Proposals for IRAM Telescopes

The deadline for submission of observing proposals on IRAM telescopes, both the interferometer and the 30m, is

13 September 2012, 17:00 CET (UT + 2 hours)

The scheduling period extends from 1 December 2012 to 31 May 2013.

Proposals should be submitted through our web–based submission facility. Instructions can be found on our web page at URL:

`http://www.iram.fr/GENERAL/submission/submission.html`

Detailed information on time estimates, special observing modes, technical information and references for both the IRAM interferometer and the IRAM 30m telescope can be found on the IRAM web site:

`http://www.iram-institute.org/`

and then following the links under `Proposals`. The submission facility will be opened about three weeks before the proposal deadline. Proposal form pages and the 30m time estimator are available now.

Please avoid last minute submissions when the network could be congested. Proposals sent by e–mail are not accepted. In case of problems, contact the IRAM scientific secretary (e–mail: `berjaud@iram.fr`). Color plots will be printed/copied in grey scale. Proposals are evaluated on the basis of the paper copy. **If color is considered essential** for the understanding of a specific figure, a respective remark should be added in the figure caption. The referees may then consult the electronic version of the proposal.

Soon after the deadline the IRAM Scientific Secretariat sends an acknowledgement of receipt to the Principal Investigator of each proposal correctly received, together with the proposal registration number. Note that the web facility allows cancellation and modification of proposals before the deadline. The facility also allows to view the proposal in its final form as it appears after re–compilation at IRAM. We **urge proposers** to make use of this feature as we always receive a number of corrupted proposals (figures missing, blank pages, etc.).

Valid proposals contain the official cover page, one or more pages of technical information, up to two pages of text describing the scientific aims, and up to two pages of figures, tables, and references. Normal proposals should *not exceed* 6 pages, except for additional technical pages. Longer proposals will be cut. We encourage the submission of **Large Observing Programmes** (see the announcement by P. Cox which appears at the end of this call). The Large Programmes may have up to 4 pages for the scientific justification, plus cover page, the technical pages, and 2 pages for supporting material.

The current versions of the proposal templates for the 30m telescope `prop-30m.tex` and for the interferometer `prop-pdb.tex` must be used together with the current LaTeX style file `proposal.sty`. All three files may be downloaded from

`http://www.iram.fr/GENERAL/submission/proposal.html`

Do not change the font type or size, and do not manipulate the style file. Please, also indicate on the proposal cover page whether your proposal is (or is not) a *resubmission* of a previously rejected proposal or a *continuation* of a previously accepted interferometer or 30m proposal. We request that the proposers describe very briefly in the introductory paragraph (automatically generated header "Proposal history:") why the proposal is being resubmitted (e.g. improved scientific justification) or is proposed to be continued (e.g. last observations suffered from bad weather).

Publications resulting from Plateau de Bure interferometer or 30m telescope observations should acknowledge this in a footnote "Based on observations carried out with the IRAM Plateau de Bure Interferometer [30m telescope]. IRAM is supported by INSU/CNRS (France), MPG (Germany) and IGN (Spain)".

J.M. Winters & N. Billot

Travel funds for European astronomers

Observations using IRAM telescopes continue to be supported by RadioNet under the European Framework Programme 7. A budget, somewhat reduced compared to the 2009 – 2011 period, is available for travel by European astronomers through the Trans National Access (TNA) Programme.

As before, travel may be supported to the 30m telescope for observation (contact: N. Billot) and to Grenoble for reduction of interferometer data (contact: R. Neri). Detailed information about the eligibility, policies, and travel claims can be found on the RadioNet home page at `http://www.radionet-eu.org`. The Principal Investigators of IRAM proposals eligible for TNA funding will be informed individually.

If a project receives financial support from Radionet through the TNA programme, resulting publications should include the following sentence: "This work is supported by the European Community Framework Programme 7, Advanced Radio Astronomy in Europe, grant agreement no.: 227290"

R. Neri & N. Billot

Call for Observing Proposals on the 30m Telescope

Summary

Proposals for three instruments will be considered for the coming winter semester (1 December 2012 to 31 May 2013):

1. the heterodyne receiver EMIR, consisting of dual-polarization mixers, operating in the four bands at 3, 2, 1.3, and 0.9 mm wavelengths,
2. the 9 pixel dual–polarization heterodyne receiver array, HERA, operating at 1.3 mm wavelength,
3. and GISMO, a 2 mm bolometer camera with 128 close-packed pixels.

During the winter semester emphasis will be put on observations at the shorter wavelengths but 3 mm proposals are also encouraged, particularly if they are suited for medium or low quality weather backup. As in previous semesters, we will offer several weeks of pooled observations in order to optimize the use of the telescope at short wavelengths. We continue to call for Large Programs using any of the heterodyne instruments.
Proposers are requested to use the EMIR and HERA time estimators which are available online via the IRAM 30m webpage. A document describing GISMO time estimations is also provided on this webpage.

What is new?

GISMO: Despite the poor weather conditions during the last GISMO pool session in April 2012, a large fraction of the accepted proposals could be observed thanks to the improved performances of the camera. The use of new optics and baffles led to a NEFD of $10\,\mathrm{mJy}\cdot\sqrt{\mathrm{s}}$. A report has been compiled describing the performance of GISMO based on the run in April 2012. The guidelines on how to derive observing time estimates have been updated, in particular telescope overheads and sensitivity penalty when trying to recover extended emission. Both reports are available on the IRAM/Granada wiki page at:

`http://www.iram.es/IRAMES/mainWiki/GoddardIramSuperconductingTwoMillimeterCamera`

For this winter semester, GISMO is offered for up to 2 weeks of pooled time with support from the Goddard team. All projects will be evaluated by the IRAM program committee. Accepted projects will be observed on a "shared risk" basis. Note also that no large programs will be accepted for GISMO.

EMIR: The local oscillator for E 330 has been recently refurbished such that EMIR can now reach sky frequencies up to 358 GHz, giving access to the 4-3 transitions of HCN and HCO^+ under excellent weather conditions.

TAPAS: The *Telescope Access for Public Archive System* is a searchable database of the header information of all astronomical observations conducted with heterodyne receivers at the IRAM 30m telescope. The database contains over 200 header variables for each observational scan since September 2009. TAPAS is available at the following URL:

`https://tapas.iram.es/tapas/`

A new capability has been implemented in TAPAS to allow observers to enter comments for individual scans, which can conveniently be used as a logsheet while carrying out the observations.

N. Billot & C. Kramer

Non-trivial changes with respect to the previous Call for Proposals are marked in red.

Applications

The official proposal cover page and the second page for the Technical Summary should be filled in with great care. All information on these pages is transferred to the IRAM proposal database. Attention should be given to *Scheduling constraints* where the proposer can enter dates where he/she is not available for observing. Proposers requesting observations which need atmospheric opacities better than typical for the semester (corresponding to 7 mm pwv in summer and 4 mm in winter) should give the maximum acceptable value of precipitable water vapor in the corresponding table of the Technical Summary.

In order to avoid duplication of observations and to protect already accepted proposals, we keep a computerized list of targets. We ask you to fill in carefully the source list in equatorial J2000 coordinates. This list *must contain all the sources* (and only those sources) for which you request observing time. Your list must adhere to the format indicated on the proposal form (sexagesimal notation). If your source list is longer than 15 sources that fit onto the cover page, please use the LaTeX macro `\extendedsourcelist`.

A scientific project should not be artificially cut into several small projects, but should rather be submitted as one bigger project, even if this means 100–150 hours of observing time. Note that large programs of particular scientific importance can be submitted in the "Large programs" category.

If time has already been given to a project but turned out to be insufficient, explain the reasons, e.g. indicate the amount of time lost due to bad weather or equipment failure; if the fraction of time lost is close to 100%, don't rewrite the proposal, except for an introductory paragraph. For continuation of proposals having led to publications, please give references to the latter.

