Proposals for IRAM Telescopes

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

12 March 2009, 17:00 CET (UT + 1 hour)

The scheduling period extends from 1 June – 30 Nov 2009. 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 above mentioned web page. 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. As an insurance against network congestion or failure, we still accept, in well justified cases, proposals submitted by:

- fax to number: (+33) 476 42 54 69 or by
- ordinary mail addressed to:
  IRAM Scientific Secretariat,
  300, rue de la piscine,
  F-38406 St. Martin d'Hères, France

Proposals sent by e–mail are not accepted. Color plots will be printed/copied in grey scale. If color is considered essential for the understanding of a specific figure, a respective remark should be added in the figure caption. The color version may then be consulted in the electronic proposal by the referees.

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 more pages of figures, tables, and references. Normal proposals should *not exceed 6 pages*, except for additional technical pages. Longer proposals will be cut. We continue to call for **Large Observing Programmes** as described by P. Cox in this Newsletter. 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.

Both proposal forms, for the 30m telescope and for the interferometer, have been changed considerably for the current deadline. In fact, we now have different template files for the two telescopes, `prop-pdb.tex` and `prop-30m.tex`. Please, **make absolutely 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[1] 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 secretary. (e–mail: `berjaud@iram.fr`).

In all cases, 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).

Short spacing observations on the 30m telescope can now be requested directly on the interferometer proposal form. A separate proposal for the 30m telescope is not required. The interferometer proposal form contains a bullet, labelled "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.

A mailing list has been set up for astronomers interested in being notified about the availability of a new Call for Proposals. A link to this mailing list is on the IRAM web page. The list presently contains all users of IRAM telescopes during the last 2 years.

J.M. Winters & C. Thum

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

Travel funds for European astronomers

The European Framework Programme 6 (FP 6) which includes the RadioNet initiative has come to an end in 2008. In FP 7, a new RadioNet initiative has been accepted in which IRAM is involved with its two Observatories. A budget similar to the 2004 – 2008 period will be available for supporting travel by European astronomers through the Trans National Access (TNA) Programme.

As before, travel may be supported to the 30m telescope and to Grenoble for reduction of interferometer data. Detailed information about the eligibility, TNA contacts, 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 contacted as soon as the new Radionet programme has officially started and the corresponding funds are available.

R. Neri & C. Thum

Call for Observing Proposals on the 30m Telescope

Summary

Proposals for three types of receivers will be considered for this summer semester (1 June – 30 Nov 2009):

1. the new four band receiver EMIR consisting of dual–polarization mixers operating at 3, 2, 1.3, and 0.9 mm.
2. the 9 pixel dual–polarization heterodyne receiver array, HERA, operating at 1.3 mm wavelength.
3. The MAMBO-2 bolometer array with 117 pixels operating at 1.2 mm.

About 2000 hours of observing time are expected to be available. The emphasis will be put on observations at the longer wavelengths. The bulk of the 1.3 mm observations will be scheduled in October/November. Proposals for the 0.9 mm band of EMIR will not be considered for this deadline. A **separate Call** for 0.9 mm Proposals may be issued in May when the commissioning results for this highly weather dependent band will be available.

We continue to call for Large Programmes which may consider using HERA and MAMBO as well as the new receiver EMIR with the exception of its 0.9 mm band (see contribution by P. Cox elsewhere in this Newsletter).

What is new?

EMIR The new generation single pixel heterodyne receiver for Pico Veleta, EMIR (**E**ight **MI**xer **R**eceiver), consisting of dual-polarization 4 GHz bandwidth mixers operating at 3, 2, 1.3, and 0.9mm, will be installed and commissioned during March/April 2009. During a large part of the five weeks installation and commissioning period, pooled observations will be made during night time.

EMIR not only provides large improvements in receiver noise temperature and bandwidth, it is also more complex than the old receivers. We therefore urge interested users to carefully study the detailed description below.

Observation time estimator We have prepared a new 30m time estimator for EMIR. Starting with the feb02b release, it is part of the GILDAS software and accessible only via ASTRO. For downloading of the GILDAS package please go to the GILDAS web site and follow the instructions. Note that a *web based* estimator for EMIR will be made available only for the next deadline in September 09. As for HERA and MAMBO, the old web based time estimator is still available here.

Proposal form. Motivated by the arrival of EMIR, the proposal form for the 30m telescope has been modified. It now collects the technical parameters of the requested observations in more detail on a separate *technical sheet* which is printed as the second page of the proposal. Note that the 30m telescope and the interferometer now have separate proposal templates.

In the following, we present the new receiver EMIR. The bolometer and HERA which continue to be operational as before are described in the full version of the Call for Porposals available on the IRAM web site.

