*Zhang*	*Lefevre*	*CD*		*26-apr / 03-jul*	*A*	*Completed*
S16AT001	*Agurto Gangas*	*Herrera*		*C*	*17-apr / 20-jun*	*B*	
S16AU001	*Blomme*	*Lefevre*	*D*			*A*	*Reduced*
S16AV001	*Kaminski*	*Winters*	*C*			*A*	*Reduced*
S16AV002	*Kaminski*	*Winters*	*D*			*A*	*Reduced*
S16AW001	*Tetarenko*			*Any*		*B*	*No*

Data publication policies

The following footnote should appear on the first page of papers based on observations made with the NOEMA interferometer:

"Based on observations carried out under project number XYYZZ with the IRAM NOEMA Interferometer. IRAM is supported by INSU/CNRS (France), MPG (Germany) and IGN (Spain)."

In addition, publications that arise from work supported by the European Community funded RadioNet project should include the following acknowledgement:

"This work has benefited from research funding from the European Community's Seventh Framework Programme."

IRAM welcomes an acknowledgement to the IRAM staff for help provided during the observations and for data reduction.

IRAM provides preprints free of charge for publication based on IRAM observations. Papers which are accepted in refereed journals and addressed to the IRAM librarian will be published as IRAM preprints.

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Any questions on how to request time for the Northern Extended Millimeter Array?

- **Check the IRAM Web pages**
- **Ask the Science Operations Group (sog@iram.fr)**

Looking forward to YOUR proposals next March!

Credit: C. Lefevre