The Telescope

This section gives all the technical details of observations with the 30m telescope that the typical user will have to know. A concise summary of telescope characteristics is published on the IRAM web pages.

Pointing and Focusing

The telescope absolute rms pointing accuracy is better than 3″ [7]. Observers are recommended to check the telescope pointing every 1 to 2 hours, depending on frequency. Checking the pointing, focus, and receiver alignment is the responsibility of the observers (use a planet for alignment checks).

Wobbling Secondary

- Beam–throw is $\leq 240''$ depending on wobbling frequency. At 2 Hz, the maximum throw is $90''$
- Standard phase duration: 2 sec for spectral line observations, 0.26 sec for continuum observations.

Unnecessarily large wobbler throws should be avoided, since they introduce a loss of gain, particularly at the higher frequencies, and imply a loss of observing efficiency (more dead time).

Beam widths and Efficiencies

See the summary of telescope parameters on the Granada web site for the beam widths and efficiencies measured between 80 and 350 GHz. The size and strengths of the error beams of the 30m are described in [9].

Receivers

GISMO

The Goddard-IRAM Superconducting 2 mm Observer (GISMO) is a bolometer camera built at the Goddard Space Flight Center (Greenbelt/Maryland) under the lead of Johannes Staguhn for the IRAM 30m telescope. GISMO consists of 8×16 close-packed pixels with super conducting transition edge sensors (TES). The TES are read out by time domain SQUID multiplexers built at the National Institute for Standards (NIST), in Boulder, Colorado. The pixels are spaced by $13.75''$ and they fill the entire field of view of the camera ($1.83' \times 3.66'$). The telescope half-power beamwidth was measured to be near the expected diffraction limit of $16.7''$.
The sensitivity of GISMO was improved since the April 2011 test run, and the NEFD measured during the last GISMO pool session in April 2012 is $10\,\mathrm{mJy}\cdot\sqrt{\mathrm{s}}$. We have compiled a report that describes in details the instrument performances as measured in last April with the new optics and baffles. In particular the report provides updates on the telescope overheads, flux reproducibility, and sensitivity penalties when trying to recover extended emission. This report is available at the IRAM/Granada wiki page at:

`http://www.iram.es/IRAMES/mainWiki/GoddardIramSuperconductingTwoMillimeterCamera`

We offer two standard observing modes where data are taken continuously while the telescope follows either Lissajous curves, or OTF zig-zag patterns. Neither mode makes use of the secondary mirror to modulate the signal. An automated pipeline merges the GISMO data with the telescope data streams to create FITS files which are automatically processed by the reduction software *CRUSH*, to create logs, pointing results, and a first quick view of the data. An on-line log is also created automatically which includes a standard pipeline quick view of the observed maps. *CRUSH* was recently updated to account for the latest performances measured in April 2012. It is the only reduction software available for GISMO data, and IRAM will not provide support for data reduction with *CRUSH*. This software is developed by A. Kovács, and it is publicly available on-line with ample documentation.

For this winter semester, GISMO is offered for up to 2 weeks of pooled time with support from the Goddard team. All projects will be evaluated by the IRAM program committee. Accepted projects will be observed on a "shared risk" basis. Note also that no large programs will be accepted for GISMO.

The document describing how to derive observing time estimates for GISMO was updated with the current performances, and it is available on the IRAM/Granada wiki page mentioned above.

EMIR

Overview: The spectral line receiver EMIR (**E**ight **MI**xer **R**eceiver) was installed on the 30m telescope in spring 2009. The receiver operates in the 3, 2, 1.3 and 0.9 mm atmospheric windows (Fig. 1). These four bands are designated as E 090, E 150, E 230, and E 330 according to their approximate center frequencies in GHz. Each band provides two orthogonal linear polarization channels tuned to the same frequency as they share a single common local oscillator. The eight individual receivers of EMIR are very well aligned with offsets below $2''$ between bands and below $1''$ between polarizations of any one band. EMIR offers very competitive noise temperatures and wide bandwidths. The band E 330 is offered for regular use under very good weather conditions (pwv < 2 mm). The frequency range of this band, currently limited at the upper end by LO power, is planned to be extended up to 360 GHz. Table 1 lists the main characteristics of the EMIR receiver. A thorough description of the EMIR receiver is available in Carter et al. [15], and its users guide is available at the EMIR web page at:

`http://www.iram.es/IRAMES/mainWiki/EmirforAstronomers.`

In November 2011 EMIR was upgraded with dual sideband (2SB) mixers for bands E 230 and E 330, as it was already the case for band E 090 (Fig. 2). These mixers offer 8 GHz of instantaneous bandwidth per sideband and per polarization, whereas the single sideband (SSB) mixer on E 150 has only a 4 GHz bandwidth per polarization. An upgrade of E150 with 2SB mixers is planed for late 2013.
Note that the local oscillator for E 330 has been recently refurbished such that EMIR can now reach sky frequencies up to 358 GHz, giving access to the 4-3 transitions of HCN and HCO^+ under excellent weather conditions.

Selection of EMIR bands: A set of warm switchable mirrors and dichroic elements are used for combining EMIR beams, or for directing the beams towards calibration loads.
In its simplest configuration, the warm optics unit selects a single EMIR band for observation. This mode avoids the use of slightly lossy dichroic elements and therefore offers the best receiver noise temperatures.
In its dual-beam configuration, the dichroic mirrors combine the beams of two receivers such that they look at the same position on the sky and have the same focus values within 0.3 mm. The following band combinations are possible: E 090 and E 150, E 090 and E 230, or E 150 and E 330 (Tab. 1). The combination of bands is not polarization selective, i.e. the combined beams will stay dual polarization. The loss of these dichroic mirrors, which is small over most of the accessible frequency range, increases however the receiver temperatures by 10–15 K. A few disadvantageous frequency combinations (e.g. HCN, HNC and HCO^+ observed with E 090 and E 230) lead to a substantial increase of the receiver noise (see the EMIR homepage for details). The observer is therefore advised to carefully evaluate whether an observation involving two different bands is more efficiently made in parallel or in series.

Calibration Considerations: EMIR has its own calibration system. The external warm optics provides ambient temperature loads and mirrors reflecting the beams back onto the 15 K stage of the cryostat. This system is expected to be very reliable and constant over time. The absolute calibration accuracy is around 10% or better depending on the band considered.

EMIR bands E 090, E 230, and E 330 are equipped with tunerless sideband separation mixers, allowing simultaneous observations of both sidebands in separate IF bands. These mixers have been characterized in the laboratory for their image rejection and are expected to have the same performance on site (> 10 dB). Below the lower frequency end of the tuning range ($\nu < 83$ GHz) the behavior of image band rejection is expected to be erratic, and such observations are therefore discouraged. The band E 150 has backshort tuned single–sideband mixers; DSB tuning is not possible, but lower or upper sidebands (USB or LSB) may be selectable within limitations. The image rejection is better than 10 dB for all frequencies. On–site measurements of the rejection is no longer straightforward for these mixers, since the Martin–Puplett interferometers are not available anymore for sideband separation. As the optimum way of calibrating the image rejection is still under study, users who propose observations which rely on an enhanced accuracy of calibration of image gains should mention this request in the proposal.

Doppler–tracking and velocity scale: It is common practice at radio observatories to correct the frequency of an observation for the strongly time variable velocity of the Observatory with respect to the solar system barycenter. This guarantees that lines observed near the Doppler–tracked frequency, usually the band center, always have the correct barycentric velocity, independent of the time of observation. At the 30m, the local oscillator and its synthesizers are constantly adjusted during observations to track the changing Doppler factor for one spectral line with its rest frequency. This causes a slight shift of lines observed simultaneously at a different frequency. This shift is proportional to the frequency difference and the Doppler factor. CLASS corrects for this shift by adapting the spectral resolution. For details, see a report by Buchbender et al. which is available at the EMIR web page mentioned above.