EMIR

Overview

The new receiver **EMIR** (Fig. 1) is scheduled for installation and commissioning at the 30m telescope in March through April 2009. EMIR will replace the current single pixel heterodyne receivers A/B100,

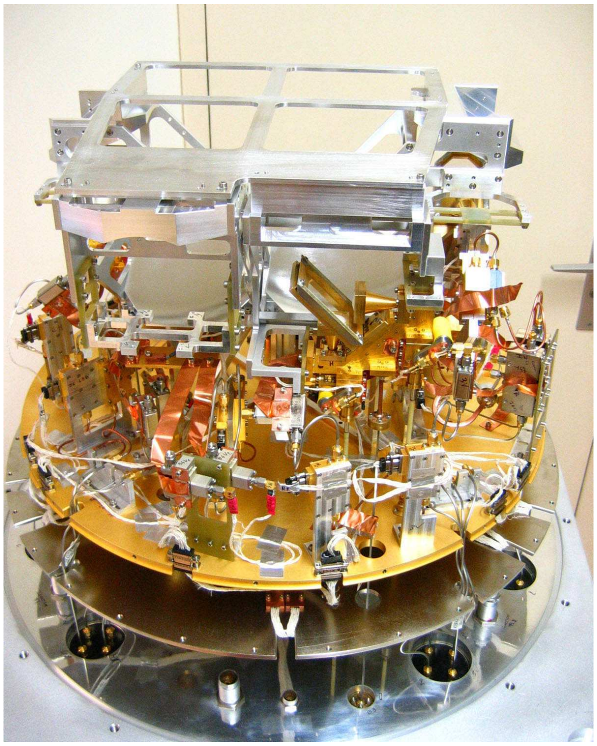

Figure 1: EMIR during final integration in the Grenoble receiver laboratory. One of the four dual–polarization mixer pairs is visible near the center of the photograph. The beams of the 4 mixer pairs leave the dewar through 4 separate windows towards the top of the figure. Warm optics (not shown) can combine some of the 4 beams for observation of the same position on the sky (see Tab. 1).

C/D150, A/B230, and C/D270. HERA, the bolometers, and the backends are unchanged. EMIR will provide a minimum instantaneous bandwidth of 4 GHz in each of the two orthogonal linear polarizations for the 3, 2, 1.3 and 0.9 mm atmospheric windows (Fig. 2). In addition to the vast increase in bandwidth compared to the old single pixel receivers, EMIR is expected to offer significantly improved noise performance, a stable alignment between bands, and other practical advantages.

The four EMIR bands are designated as E 090, E 150, E 230, and E 330 according to their approximate center frequencies in GHz. While the E 150 and E 230 bands have SSB mixers with a single sideband available at a time, the E 090 and E 330 bands are operated in 2SB mode where both sidebands are available for connection to backends. Furthermore, the E 090 band uses a technology that offers 8 GHz instantaneous bandwidth per sideband and polarization. Both polarizations of a given band will always be tuned to the same frequency as they share a single common local oscillator. The tuning ranges of the 4 bands, the typical receiver noise temperatures, and other parameters as measured in the lab are listed in Tab. 1.

For the first time in the history of the 30m telescope, EMIR will provide a permanently available high sensitivity E 330 band, opening this atmospheric window for regular use under good weather conditions. However, as commissioning of this band will be difficult and time consuming during the summer semester, we do not offer the 0.9 mm band right now. A separate Call for 0.9 mm observations may be issued in May in case that commissioning of this band came to a positive conclusion.

At the time of writing, EMIR is undergoing final tests in the receiver laboratory. Precise figures of EMIR's performance at the telescope will not be known before the proposal deadline. The Observatory will make the results of the commissioning available as soon as possible on the 30m web site. The interested astronomer may also find more detailed technical information on EMIR under this URL. IRAM staff is also be available to help astronomers with the preparation of EMIR (and other) proposals.

Selection of EMIR bands

Before reaching the Nasmyth mirrors, the four beams of the EMIR bands pass through warm optics that contains switchable mirrors and dichroic elements for redirection of the beams towards calibration loads and for combining beams. In its simplest mode, the warm optics unit selects one single EMIR band for observation. This mode avoids the use of the slightly lossy dichroic elements and therefore offers the best receiver noise temperatures.

Three dichroic mirrors are available for combining either the E 090 and E 150 beams, or the E 090 and E 230 beams, or the E 150 and E 330 beams (Tab. 1). The combination of bands is not polarization selective, i.e. the combined bands will stay dual polarization. The loss of these dichroics which is small over most of the accessible frequency range, increases however the receiver temperatures by 10 – 15 K. The observer is therefore adviced to carefully evaluate whether an observation involving two different bands is more efficiently made in parallel or in series.