Connection to backends: The IF transport system was upgraded with 4 additional IF cables, each with a 4 GHz bandwidth. Including the 4 previous IF cables, the total bandwidth of the IF transport system now reaches 32 GHz, that is an instantaneous bandwidth of 16 GHz in both polarizations. This bandwidth can be entirely covered by the newly installed FTS units at a spectral resolution of 200 kHz (see the backends section below for details).

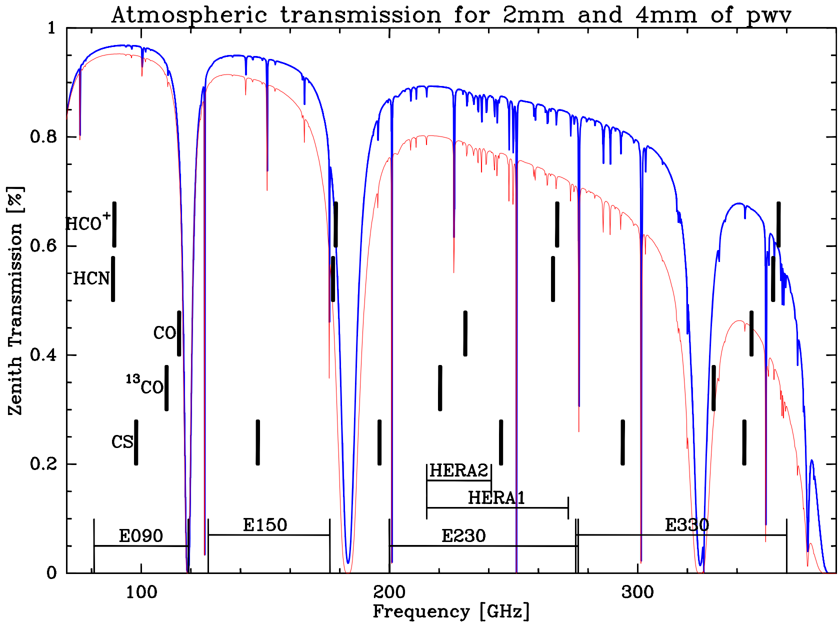

Figure 1: Atmospheric transmission at the 30m site between 60 and 400 GHz for 1 and 4mm of precipitable water vapor, derived from the ATM model. The EMIR bands are indicated and the frequencies of a few important molecular transitions are marked.

An **IF switch box** in the receiver cabin is used to select 8 EMIR channels of 4 GHz bandwidth each. The design of the box allows the selection of all commonly used combinations of EMIR bands. A detailed description of the (im)possible sub-band combinations is available on the EMIR web page.

The selected 8 output channels are sent via the IF cables to **backend distribution units** which provide copies of these 8 channels to a range of backend processors that prepare the IF signals for distribution to the spectrometers (see backends section below). The following four backend processors feed the 4 GHz wide IF channels to the backends:

- ▷ The **FTS processor** takes the 8 IF channels from EMIR as input, and feeds the FTS with either 8 4 GHz wide channels for the 200 kHz resolution mode, or 8 1.8 GHz channels for the 50 kHz resolution mode.
- ▷ The **WILMA processor** rearranges four incoming 4 GHz wide IF channels into 16 channels of 1 GHz width which can be processed by 16 WILMA autocorrelator units.
- ▷ The **4 MHz processor** rearranges any two incoming 4 GHz wide IF channels into 8 slices of 1 GHz bandwidth for processing in 8 units of the 4 MHz filter bank.
- ▷ The **"narrow band backends" processor** prepares 4 incoming IF channels for input into VESPA. Only the central 640 MHz of the 4 GHz IF channels is accessible to this backend.

HERA

A full description of HERA **HE**terodyne **R**eceiver **A**rray and its observing modes is given in the HERA manual. Here we only give a short summary.
The 9 dual–polarization pixels are arranged in the form of a center–filled square and are separated by 24″. Each beam is split into two linear polarizations which couple to separate SIS mixers. The 18 mixers feed 18 independent IF chains. Each set of 9 mixers is pumped by a separate local oscillator system. The same positions can thus be observed simultaneously at any two frequencies inside the HERA tuning range (210-276 GHz for HERA1, and 210-242 for HERA2).
A derotator optical assembly can be set to keep the 9–pixel pattern stationary in the equatorial or horizontal coordinates. Receiver characteristics are listed on the 30m web site.

Observations have shown that the noise temperature of the pixels of the HERA2 array may vary across the 1 GHz IF band. The highest noise occurs towards the band edges which are, unfortunately, picked up when HERA is connected with VESPA whose narrow observing band is located close to the lower edge of the 1 GHz band. Therefore, while not

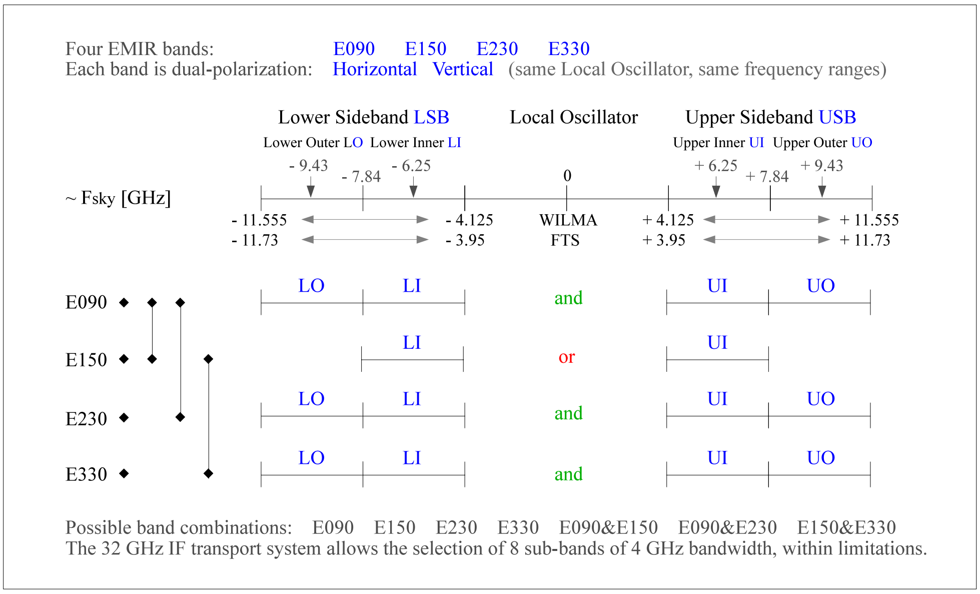

Figure 2: Visual overview of EMIR bands. Eight sub-bands can be transported to backends for a total of 32 GHz instantaneous bandwidth. Frequencies shown above the frequency scale indicate the central frequencies of the (sub-)bands. Frequencies at the sideband edges give the frequency coverage of the WILMA and FTS backends.

as important for wide band observations with centered IF band, the system noise in narrow mode is higher (factor 1.5 – 2) as compared to the HERA1 array. We do not recommend to use HERA2 for frequencies > 241 GHz.
HERA can be connected to four sets of backends: the FTS, VESPA, WILMA and the 4 MHz filter bank. When connected to HERA, these backends offer spectral resolutions ranging from 20 kHz to 4 MHz over bandwidths ranging from 40 MHz to the entire 1 GHz bandwidth of HERA. The backend section below provides a description of the available backend configurations.