Table 1: EMIR Frontend. Sky frequencies, F_{sky}, refer to the center of the IF band. 2SB – dual sideband mixers, SSB – single side band mixers, H/V – horizontal and vertical polarizations, T_{sb} is the SSB receiver temperature in single band observations (*left*). For dual–band observations, T_{db} includes a 15 K noise contribution from the dichroics (*right*).

EMIR band	F_{sky} GHz	mixer type	polari- zation	IF width 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	200 – 267	SSB	H/V	4	50	> 13	X			65
E 330	260 – 360	2SB	H/V	4	70	> 10		X		85

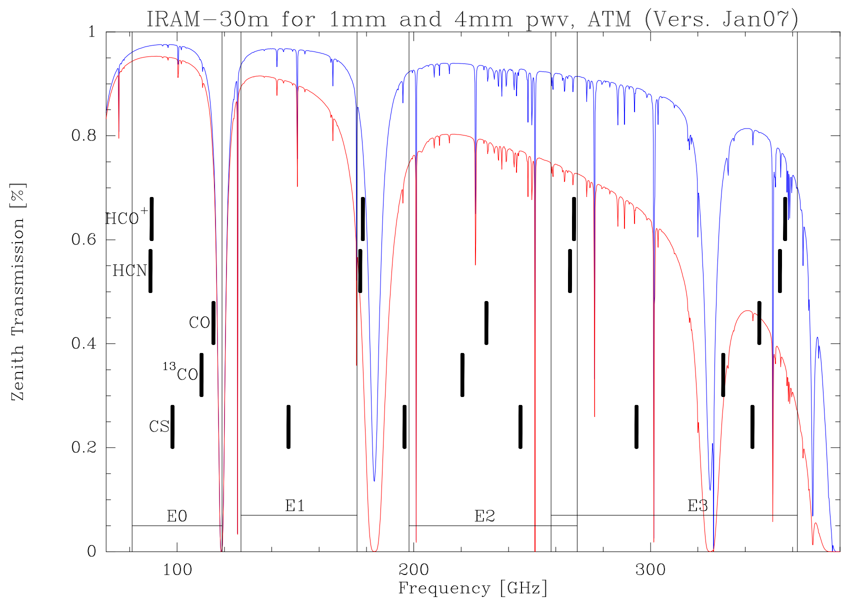

Figure 2: Atmospheric transmission at the 30m site between 60 and 400 GHz for 1 and 4mm of precipitable water vapor, derived from the ATM model. The EMIR bands are indicated and the frequencies of a few important molecular transitions are marked.

Connection to backends

The remarkable bandwidth of EMIR of altogether 64 GHz faces 2 limitations of the existing 30m hardware: (1) the four IF cables can transport only 4 GHz each (the 4 × 4 GHz bottleneck) and (2) only at low spectral resolution are there enough backends to cover the 16 GHz which pass through the bottleneck.

A new **IF switch box** in the receiver cabin allows to select 4 EMIR channels of 4 GHz bandwidth each from 16 inputs.[2] The box can handle all plausible single band observations as well as the band combinations indicated in Tab. 1. A full list of possible switch settings is available on the 30m web site.

The selected 4 output channels are sent via the IF cables to a new **backend distribution unit** which provides copies of these 4 channels to a range of backends processors which then prepare the IF signals for distribution to the spectrometers. Three new backend processors have been build to feed the new 4 GHz wide IF channels to the existing backends:

▷ The **WILMA processor** rearranges the four incoming 4 GHz wide IF channels into 16 channels of 1 GHz width which can be processed by 16 WILMA autocorrelator units. Since each unit provides 512 spectral channels of 2 MHz, sufficient backend power is available at this low spectral resolution for full coverage of the 4 × 4 GHz bottleneck.

[2] The 4 channels of 8 GHz width available from E 090 are rearranged by the IF switch box into 4 pairs of inner and outer 4 GHz wide channels.

- ▷ The **4 MHz processor** rearranges any two incoming 4 GHz wide IF channels into 8 slices of 1 GHz width for processing in 8 units of the 4 MHz filter bank. 2×4 GHz of EMIR bandwidth are thus covered at 4 MHz resolution.
- ▷ The **"narrow band backends" processor** prepares the 4 incoming IF channels for input into the 1 MHz filterbank and VESPA. Only the central part of the 4 GHz IF channels is accessible to these backends. Inside this central part (1 GHz for the filterbank and 640 MHz for VESPA), these backends can be configured as before. The VLBI terminal is also fed from this processor.

Calibration Issues

EMIR comes with a new 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. Absolute calibration accuracy will be better than 10% with EMIR when all details are well settled.

Bands E 150 and E 230 have backshort tuned single–sideband mixers; DSB tuning is not possible, but 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 not longer straightforward for these mixers, since the Martin–Puplett interferometers are not available anymore. 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.

Bands E 090 and E 330 have 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 ($>$ 13 dB).