HERA is operational in two basic spectroscopic observing modes: *(i)* raster maps of areas typically not smaller than $1'$, in position, wobbler, or frequency switching modes, and *(ii)* on–the–fly maps of moderate size (typically $2' - 10'$). HERA proposers should use the web–based Time Estimator. For details about observing with HERA, consult the User Manual. The HERA project scientist, Karl Schuster (schuster@iram.fr), or Manuel Gonzalez (gonzalez@iram.fr), the heterodyne pool coordinator, may also be contacted.
Accepted HERA proposals will be pooled together in order to make more efficient use of stable 1.3 mm observing conditions. Questions concerning the HERA pool organization can be directed to the scheduler or the heterodyne pool coordinator.

Frequency switching

Frequency switching is available for both HERA polarizations as well as for EMIR. This observing mode is interesting for observations of narrow lines where flat baselines are not essential, although the spectral baselines with HERA are among the best known in frequency switching. Certain limitations exist with respect to maximum frequency throw (≤ 45 km/s), backends, phase times etc.; for a detailed report see [2]. This report also explains how to identify mesospheric lines which may easily be confused in some cases with genuine astronomical lines from cold clouds.

Backends

The following four spectral line backends can be individually connected to any EMIR band or to HERA. Specific documentation on the backends available at the 30m telescope can be found on the wiki page at:

`http://www.iram.es/IRAMES/mainWiki/BackendsForEmirHeraMambo`

Fast Fourier Transform Spectrometer

The FTS can be connected to EMIR and HERA. It consists of a series of 24 FTS modules purchased

Table 1: EMIR Frontend characteristics for this semester. The sky frequency range, F_{sky}, refers to the center of the outer IF sub-bands. 2SB stands for dual sideband mixers, SSB for single side band mixers, and H/V for horizontal and vertical polarizations. T_{sb} and T_{db} are the SSB receiver temperatures in single– and dual–band observations, respectively. Note that T_{db} includes a 15 K noise contribution from the dichroics. The high-frequency end of the E 330 bandpass has been extended by 6 GHz.

EMIR band	F_{sky} GHz	mixer type	polarization	bandwidth GHz	T_{sb} K	G_{im} dB	combinations E 0/2	E 1/3	E 0/1	T_{db} K
E 090	83 – 117	2SB	H/V	8	50	> 13	X		X	65
E 150	129 – 174	SSB	H/V	4	50	> 10		X	X	65
E 230	202 – 274	2SB	H/V	8	80	> 13	X			95
E 330	277 – 358	2SB	H/V	8	80	> 10		X		95

from Radiometer Physics (Klein et al. [16, 17]). All FTS units work either at 200 kHz resolution or 50 kHz resolution. It is not possible to set them individually to different resolutions. At 200 kHz resolution, the 24 units provide 32 GHz of instantaneous bandwidth where each block of 3 FTS units covers a contiguous 4 GHz band of EMIR. At 50 kHz resolution, 3 FTS units cover the inner 1.8 GHz of the 4 GHz EMIR bands. When connected to HERA, the FTS can cover each of the 18 pixels over a bandwidth of 1 GHz in the low spectral resolution mode, or over a reduced bandwidth of 625 MHz in the high spectral resolution mode.

Note that the FTS, if used with a short integration phase time, will generate a large amount of data. For example, in the high resolution mode, a single FTS spectrum is about 1 MB, which translates into a data rate of 36 GB per hour for the shortest phase time of 100 ms currently offered for the FTS. We therefore encourage observers requesting short phase times with the FTS to bring an external USB disk to the 30m to copy their data and bring them back to their home institute.
Note also that spectra may show platforming between the FTS units, i.e. total power instabilities of the individual units which are caused by drifts in the analog-to-digital converters. For deep integrations on faint broad lines, we recommend to use WILMA or the 4 MHz filterbank in parallel.

VESPA

The Versatile Spectrometric and Polarimetric Array can be connected to HERA and EMIR. It is also used for polarimetry measurements (see Polarimetry section below). When connected to a set of 4 IF channels from EMIR, VESPA typically provides up to 12 000 spectral channels (up to 18 000 channels are possible in special configurations). Nominal spectral resolutions range from 3.3 kHz to 1.25 MHz. Nominal bandwidths are in the range 10 to 512 MHz. VESPA basebands can be offset from band center by up to ±250 MHz. When VESPA is connected to HERA, up to 18 000 spectral channels can be used with the following combinations of nominal resolution (kHz) and maximum bandwidth (MHz): 20/40, 40/80, 80/160, 320/320, 1250/640. For each one of these configurations, the maximum bandwidth can actually be split into two individual bands for each of the 18 detectors at most resolutions. These individual bands can be shifted separately by up to ±250 MHz offsets from the sky frequency. The many VESPA configurations and user modes are summarized in a Newsletter contribution [10] and in a user guide, but are best visualised on a demonstration program which can be downloaded from our web page at http://www.iram.fr/IRAMFR/PV/veleta.htm.

WILMA

The wideband autocorrelator WILMA consists of 18 units. Each unit provides 512 spectral channels, spaced out by 2 MHz and thus covering a total bandwidth of 1 GHz. Each band is sliced into two 500 MHz sub–bands which are digitized with 2 bit/1 GHz samplers. WILMA can be connected to the 18 detectors of HERA, thus covering the entire bandwidth of both polarizations. A subset of 16 units can also be connected to EMIR covering a bandwidth of 4×4 GHz at a 2 MHz resolution. An informative technical overview of the architecture of WILMA is available at URL:

`http://www.iram.fr/IRAMFR/TA/backend/veleta/wilma/index.htm`

4 MHz filterbank

The 4 MHz filterbank consists of nine units. Each unit has 256 channels (spacing of 4 MHz, spectral resolution at 3 dB is 6.2 MHz) and thus covers a total bandwidth of 1 GHz. The 9 units are designed for connection to HERA. Note that only one polarization of the full array, i.e. HERA1 or HERA2, is thus connectable to this filter bank. A subset of 8 units can also be connected to EMIR covering a bandwidth of 2×4 GHz at a 4 MHz resolution.

Polarimetry

Polarimetric observations can be made using a dual–polarization band of EMIR connected to VESPA in a setup designated as XPOL. The technical aspects of XPOL are described in detail for the previous generation of heterodyne receivers (Thum et al. [13]), together with its observing capabilities and limitations. The adaptation to EMIR is described in a technical note on the IRAM spanish wikipage at:

`http://www.iram.es/IRAMES/mainWiki/CalibrationPapers`

Most notably, XPOL generates simultaneous spectra of all 4 Stokes parameters. The following combinations of spectral resolution (kHz) and bandwidth (MHz) are available: 40/120, 80/240, and 320/480. More complex observing modes where VESPA is split into two bands are also possible (see the VESPA user guide[10]).
XPOL has been tested for the EMIR bands E 090 and E 230 (see the aforementioned technical note). XPOL profits from the improved performance of EMIR in several respects: smaller or negligible phase drifts, small and stable offsets between the two polarizations, and negligible decorrelation losses.
Polarized sidelobes, albeit smaller than typically observed with the previous receivers, are still complicating observations of extended sources. Current evidence indicates that the rotation of the sidelobes with elevation is more complicated than with the previous receivers, possibly due to the off–axis installation of EMIR. Proposals for observation of extended sources should demonstrate that their observations are feasible in the presence of the known sidelobes.
Proposals for polarimetric observations may be submitted for all EMIR bands, although E 330 still requires some commissioning tests that are scheduled for this winter semester. Astronomers interested in using XPOL are invited to get in touch with Clemens Thum.

Observing time estimates

This matter needs special attention as a serious time underestimate may be considered as a sure sign of sloppy proposal preparation. We strongly recommend to use the current time estimator on–line at the Granada web site which handles EMIR and HERA.
If very special observing modes are proposed which are not covered by the Time Estimator, proposers must give sufficient technical details so that their time estimate can be *reproduced*. In particular, the proposal must give values for $T_{\rm sys}$, the spectral resolution, the expected antenna temperature of the signal, the signal/noise ratio which is aimed for, all overheads and dead times, and the resulting observing time.
Proposers should base their time request on normal winter conditions, corresponding to 4 mm of precipitable water vapor (pwv). Conditions during afternoons can be degraded due to anomalous refraction. The observing efficiency is then reduced and the flux/temperature calibration is more uncertain than the typical 10 percent.

Proposers requesting observations which need pwv values lower than 4 mm should enter the maximum acceptable pwv value on the Technical summary page. Very demanding proposals, e.g. observations using E 330 above 300 GHz, or some very deep and/or high frequency continuum observations, may need pwv values $\leq$ 2mm. These observations will be scheduled in a pool.

Organizational aspects

Pooled observing

As in previous semesters, we plan to pool the accepted high frequency ($\lambda \leq 1.3$ mm) proposals. This includes HERA, and those EMIR proposals which principally request the E 230 and E 330 bands. These high frequency proposals will be combined with less weather dependent proposals at lower frequencies in several pool sessions. Proposals with particularly strong demands on weather quality (e.g. heterodyne observations at $\nu > 300$ GHz) will be included in these pools where they get precedence as soon as the precipitable water vapor column (pwv) falls below 2 mm and other conditions are fulfilled. A correct specification of the pwv on the technical summary page is therefore very important. All GISMO proposals will also be scheduled in a dedicated pool.

The proposals participating in the pools will be observed by the PIs and Co-PIs of participating projects, and IRAM staff. The pool observations will be organized by the pool coordinators, Manuel Gonzalez (heterodyne) and Gabriele Bruni (GISMO). The participating proposals are grouped according to their demand on weather quality, and they get observed following the priorities assigned by the program committee. The organization of the observing pools are described on the IRAM 30m web site.

Heterodyne proposals which are particularly weather tolerant qualify as backup for the pools. Participation in the pools is voluntary, and the respective box on the proposal form should be checked. Questions concerning the pool organization can be directed to the scheduler (scheduler30m@iram.es) or to the Pool Coordinator (gonzalez@iram.es).

Service observing

To facilitate the execution of short (≤8 h) programs, we propose "service observing" for some easy to observe programs *with only one set of tunings.* Observations are made by the local staff using precisely laid–out instructions by the principal investigator. For this type of observation, we request an acknowledgement of the IRAM staff member's help in the forthcoming publication. If you are interested in this mode of observing, specify it as a "special requirement" in the proposal form. IRAM will then decide which proposals can actually be accepted for this mode.

Remote observing

Remote observations are restricted to experienced 30m observers who have been granted less than 10 to 20 hours of observing time. Please contact Nicolas Billot (scheduler) and Carsten Kramer (station manager) at least 2 weeks in advance if you plan to conduct remote observations.

In this observing mode, the remote observer actually controls the telescope very much like on Pico Veleta. Remote observing is available from the IRAM offices in Granada and Grenoble, and from the MPIfR Bonn, and from OAN in Madrid. If you are planning to use this observing mode, please contact the Astronomer on Duty (for Granada), Catherine Berjaud and Roberto Neri (for Grenoble), J. Alcolea (for Madrid), or Dirk Muders (for Bonn) well in advance of your observing run. As a safeguard, please email observing instructions and macros to the AoD and/or operator.

Reminders

For any questions regarding the telescope and the control programs, we recommend to consult the summary of telescope parameters and the NCS web pages.
The applied calibration procedure is explained in depth in a special report entitled "Calibration of spectral line data" available at

`http://www.iram.es/IRAMES/mainWiki/CalibrationPapers`

The astronomer on duty may be contacted for any special questions concerning the preparation of an observing run. The AoD schedule is available at

`http://www.iram.es/IRAMES/mainWiki/AstronomerOnDutySchedule`

If your observations with GISMO at the 30m telescope result in a publication, please acknowledge support from the GISMO team and include a reference to Staguhn et al. 2008 [14].

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20th International Symposium on Space Terahertz Technology, Charlottesville, 20-22 April 2009

These reports are available upon request (see also previous Newsletters) from Mrs. C. Berjaud, IRAM Grenoble (e–mail: `berjaud@iram.fr`).

Nicolas Billot & Carsten Kramer

News from the Plateau de Bure Interferometer

Weather conditions and observing

Observing conditions this spring were quite variable in terms of atmospheric opacity and stability, and allowed for useful 1 mm observations until around mid of March. Reasonable 3 mm and occasionally even good 2 mm observing conditions are currently still met during the night and typically lasting until around noon.

This year, we moved the array from its A configuration into the second most extended configuration (B) on March 1st. C configuration was scheduled from March 12 to April 2nd, when the interferometer was moved back into the most compact (D) configuration. The antenna maintenance period started on May 15, when antenna 6 was brought into the maintenance hall and the array entered into its 5D summer configuration. The current maintenance period is foreseen to end around mid September, when antenna 1 will leave the hangar.

Plateau de Bure participated in the global spring 3 mm VLBI session from May 17 to 22 with the array observing in changing weather conditions until the morning of May 20, when observations finally had to be stopped due to high winds, snow, and rain. For this autumn, no global 3 mm VLBI observations are planned.

Work to better protect the antenna stations against water penetration and to refurbish the pavement of the eastern and western track is currently under way. This work is expected to be completed by the end of July. To provide access to the stations from E03 to W08, a non-standard D-like configuration is exceptionally scheduled during this period. In order to guarantee a good accuracy of the antenna surfaces, holographic measurements are being done for each antenna and, if deemed necessary, appropriate panel adjustments are applied to keep the surface roughness within the specification of 50 microns.

In the frame of the NOEMA project work is going on, in particular during the afternoons, to implement and test a "double array mode", which will be used in the future for the commissioning of new hardware that will be arriving on Plateau de Bure. Also in view of NOEMA, a switch for the LO will be installed on one antenna and tested this summer with the goal to feed the band 2 and band 3 receivers with the same local oscillator (currently individual oscillators are used for each band). The control systems of the antenna drives currently in use on Plateau de Bure are not fabricated anymore and therefore a new solution needs to be found for the NOEMA antennas. To prepare this exchange, a new generation of azimuth and elevation motors, control electronics, and corresponding software will be installed on one of the current antennas and thoroughly tested during the coming months.

All A-rated projects requesting the extended A- and B-configurations could be completed this year. No project needs to be carried over for observations in the two most extended configurations for the upcoming winter semester. The Large Programs are proceeding smoothly and as planned.

As far as A-rated projects are concerned, we hope to bring most of these to completion before the end of the summer semester. B-rated projects are likely to be observed only if they fall in a favorable LST range. We remind users of the Plateau de Bure interferometer that B-rated proposals as well as time-filler programs of the current summer semester, which are not started before the proposal deadline, have to be resubmitted.

Investigators who wish to check the status of their project may consult the interferometer schedule on the Web at ../IRAMFR/PDB/ongoing.html[1]. This page is updated daily.

Jan Martin WINTERS

Call for Observing Proposals on the Plateau de Bure Interferometer

Conditions for the next winter session

Based on our experience in carrying out configuration changes in winter conditions, we plan again to schedule four (maybe five) configuration changes during the upcoming winter semester. We therefore accept proposals for any of the 4 primary configurations of the six antenna array.

A preliminary configuration schedule for the winter period is outlined below. Adjustments to this provisional configuration planning will be made according to proposal pressure (in particular on the 0.8 mm receiver), weather conditions, and other contingencies. The configuration schedule given below should be taken as a guideline, in particular when

[1] from here on we give only relative URL addresses. In the absolute address the leading two dots (..) should be replaced by `http://www.iram.fr`

the requested astronomical targets cannot be observed during the entire winter period because of the sun avoidance constraints.