Velocity scales

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. However, the effect of the Observatory's motion on the velocity *scale* which affects most the velocity channels farthest away from the Doppler–tracked frequency, is usually ignored.

This effect which is of the order of 10^{-4} cannot be neglected anymore if large bandwidths are used, as with EMIR. The worst case occurs with band E 090 where channels as far away as 20 GHz need to be considered if a velocity channel in one of the sidebands is Doppler–tracked. In unfavorable but nevertheless frequent cases (target source not too far from the ecliptic, like the Galactic center), errors of up to ± 2 MHz occur. Since the magnitude of the error changes with time, narrow spectral lines may be broadened after a few hours of observation.

Observers concerned by this complication may consult the 30m web site for further details and solutions.

Update of PaKo

The observer interface program PaKo has been adapted for EMIR. In particular, the receiver and backend commands have been updated. The updated documentation will be available from the 30m web site in time for the preparation of observations with EMIR.

Observation time estimator

The GILDAS group has prepared a new 30m time estimator for EMIR. It is now part of the GILDAS software package and accessible via ASTRO. For download of the GILDAS package please connect to the GILDAS home page and follow the instructions. For HERA and MAMBO2, the old web based time estimator is still available from the 30m web site. Note that a web based version of the estimator for EMIR will be made available for the next deadline. As commissioning of EMIR has not yet started at the time of writing, the new time estimator is based on the laboratory performance of EMIR and the *expected* losses at the telescope.

Receivers

This section gives all the technical details of observations with the bolometer and the multi–beam receiver HERA. The new single pixel spectroscopic receiver EMIR is described above.

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 the first polarization, and 210-242 for the second polarization).

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.

Recent observations have shown that the noise temperature of the pixels of the second polarization 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 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 first polarization array. We do not recommend to use the second polarization for frequencies > 241 GHz.

HERA can be connected to three sets of backends:

- ▷ VESPA with the following combinations of nominal resolution (KHz) and maximum bandwidth (MHz): 20/40, 40/80, 80/160, 320/320, 1250/640. 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 up to ±200 MHz offsets from the sky frequency (see also the sections on backends below).
- ▷ a low spectral resolution (4 MHz channel spacing) filter spectrometer covering the full IF bandwidth of 1 GHz. Nine units (one per HERA pixel) are available. Note that only one polarization of the full array is thus connectable to these filter banks.
- ▷ WILMA with a 1 GHz wide band for each of the 18 detectors. The bands have 512 spectral channels spaced out by 2 MHz.

HERA is operational in two basic spectroscopic observing modes: *(i)* raster maps[3] 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′). Extragalactic proposals should take into account the current limitations of OTF line maps, as described in the HERA User Manual, due to baseline instabilities induced by residual calibration errors. 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 Albrecht Sievers (sievers@iram.es), the astronomer in charge of HERA, may also be contacted.

Accepted HERA proposals will be pooled together in order to make more efficient use of stable 1.3mm observing conditions (see section . Questions concerning the HERA pool organization can be directed to the scheduler (thum@iram.fr) or the HERA Pool Coordinator, Helmut Wiesemeyer (wiesemeyer@iram.es).

MPIfR Bolometer arrays

The bolometer arrays, MAMBO–1 (37 pixels) and MAMBO–2 (117 pixels), are provided by the Max–Planck–Institut für Radioastronomie. They consist of concentric hexagonal rings of horns centered on the central horn. Spacing between horns is $\simeq 20''$. Each pixel has a HPBW of 11″. We expect that MAMBO–2 will be normally used, but MAMBO–1 is kept as a backup.

The effective sensitivity of both bolometers for onoff observations is ~ 40 mJy s$^{\frac{1}{2}}$ and ~ 45 mJy s$^{\frac{1}{2}}$ for mapping. The *rms*, in mJy, of a MAMBO–2 map is typically

$$rms = 0.4 f \sqrt{v_{scan} \Delta s}$$

where v_{scan}, in arc sec/sec, is the velocity in the scanning direction and Δs, in arc sec, is the step size in the orthogonal direction. The factor f is 1 (2) for sources of size $< 30''$ ($> 60''$). It is assumed that the map is made large enough that all beams cover the source. The sensitivities apply to bolometric conditions (stable atmosphere), (τ(250GHz) $\sim$ 0.3, elevation 45 deg, and application of skynoise filtering algorithms). In cases where skynoise filtering algorithms are not or not fully effective (e.g. extended source structure, atmosphere not sufficiently stable), the effective sensitivity is typically about a factor of 2 worse. The principal investigators of accepted proposals will be requested to specify in the pool database which minimum atmospheric conditions their observations need.

The bolometer arrays are mostly used in two basic observing modes, ON/OFF and mapping. Previous experience with MAMBO–2 shows that the

[3] As long as the NCS raster command is not operational, the raster pattern has to be traced out with the help of a SIC loop.