Conf	Scheduling Priority Winter 11/12
C	December
(D	December – January)
A	January – February
B	February – March
C	March – April
D	April – May

We strongly encourage observers to submit proposals for the set of AB configurations that include the longest baselines. For these proposals we ask to focus on bright compact sources, possibly at high declination.

We invite proposers to submit proposals also for observations at 3 mm. When the atmospheric conditions are not good enough at 1.3 mm or at 2 mm, 3 mm projects will be observed: in a typical winter, 20-30% of the time used for observations is found to be poor at 1.3 mm, but still excellent at 3 mm.

General Proposal Considerations

Please give high importance to the quality of your proposal. The Plateau de Bure Interferometer is a powerful, but complex instrument, and proposal preparation requires special care. In particular, your proposal should not only justify the scientific interest, but also the need for the Plateau de Bure interferometer. The proposers should also note in their application whether the same or a similar proposal was or is intended to be submitted to ALMA, in which case a special justification is required why IRAM telescope time is needed.

Don't hesitate to contact the Plateau de Bure Interferometer Science Operations Group (sog@iram.fr) in case of doubts and for questions related to the preparation of a proposal.

Proposal templates

We provide different template files for the two telescopes, `prop-pdb.tex` and `prop-30m.tex`. Please, make sure to use the current version of these files and the common LaTeX style file `proposal.sty`. All three files may be downloaded from the IRAM web pages at URL ../GENERAL/submission/-proposal.html. Do not change the font type or size, and do not manipulate the style file. In case of problems, contact the IRAM scientific secretary (berjaud@iram.fr).

Proposal category

Proposals should be submitted for one of the seven categories:

3MM: Proposals that ask for 3 mm data.

2MM: Proposals that ask for 2 mm data. 3 mm receivers can be used for calibration purposes, but cannot provide any imaging.

1.3MM: Proposals that ask for 1.3 mm data. 3 mm receivers can be used for calibration purposes, but cannot provide any imaging.

BAND4: If your proposal requests observations using the 0.8 mm band, please check this bullet. 3 mm receivers can be used for calibration purposes, but cannot provide any imaging.

TIME FILLER: Proposals that have to be considered as background projects to fill in periods where the atmospheric conditions do not allow mapping, to fill in gaps in the scheduling, or even to fill in periods when only a subset of the standard 6-antenna configurations will be available. These proposals will be carried out on a "best effort" basis only.

SPECIAL: Exploratory proposals: proposals whose scientific interest justifies the attempt to use the PdB array beyond its guaranteed capabilities. This category includes for example non-standard frequencies for which the tuning cannot be guaranteed, non-standard configurations, and more generally all non-standard observations. These proposals will be carried out on a "best effort" basis only.

LARGE PROGRAM: This category is offered on both IRAM instruments since the winter 2008/2009 observing period. See Section *Large Observing Programs* for a detailed explanation.

The proposal category will have to be specified on the proposal cover sheet and should be carefully considered by proposers.

Short spacing observations on the 30m telescope should directly be requested on the interferometer proposal form. A separate proposal for the 30m telescope is not required. The interferometer proposal form contains a bullet, labeled "30M short spacings" which should then be checked. The user will be prompted to fill in an additional paragraph in which the scientific need for the short spacings should be described. It is essential to give here all observational details, including size of map, sampling density and rms noise, spectral resolution, receiver configuration, and time requested.

Configurations of the six-antenna array

The six-element array can be arranged in the following configurations:

Conf	Stations					
A	W27	E68	N46	E04	E24	N29
B	W27	E23	N46	W12	E12	N20
C	W12	E10	N17	W09	E04	N11
D	W08	E03	N11	W05	N02	N07

The general properties of these configurations are:

- `A` alone is well suited for mapping or size measurements of very compact, strong sources. It provides a resolution of $0.8''$ at 100 GHz, $\sim 0.35''$ at 230 GHz.
- `B` alone yields $\sim 1.2''$ at 100 GHz and, in combination with A provides a $\sim 1.0''$ beam at 100 GHz with very low sidelobe levels. It is mainly used for relatively strong sources.
- `C` provides a fairly complete coverage of the uv-plane (low sidelobe level) and is well adapted to combine with D for low angular resolution studies ($\sim 3.5''$ at 100 GHz, $\sim 1.5''$ at 230 GHz) and with B for higher resolution ($\sim 1.7''$ at 100 GHz, $\sim 0.7''$ at 230 GHz). C alone ($\sim 2.7''$ at 100 GHz, $\sim 1.2''$ at 230 GHz) is also well suited for snapshot and size measurements, and for detection experiments at low declination.
- `D` alone is best suited for deep integration and coarse mapping experiments (resolution $\sim 5''$ at 100 GHz). This configuration provides both the highest sensitivity and the lowest atmospheric phase noise.

The four configurations can be used in different combinations to achieve complementary sampling of the uv-plane, and to improve on angular resolution and sensitivity. Mosaicing is usually done with D or CD, but the combination BCD can also be requested for high resolution mosaics. Check the ANY bullet in the proposal form if the scientific goals can be reached with any of the four configurations or their subsets.

Please consult the documentation *An Introduction to the IRAM interferometer*, accessible at `../IRAMFR/PDB/docu.html` for further details.

Receivers

All antennas are equipped with dual polarization receivers for the 3 mm, 2 mm, 1.3 mm, and 0.8 mm atmospheric windows. The frequency ranges are 80 GHz to 116 GHz for the 3 mm band, 129 GHz to 174 GHz for the 2 mm band, 201 to 267 GHz for the 1.3 mm band, and 277 to 371 GHz for the 0.8 mm band.

Each band of the receivers is dual-polarization with the two RF channels, one per polarization, of one band observing at the same frequency. The four different bands are not co-aligned in the focal plane (and therefore on the sky). Due to the pointing offsets between the different frequency bands, only one band can be observed at any time. Time-shared observations between the 3 mm band and one of the other frequency bands (e.g. band 1 and band 3) are possible in well justified cases, they are however not very efficient. Please contact the Interferometer Science Operations Group (sog@iram.fr) to discuss the feasibility in case you are interested in using this mode.

The mixers for bands 1, 2, and 3 are single-sideband, backshort-tuned; they will usually be tuned LSB, except for the upper part of the frequency range in all three bands where the mixers will be tuned USB. The band 4 mixers are 2SB receivers, operated in SSB mode. They can be tuned LSB or USB throughout most of the accessible frequency range. The typical image rejection is 10 dB, 20 dB for band 4.

Signal to Noise

The rms noise can be computed from

$$\sigma = \frac{J_{\rm pK} T_{\rm sys}}{\eta \sqrt{N_{\rm a}(N_{\rm a}-1) N_{\rm c} T_{\rm ON} B}} \frac{1}{\sqrt{N_{\rm pol}}} \qquad (1)$$

where

- $J_{\rm pK}$ is the conversion factor from Kelvin to Jansky (22 Jy/K at 3 mm, 29 Jy/K at 2 mm, 35 Jy/K at 1.3 mm, and 45 Jy/K at 0.8 mm).
- $T_{\rm sys}$ is the system temperature ($T_{\rm sys}$ = 100 K below 110 GHz, 170 K at 115 GHz, 130 K between 130 GHz and 150 GHz, 170 K above 150 GHz in the 2 mm band, 200 K at 230 GHz, and 370 K at 350 GHz for sources at $\delta \geq 20°$ and for typical winter conditions.
- η is an efficiency factor due to atmospheric phase noise (0.9 at 3 mm, 0.85 at 2 mm, 0.8 at 1.3 mm, and 0.70 at 0.8 mm in typical winter conditions).

	Band 1	Band 2	Band 3	Band 4
RF range*/[GHz]	80–116	129–174	201–267	277–371
T_{rec}/[K] LSB	40–55	30–50	40–60	30–50
T_{rec}/[K] USB	40–55	40–80	50–70	30–50
G_{im}/[dB]	-10	-12 ... -10	-12 ... -8	-20
RF LSB/[GHz]	80–104	129–165	201–264	277-359
RF USB/[GHz]	104–116	164–174	264–267	289-371

* center of the 4.2-7.8 GHz IF band

- N_a is the number of antennas (6), and N_c is the number of configurations: 1 for D, 2 for CD, and so on.
- T_{ON} is the on-source integration time per configuration in seconds (2 to 8 hours, depending on source declination). Because of various calibration overheads, the total observing time is typically 1.6 T_{ON}.
- B is the spectral bandwidth in Hz (40 kHz to 2.5 MHz for spectral line observations using the narrow-band correlator, and from about 2 MHz for line projects up to 3.6 GHz for continuum projects using WideX).
- N_{pol} is the number of polarizations: 1 for single polarization and 2 for dual polarization (see section *Correlators* for details).

Investigators have to specify in the "technical justification" **and on the Technical Sheet** the 1 sigma noise level which is necessary to achieve each individual goal of a proposal, and particularly for projects aiming at deep integrations.

Correlators

Wide-Band correlator (WideX)

At any given time, only one frequency band can be observed, but with the two polarizations available. Each polarization delivers a 3.6 GHz bandwidth (from IF=4.2 to 7.8 GHz). The two 3.6-GHz bandwidths coincide in the sky frequency scale.

The wide-band correlator WideX gives access to the two 3.6 GHz wide IF bands simultaneously. WideX provides a fixed spectral resolution of 1.95 MHz over the full bandwidth and, by default, always is available in parallel to the narrow-band correlator.

Narrow-Band Correlator

The narrow-band correlator accepts as input two signals of 1 GHz bandwidth, that must be selected within the 3.6 GHz delivered by the receiver. In practice, the IF processor splits the two input 4.2–7.8 GHz bands in four 1 GHz wide "quarters", labeled *Q1...Q4*. Two of these quarters must be selected as narrow-band correlator inputs. The system allows the following choices:

- first correlator entry can only be Q1 HOR, or Q2 HOR, or Q3 VER, or Q4 VER
- second correlator entry can only be Q1 VER, or Q2 VER, or Q3 HOR, or Q4 HOR

where HOR and VER refer to the two polarizations:

Quarter IF1 [GHz]	Q1 4.2-5.2	Q2 5.0-6.0	Q3 6.0-7.0	Q4 6.8-7.8
input 1	HOR	HOR	VER	VER
input 2	VER	VER	HOR	HOR

Note, that the combination VER VER is not allowed.

The two selected quarters are converted down to 0.1-1.1 GHz, the input range of the narrow-band correlator.

How to observe two polarizations? To observe simultaneously the two orthogonal polarizations at the same sky frequency, one must select the same quarter (Q1 or Q2 or Q3 or Q4) for the two narrow-band correlator entries, e.g. Q3 Q3. This will necessarily result in each entry seeing a different polarization. The system thus gives access to 1 GHz × 2 polarizations.

How to use the full 2 GHz bandwidth? If two different quarters are selected (any combination except VER VER is possible), a bandwidth of 2 GHz can be analyzed by the narrow-band correlator (e.g., Q2 Q3). Only one polarization per quarter is available in that case; this may or may not be the same polarization for the two chunks of 1 GHz.

Is there any overlap between the four quarters? In fact, the four available quarters are 1 GHz wide each, but with a small overlap between some of them: Q1 is 4.2 to 5.2 GHz, Q2 is 5.0 to 6.0 GHz, Q3 is 6.0 to 7.0 GHz, and Q4 is 6.8 to 7.8 GHz. This results from the combination of filters and LOs used in the IF processor. E.g., the combination Q1 Q2 would cover a bandwidth of 1.8 GHz with an overlap of 200MHz in the center.

Is the 2 GHz bandwidth necessarily continuous? No: any combination (except VER VER) of two quarters can be selected. Adjacent quarters will result in a (quasi) continuous 1.8 or 2 GHz band. Non-adjacent quarters will result in two separate 1 GHz bands.

Where is the selected sky frequency in the IF band? It would be natural to tune the receivers such that the selected sky frequency corresponds to the center of the IF bandwidth, i.e. 6.0 GHz. However, this corresponds to the limit between Q2 and Q3. If your project depends on the narrow-band correlator, it is therefore highly recommended to center a line at the center of a quarter (see Section "ASTRO" below). In all bands, the receivers offer best performance in terms of receiver noise and sideband rejection in Q3 (i.e. the line should usually be centered at an IF1 frequency of 6500 MHz).

Spectral units of the narrow band correlator

The narrow band correlator has 8 independent units, which can be placed anywhere in the 100–1100 MHz band (1 GHz bandwidth). 7 different modes of configuration are available, characterized in the following by couples of total bandwidth/number of channels. In the 3 DSB modes (320MHz/128, 160MHz/256, 80MHz/512 – see Table) the two central channels may be perturbed by the Gibbs phenomenon if the observed source has a strong continuum. When using these modes, it is recommended to avoid centering the most important part of the lines in the middle of the band of the correlator unit. In the remaining SSB modes (160MHz/128, 80MHz/256, 40MHz/512, 20MHz/512) the two central channels are not affected by the Gibbs phenomenon and, therefore, these modes may be preferable for some spectroscopic studies.

Spacing (MHz)	Channels	Bandwidth (MHz)	Mode
0.039	1×512	20	SSB
0.078	1×512	40	SSB
0.156	2×256	80	DSB
0.312	1×256	80	SSB
0.625	2×128	160	DSB
1.250	1×128	160	SSB
2.500	2×64	320	DSB

Note that 5% of the passband is lost at both ends of each subband. The 8 units can be independently connected to the first or the second correlator entry, as selected by the IF processor (see above). Please note that the center frequency is expressed in the frequency range seen by the correlator, i.e. 100 to 1100 MHz. The correspondence to the sky frequency depends on the parts of the 3.6 GHz bandwidth which have been selected as correlator inputs and on the selected receiver side band (LSB or USB).

ASTRO

The software ASTRO can be used to simulate the receiver/correlator configuration. Astronomers are urged to download the most recent version of GILDAS at `../IRAMFR/GILDAS` to prepare their proposals.

The previous `LINE` command has been replaced by several new commands (see internal help; the following description applies to the current receiver system). The behavior of the `LINE` command can be changed by the `SET PDBI 1995|2000|2006` command, that selects the PdBI frontend/backend status corresponding to years 1995 (old receivers, 500 MHz bandwidth), 2000 (580 MHz bandwidth), 2006 (new receivers and new IF processor, 3.6 GHz bandwidth). Default is 2006:

- `LINE`: receiver tuning
- `NARROW`: selection of the narrow-band correlator inputs
- `SPECTRAL`: spectral correlator unit tuning
- `PLOT`: control of the plot parameters.

A typical session would be:

```
! choice of receiver tuning
line xyz 93.200 lsb 6500

! choice of the correlator windows
narrow Q3 Q3
```

```
! correlator unit #1, on entry 1
spectral 1  20 600 /narrow 1

! correlator unit #2, on entry 1
spectral 2  20 735 /narrow 1

! correlator unit #3, on entry 1
spectral 4 320 300 /narrow 1

! correlator unit #4, on entry 2
spectral 4 320 666 /narrow 2
...
```

The first step above:

```
! choice of receiver tuning
line xyz 93.2 lsb 6500
```

would produce a plot showing the full 3.6 GHz bandwidth delivered by the receivers that is accessible to WideX in dual polarization.