ON/OFF reaches typically an rms noise of ~ 2.3 mJy in 10 min of total observing time (about 200 sec of ON source, or about 400 sec on sky integration time) under stable conditions. Up to 30 percent lower noise may be obtained in perfect weather. In this observing mode, the noise integrates down with time t as $\sqrt{t}$ to rms noise levels below 0.4 mJy.

In the mapping mode, the telescope is scanning in the direction of the wobbler throw (default: azimuth) in such a way that all pixels see the source once. A typical single map[4] with MAMBO–2 covering a fully and homogeneously sampled area of $150'' \times 150''$ (scanning speed: 5″per sec, raster step: 8″) reaches an rms of 2.8 mJy/beam in 1.9 hours if skynoise filtering is effective. Much more time is needed (see Time Estimator) if sky noise filtering cannot be used. The area actually scanned ($8.0' \times 6.5'$) must be larger than the map size (add the wobbler throw and the array size (4′), the source extent, and some allowance for baseline determination) if the EHK–algorithm is used to restore properly extended emission. Shorter scans may lead to problems in restoring extended structure. Mosaicing is also possible to map larger areas. Under many circumstances, maps may be co–added to reach lower noise levels. If maps with an rms $\lesssim 1$ mJy are proposed, the proposers should contact R. Zylka (zylka@iram.fr).

The bolometers are used with the wobbling secondary mirror (wobbling at a rate of 2 Hz). The orientation of the beams on the sky changes with hour angle due to parallactic and Nasmyth rotations, as the array is fixed in Nasmyth coordinates and the wobbler direction is fixed with respect to azimuth during a scan. Bolometer proposals participating in the pool have their observations (maps and ONOFFs) pre-reduced by a data quality monitor which runs scripts in MOPSIC. This package, complete with all necessary scripts, is also installed for off-line data analysis in Granada and Grenoble. It is also available for distribution from the IRAM Data Base for Pooled Observations or directly from R. Zylka (zylka@iram.fr).

Bolometer proposals will be pooled together like in previous semesters along with suitable heterodyne proposals as long as the respective PIs agree. The web–based time estimator handles well the usual bolometer observing modes, and its use is again strongly recommended. The time estimator uses rather precise estimates of the various overheads which will be applied to all bolometer proposals. If exceptionally low noise levels are requested which may be reachable only in a perfectly stable (quasi winter) atmosphere, the proposers must clearly say so in their time estimate paragraph. Such proposals will however be particularly scrutinized. On the other extreme, if only strong sources are observed and moderate weather conditions are sufficient, the proposal may be used as a backup in the observing pool. The proposal should point out this circumstance, as it affects positively the chance that the proposal is accepted and observed.

4 see also the Technical report by D. Teyssier and A. Sievers on a special fast mapping mode (IRAM Newsletter No. 41, p. 12, Aug. 1999).

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

With the systematic use of inclinometers the telescope pointing became much more stable. Pointing sessions are now scheduled at larger intervals. The fitted pointing parameters typically yield an absolute rms pointing accuracy of better than 3″ [9]. However, larger deviations can occur around sunset or sunrise, in which case we recommend more frequent pointings (every 1 or 2 hours, depending on the beam size). An effort is made that receivers are closely (usually $\lesssim 2''$) aligned. Checking the pointing, focus, and receiver alignment is the responsibility of the observers (use a planet for alignment checks). Systematic (up to 0.4 mm) differences between the foci of various receivers can occasionally occur. In such a case the foci should be carefully monitored and a compromise value be chosen. Not doing so may result in broadened and distorted beams ([1]).

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, 0.25 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 and Efficiencies

See the summary of telescope parameters for the current efficiencies between 70 and 270 GHz, and the predictions for the 345 GHz (0.8 mm) band.

Backends

The following five spectral line backends are available which can be individually connected to any EMIR band and to HERA.

The 1 MHz filterbank consists of 4 units. Each unit has 256 channels with 1 MHz spacing and can be connected to different or the same receivers giving bandwidths between 256 MHz and 1024 MHz. The maximum bandwidth is available for only one receiver, naturally one having a 1 GHz wide IF bandwidth. Connection of the filterbank in the 1 GHz mode presently excludes the use of any other backend with the same receiver.

Other configurations of the 1 MHz filterbank include a setup in 2 units of 512 MHz connected to two different receivers, or 4 units of 256 MHz width connected to up to four (not necessarily) different receivers. Each unit can be shifted in steps of 32 MHz relative to the center frequency of the connected receiver.

VESPA, the versatile spectrometric and polarimetric array, can be connected either to HERA or to a subset of 4 single pixel receivers, or to a pair of single pixel receivers for polarimetry. The many VESPA configurations and user modes are summarized in a Newsletter contribution [13] and in a user guide, but are best visualised on a demonstration program which can be downloaded from our web page at URL /IRAMFR/PV/veleta.htm. Connected to a set of 4 single pixel receivers, VESPA typically provides up to 12 000 spectral channels (on average 3 000 per receiver). 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 — 512 MHz. When VESPA is connected to HERA, up to 18 000 spectral channels can be used with the following typical combinations of nominal resolution (kHz) and maximum bandwidth (MHz): 20/40, 40/80, 80/160, 320/320, 1250/640.

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, but a subset of 4 units can also be connected to the backend distribution box which feeds the single pixel spectral line receivers. All these receivers have a 1 GHz RF bandwidth except for A100 and B100 (500 MHz only).

The **wideband autocorrelator WILMA** consists of 18 units. They can be connected to the 18 detectors of HERA. 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 subbands which are digitized with 2 bit/1 GHz samplers. An informative technical overview of the architecture is available at URL ../IRAMFR/TA/backend/veleta/wilma/index.htm.

Organizational aspects

The official proposal cover page should be filled in with great care. All information on this page gets directly transferred into the IRAM proposal database. Attention should be given to *Special requirements* and *Scheduling constraints* where the proposer can enter dates where he/she is not available for observing.

In order to avoid useless 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. If your source list is longer than 15 sources that fit onto the cover page, please use the LaTeXmacro `\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.

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 calibration procedure is explained in detail in the report entitled

"Calibration of spectral line data" on the 30m web page.

The astronomer–on–duty (see schedule at: /IRAMES/mainWiki/AstronomerOnDutySchedule) should be contacted well in advance for any special questions concerning the preparation of an observing run.

Frequency switching is available for both HERA and shall also be available 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 ($\leq$ 45 km/s), backends, phase times etc.; for a detailed report see [4]. This report also explains how to identify mesospheric lines which may easily be confused in some cases with genuine astronomical lines from cold clouds.

If your observations with the 30m telescope results in a publication, please acknowledge this in a footnote "Based on observations with the IRAM 30-m telescope. IRAM is supported by CNRS/INSU (France), the MPG (Germany) and the IGN (Spain). Please email a copy of the publication to Dennis Downes (downes@iram.fr).

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 a new version of ASTRO/GILDAS for time estimates for EMIR, as detailed above, and the old web–based Time Estimator for HERA and MAMBO2.

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_{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. The details of the procedures on which our time estimator is based are explained in a technical report published in the January 1995 issue[5] of the IRAM Newsletter [5].

Proposers should base their time request on normal summer conditions, corresponding to 7 mm of precipitable water vapor. 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 (possibly slightly more for bolometer observations). If exceptionally good transmission or stability of the atmosphere is requested which may be reachable only in best summer conditions, the proposers must clearly say so in their time estimate paragraph. Such proposals will however be particularly scrutinized.

Pooled observing

As in previous semesters, we plan to pool the bolometer with other suitable proposals into a bolometer pool. HERA projects will be pooled with other less demanding project into a HERA pool. Both pools will be organized in several sessions, occupying a significant fraction of the totally available observing time. We plan to include EMIR 0.8 mm observations in these pools. 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, Guillermo Quintana-Lacaci (MAMBO2/1) and Helmut Wiesemeyer (HERA). 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 bolometer and the HERA observing pools are described at ../IRAMES/mainWiki/PoolObserving.

Bolometer and 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 (thum@iram.fr) or the Pool Coordinators, Guillermo Quintana-Lacaci (quintana@iram.es) and Helmut Wiesemeyer (wiesemeyer@iram.es).

Service observing

To facilitate the execution of short ($\leq$8 h) programmes, we propose "service observing" for some easy to observe programmes *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

[5] electronically available at URL `../IRAMFR/ARN/-newsletter.html`

"special requirement" in the proposal form. IRAM will then decide which proposals can actually be accepted for this mode.

Remote observing

This observing mode where the remote observer actually controls the telescope very much like on Pico Veleta, is available from the IRAM offices in Granada and Grenoble, and from the MPIfR Bonn and Madrid. If you are planning to use remote observing, please contact the Astronomer on Duty (for Granada), or Dirk Muders, muders@mpifr-bonn.mpg.de for Bonn well in advance of your observing run. As a safeguard, please email observing instructions and macros to the AoD and/or operator. A dedicated phone line to the control desk for voice mail is available for remote observers: +34 958 482009.