Source coordinates and Velocities

The interferometer operates in the equatorial J2000.0 coordinate system. Please do not forget to specify LSR velocities for the sources. For pure continuum projects, the "special" velocity `NULL` (no Doppler tracking) can be used. The source list must contain all the sources (and only those sources) for which observing time is requested. The list must adhere to the format indicated on the proposal form (sexagesimal notation). If your list contains more than 18 sources that fit onto the cover page, please use the LaTeX macro `\extendedsourcelist`.

Any later request for a swap of targets has to be submitted for approval to the IRAM director and to be justified by new evidence or exceptional circumstances.

Sun Avoidance

For safety reasons, a sun avoidance limit is enforced at **35 degrees from the sun**. We are working to further reduce the sun avoidance limit for forthcoming semesters.

Mosaics

The PdBI has mosaicing capabilities, but the pointing accuracy may be a limiting factor at the highest frequencies. Please contact the Science Operations Group (sog@iram.fr) in case of doubts.

Local Contact

A local contact will be assigned to every A or B rated proposal which does not involve an in-house collaborator. He/she will assist you in the preparation of the observing procedures and provide help to reduce the data.

Assistance (write to sog@iram.fr) is also provided before a deadline to help newcomers in the preparation of a proposal. Depending upon the program complexity, IRAM may require an in-house collaborator instead of the normal local contact.

Data reduction

Proposers should be aware of constraints for data reduction:

- We recommend that proposers reduce their data in Grenoble. For the time being, remote data reduction can only be offered in exceptional cases and with some restrictions enforced on the VISITOR accounts. Please contact your local contact if you're interested in this possibility.
- We keep the data reduction schedule very flexible, but wish to avoid the presence of more than 2 groups at the same time in Grenoble. Data reduction will be carried out on dedicated computers at IRAM. Please contact us in advance.
- In certain cases, proposers may have a look at the uv-tables as the observations progress. If necessary, and upon request, more information can be provided. Please contact your local contact or PdBI's Science Operations Group (sog@iram.fr) if you are interested in this.
- Observers who wish to finish data reduction at their home institute should obtain the most recent version of CLIC. Because differences between CLIC versions may potentially result in imaging errors if new data are reduced with an old package, we advise observers having a copy of CLIC to take special care in maintaining it up-to-date. The newer versions are in general downward compatible with the previous releases. The recent upgrades of CLIC implied however many modifications for which backward compatibility with old PdBI receiver data is not established. To calibrate data obtained with the "old" receiver system (up to September 2006), we therefore recommend to use the January 2007 version of CLIC. This CLIC version is included in the general GILDAS package, accessible as "clic07".

Technical pre-screening

All proposals will be reviewed for technical feasibility in parallel to being sent to the members of the program committee. Please help in this task by submitting technically precise proposals. Note that your proposal must be complete and exact: the source position and velocity, as well as the requested frequency setup must be correctly given.

Non-standard observations

If you plan to execute a non-standard program, please contact the Interferometer Science Operations Group (sog@iram.fr) to discuss the feasibility.

Documentation

The documentation for the IRAM Plateau de Bure Interferometer includes documents of general interest to potential users and more specialized documents intended for observers on the site (IRAM on-duty astronomers, operators, or observers with non-standard programs). All documents can be retrieved on the Internet at `../IRAMFR/PDB/docu.html`. Information on the current receiver system is given in the *Introduction to the IRAM Plateau de Bure Interferometer* at `../IRAMFR/GILDAS/doc/html/pdbi-intro-html`, in this call for proposals, and in the *Calibration CookBook*, available at `../IRAMFR/GILDAS/doc/html/pdbi-cookbook-html`.

Publication

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

Jan Martin WINTERS

Guidelines for Observing Time at the IRAM Facilities

Considering the much increased time requests for the IRAM telescopes over the last few years, taking into account the imminent begin of science operations of ALMA, and considering the substantial new investments of the IRAM partners into upgrading the current Plateau de Bure interferometer into NOEMA, the IRAM Council has decided the following guidelines for allocation of telescope time, starting in the winter semester 2011/2012, namely:

1. The fraction of time for Large Programs (projects that request in between 100 and 1000 hours of observing time over a maximum of 6 semesters) can be expanded to a total of about 50% of the scheduled telescope time on either of the IRAM telescopes, if these programs meet the combined requirements of outstanding scientific quality, timeliness, very high impact in an important and broad field of scientific research, and proven top track record of the proposers. In order to ensure proper management of these programs in close interaction with the IRAM observatory, including the provision of suitable archive data products for the general scientific community furnished by the large program team within 18 months of the completion of the program, preference will be given to programs led by a PI located in one of the IRAM partner countries.
2. PIs of Large Programs cannot submit other proposals (as PI) during the active time of the large program.
3. In deciding on proposal rankings the Program Committee is requested to take into account the publication record and impact of the proposers with previous IRAM telescope time allocations. The proposers should also note in their application whether the same or a similar proposal was or is intended to be submitted to ALMA, in which case a special justification is required why IRAM telescope time is needed.

Finally, we inform that the Partners will reserve time for mutually agreed "Observatory Programs" once the NOEMA upgrade is sufficiently advanced.

Large observing programs

IRAM offers the possibility to apply for observing time in the framework of a *Large Program* for the 30-meter telescope and the Plateau de Bure interferometer.

A Large Program should require in between 100 and 1000 hours of observing time, spread over a maximum of three years, i.e. 6 contiguous semesters. IRAM will accept a limited number of Large Programs to be carried out per semester and instrument (30-meter and Plateau de Bure interferometer), allocating a maximum of 50% of observing time to such projects.

The Large Program should address strategic scientific issues leading to a breakthrough in the field. Large Programs should be coherent science projects, not reproducible by a combination of smaller normal proposals.

The Large Program proposals should contain a solid management plan ensuring an efficient turnover, including data reduction, analysis, and organization of the efforts.

Because of the large investment in observing time, but also of the inherent support from IRAM, it is advised that Large Programs involve one or more IRAM internal collaborators.

During the execution period of the Large Programs (ideally before mid-term), the team leading the Large Program should report to IRAM about the preliminary results and possible technical difficulties, so that IRAM could assess the progress made, assist with any problems encountered in the course of the observations, and, if needed, adjust the program scheduling.

The proprietary period ends 18 months after the end of the last scheduling semester in which the Large Program was observed. The raw data and processed data then enter the public domain. An extension of this proprietary period may be granted in exceptional cases only. A corresponding request will have to be submitted to the IRAM director.

Finally, it should be noted that following the new guidelines decided by the IRAM Council, PIs of Large Programs cannot submit other proposals (as PI) during the active time of the Large Program.

Because of the scope of the Large Programs and the need to explain the organization of the project, Large Program proposals will have a maximum length of 4 pages (not including figures, tables, or references), instead of the 2 pages for normal proposals. Large observing program proposals should be submitted using the standard proposal templates; just check the "Large Program" bullet on the cover page. The following sections should be included: i) Scientific Rationale, ii) Immediate Objective, iii) Feasibility and Technical Justification, and iv) Organizational Issues. For the Plateau de Bure interferometer, the latter section must include a consideration of sun avoidance constraints and configuration scheduling.

The scientific evaluation of the Large Program proposals will be done by the Program Committee at large (all 12 members, except if there is a direct implication of one of the members in the proposal). External reviewers will be asked to evaluate Large Programs, if needed. In addition to the scientific evaluation, there will be an assessment of the technical feasibility by IRAM staff.

Note that a Large Program will either be accepted in its entirety or rejected, there will be no B–rating ("backup status") nor a partial acceptance/rejection of the proposal.

For the Winter semester 2012, the call for Large Programs will be open for the 30m telescope and the Plateau de Bure interferometer. For the 30m telescope, Large Programs may consider using HERA and EMIR.

Pierre Cox