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[15] A Versatile IF Polarimeter at the IRAM 30m Telescope
C. Thum, H. Wiesemeyer, D. Morris, S. Navarro, and M. Torres
in "Polarimetry in Astronomy", Ed. S.Fineschi, Proc.of SPIE Vol.4843, 272–283 (2003)

[16] XPOL – the correlation polarimeter at the IRAM 30m telescope
Thum, C., Wiesemeyer, H., Paubert, G., Navarro, S., and Morris, D.
PASP 120, 777 (2008)

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

Clemens Thum & Carsten Kramer

News from the Plateau de Bure Interferometer

Aluminum panels for antenna 4

By the end of last summers' antenna maintenance period the reflector of antenna 4 was equipped with new aluminum panels, replacing the previous carbon fiber panels. The antenna was moved out of the maintenance hall on October 17 and the surface was subsequently adjusted to an accuracy of better than 50 μm rms in a series of holographic measurements and panel adjustments.

Weather conditions and observing

The current winter semester was affected by quite variable weather conditions so far with periods of excellent atmospheric stability and transparency in particular at the end of November and the beginning of January but with very poor weather during most of December and the second half of January. Bure entered into the winter observing period with the array in its C-configuration and we switched to the B configuration already on December 28. The most extended A configuration was available from January 30 and it is now planned to move back to the C configuration by beginning of March. Compared with the original planning, scheduling of the B and A configuration has been interchanged due to the already acceptable though not exceptional atmospheric conditions in late December. The switch back to the compact D configuration is foreseen before the end of April. Global VLBI observations, which include the array in the 3 mm phased-array mode, are planned from May 7 to 12, 2009. According to these plans, it will not be possible to complete projects requesting deep integrations using the compact configurations before the end of the current observing period.

As far as A-rated projects are concerned, we expect to bring most of these to completion before the end of the current winter 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 which are not started before the end of the winter period have to be resubmitted.

Investigators, who wish to check the status of their project may consult the interferometer schedule on the Web at ../PDBI/ongoing.html. This page is updated daily.

Jan Martin WINTERS

Call for Observing Proposals on the Plateau de Bure Interferometer

Conditions for the next summer period

As every year, we plan to carry out extensive technical work during the summer semester, including the regular maintenance of the antennas. In particular, yet another antenna will be fully equipped with new aluminum panels replacing its current carbon fiber panels. During this period, regular scientific observations will therefore mostly be carried out with the five element array. We plan to start the maintenance at the latest by the end of May and to schedule the D configuration between June and October.

We strongly encourage observers to submit proposals that can be executed during summer operating conditions. To keep the procedure as simple as possible, we ask to focus on:

- observations requesting the use of the 2 mm and 3 mm receivers
- circumpolar sources or sources transiting at night between June and September,
- observations that qualify for the 5D, 6D, and 6C configurations

Proposal category

Proposals should be submitted for one of the five categories:

1.3MM: Proposals that ask for 1.3 mm data. 2 mm or 3 mm receivers can be used for pointing and calibration purposes, but cannot provide any imaging. During the summer semester, proposals requesting the extended tuning range (256-267 GHz) will be carried out on a "best effort" basis only.

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

3MM: Proposals that ask for 3 mm data.

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 5-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.

Configurations

Configurations planned for the summer period are:

Name	Stations
5Dq	W08 E03 N07 N11 W05
6Dq	W08 E03 N07 N11 N02 W05
6Cq	W12 E10 N17 N11 E04 W09

Part of the projects will be scheduled at the end of the summer period when the six-element array (likely in C-configuration) is expected to be back to operation. Projects that should be observed with a subset of the five-element array will be adjusted in uv-coverage and observing time.

The following configuration sets are available:

- `D` 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.
- `CD` is well adapted for low angular resolution studies ($\sim$3.5$''$ at 100 GHz, $\sim$1.5$''$ at 230 GHz.
- `C` is appropriate for mapping, snapshot, and size measurements and for detection experiments at low declination. It provides a spatial resolution of $\sim 2.8''$ at 100 GHz.

Finally, enter ANY in the proposal form if your project doesn't need any particular configuration.

Please consult the documentation *An Introduction to the IRAM interferometer* (../IRAMFR/PDB/docu.html) for further details.

Receivers

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

	Band 1	Band 2	Band 3
RF range*/[GHz]	80–116	129–174	201–267
T_{rec}/[K] LSB	40–55	30–50	40–60
T_{rec}/[K] USB	40–55	40–80	50–70
G_{im}/[dB]	-10	-12 ... -10	-12 ... -8
RF LSB/[GHz]	80–104	129–168	201–267
RF USB/[GHz]	104–116	147–174	

* center of the 4-8 GHz IF band

Each band of the receivers is dual-polarization with the two RF channels of one band observing at the same frequency. The three 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. One of the two other bands is in stand-by mode (power on and local oscillator phase-locked) and is available, e.g., for pointing. Time-shared observations between different RF bands are presently being tested. Please contact the Interferometer Science Operations Group (sog@iram.fr) to discuss the feasibility in case you are interested to use this mode.

The mixers 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 typical image rejection is 10 dB. Each IF channel is 4 GHz wide (4-8 GHz). The two 4 GHz wide IF-channels (one per polarization) can be processed only partially by the existing correlator. A dedicated IF processor converts selected 1 GHz wide slices of the 4-8 GHz first IFs down to 0.1-1.1 GHz, the input range of the existing correlator. Further details are given in the section describing the correlator setup and the IF processor.

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_{pK} is the conversion factor from Kelvin to Jansky (22 Jy/K at 3 mm, 29 Jy/K at 2 mm, and 35 Jy/K at 1.3 mm)

– T_{sys} is the system temperature ($T_{sys} = 100$ K below 110 GHz, 180 K at 115 GHz, 180 K at 150 GHz, and 250 K at 230 GHz for sources at $\delta \geq 20°$ and for typical summer conditions).

– η is an efficiency factor due to atmospheric phase noise and instrumental phase jitter (0.9 at 3 mm, 0.8 at 2 mm, and 0.6 at 1.3 mm) in typical summer conditions.

– N_a is the number of antennas (5), and N_c is the number of configurations: 1 for D, 2 for CD, 1 for C.

– T_{ON} is the on-source integration time per configuration in seconds (2 to 8 hours, depending on source declination). Because of various calibration observations the total observing time is typically 1.6 T_{ON}.

– B is the spectral bandwidth in Hz (up to 2 GHz for continuum, 40 kHz to 2.5 MHz for spectral line, according to the spectral correlator setup)

– N_{pol} is the number of polarizations: 1 for single polarization and 2 for dual polarization (see section *Correlator* for details).

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

Coordinates and Velocities

For best position accuracy, source coordinates must be in the J2000.0 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.

Correlator

IF processor

At any given time, only one frequency band can be observed, but with the two polarizations available. Each polarization delivers a 4 GHz bandwidth (from IF=4 to 8 GHz). The two 4-GHz bandwidths coincide in the sky frequency scale. The current correlator accepts as input two signals of 1 GHz bandwidth, that must be selected within the 4 GHz delivered by the receiver. In practice, the IF processor splits the two input 4–8 GHz bands in four 1 GHz "quarters", labeled *Q1...Q4*. Two of these quarters must be selected as 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 5-6	Q3 6-7	Q4 6.8-7.8
input 1	HOR	HOR	VER	VER
input 2	VER	VER	HOR	HOR

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

How to use the full 2 GHz bandwidth? If two different quarters are selected (any combination is possible), a bandwidth of 2 GHz can be analyzed by the correlator. But 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 to 6 GHz, Q3 is 6 to 7 GHz, and Q4 is 6.8 to 7.8 GHz. This results from the combination of filters and LOs used in the IF processor.

Is the 2 GHz bandwidth necessarily continuous? No: any combination of two quarters can be selected. Adjacent quarters will result in a continuous 2 GHz band. Non-adjacent quarters will result in two independent 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 middle of the IF bandwidth, i.e. 6.0 GHz. However, this corresponds to the limit between Q2 and Q3. It is therefore highly recommended to center a line at the center of a quarter (see Section "ASTRO" below). In all three bands, 3 mm, 2 mm, and 1.3 mm the receivers offer best performance in terms of receiver noise and sideband rejection in Q3 (i.e. the line should be centered at an IF1 frequency of 6500 MHz).

Spectral units of the correlator

The 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 the end 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 4 GHz bandwidth which have been selected as correlator inputs and on the selected 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, 1 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 93.2 lsb low 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
...
```

Sun Avoidance

For safety reasons, a sun avoidance limit is enforced at 45 degrees from the sun. We are presently testing a reduced sun avoidance circle at 35 degrees and expect that projects observed in the summer semester may already profit from this reduction. This can however not be guaranteed yet and we therefore ask proposers to still take into account the 45 degrees limit for the target sources.

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 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 will only be offered in exceptional cases. 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 has not yet been fully checked. To calibrate data obtained with the "old" receiver system (up to September 2006), we urge you to use the January 2007 version of CLIC.

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`. Note however, that not all the documentation on the web has already been updated with respect to the current receivers. All information presently available 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` and in this call for proposals.

> Finally, we would like to stress again the importance of the quality of the observing proposal. The IRAM interferometer is a powerful, but complex instrument, and proposal preparation requires special care. Information is available in this call and at `../IRAMFR/PDB/docu.html`. The IRAM staff can help in case of doubts if contacted well before the deadline. Note that the proposal should not only justify the scientific interest, but also the need for the Plateau de Bure Interferometer.

Jan Martin WINTERS

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 a minimum of 100 hours of observing time, spread over a maximum of two years, i.e. 4 contiguous semesters. In the next two years, 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 30% 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.

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 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 summer semester 2009, 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 MAMBO, as well as EMIR with the exception of its 0.9 mm band.

Pierre Cox