IRAM

Institut de Radioastronomie Millimétrique
Institut für Radioastronomie im Millimeterbereich
Instituto de Radioastronomía Milimétrica

Newsletter

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Contents

Calendar

May 27 -28th, 2004 Scientific Advisory Committee meeting in Grenoble

June 28-29, 2004 Executive Council meeting in Garching

November 22-27, 2004: 4th IRAM Interferometry School

Fourth IRAM Millimeter Interferometry School - Second Announcement

IRAM organizes this year its **Fourth Millimeter Interferometry School**. The school will take place at the IRAM headquarters (Grenoble, France) from November 22 to 27, 2004. The registration is open now. If you want to attend the school, or if you are simply interested, please visit the school's web site at

http://www.iram.fr/IRAMFR/IS/school.htm,

proceed to the section "Registration & Practical Information", and follow the instructions. A copy of the registration form can also be found at the end of this Newsletter. Deadline for registration is September 15. Late registrations will be handled on a best-effort base without any guarantee.

The school is intended for PhD students, post-docs and scientists who want to acquire a good knowledge of interferometry techniques at mm wavelengths. In the same spirit as the previous three interferometry schools, the courses will be focused on the Plateau de Bure Interferometer, with an outlook to the next generation interferometer ALMA. Demonstration sessions will help the participants to become familiar with the reduction and imaging of Plateau de Bure data and the related technology. We would like to encourage participants to present posters related to their scientific work.

Helmut WIESEMEYER

Staff Changes

IRAM Granada

Jean-Francois Desmurs from the IRAM Granada Astronomy Group left the Institute on 15.2.2004 to work at the OAN in Madrid. Ramon y Cajal fellow Miguel Angel Perez Torres has left IRAM on 1.4.2004.

Rainer MAUERSBERGER

IRAM Grenoble

The Grenoble SIS group welcomes a new member: Nicholas KREBS has joined our institute on March 1st as a process engineer.

Philippe SALOME and Theo SCHERER have joined the Grenoble astronomy group on March 1st and May 1st, respectively. We wish them many interesting photons.

Michael BREMER

IRAM Program Committee Recommendations

The IRAM program committee convened in Grenoble on April 1 and 2 to discuss the proposals submitted for the summer 2004 scheduling period. The committee was chaired by Mario Tafalla (Observatorio de Madrid).

Plateau de Bure Interferometer Proposals

A total of 45 proposals were received for the interferometer. The projects were classified by the Program Committee as "A" (accepted), "B"(backup), and "C"(rejected), as listed in Table 1. Projects rated "A" will be scheduled in priority. Further time, if available, will go to the "B" programs, taking into account scientific merit, crowding in certain right ascension ranges, and general aspects of balance. The Principal Investigators of the proposals will be informed by letter which will include comments issued by the committee if there are any.

A: Accepted, B: Backup, C: Rejected					
Proj.	Rate	Proj.	Rate	Proj.	Rate
O001	A	O002	A†	O003	B
O004	A	O005	A	O006	B
O007	B	O008	C	O009	-
O00A	A	O00B	B†‡	O00C	B
O00D	C	O00E	B†	O00F	B
O010	B†	O011	C	O012	B
O013	A	O014	B	O015	A
O016	A	O017	B	O018	B†
O019	A	O01A	B	O01B	-
O01C	A	O01D	B	O01E	A
O01F	C	O020	B‡	O021	C
O022	A	O023	C	O024	C
O025	A‡	O026	C	O027	C
O028	C	O029	B	O02A	A
O02B	B‡	O02C	B‡	O02D	A

†: some parts of the program - others rated C
‡: Time filler program

Table 1: IRAM PDBI proposal ratings: Summer 2004

For projects rated "A" and "B" without an IRAM co-investigator, please consult the list of local contacts, which will be posted later.

30m Proposals

105 proposals were received for the 30m telescope, requesting 3846 hours of telescope time. The Program Committee granted 30m time, mainly for measurement of zero-spacings, to additional 7 proposals submitted for the Interferometer. The highest rating "A" was given to 30 proposals; 58 proposals were rated "B", i.e. were given backup status. The remaining proposals, although scientifically valuable in most cases, were rated "C". The individual ratings are listed in the attached Table 2. All A-rated proposals will be scheduled on the telescope, although some with less time than requested. We expect that about half of the B-rated programs will actually be scheduled. The selection will take into account scientific merit, crowding in certain right ascension ranges, and general aspects of balance. Proposals rated "C" will not get telescope time.

The principal investigators of each proposal will also be informed by letter which will include comments issued by the committee if there are any.

Roberto NERI and Clemens THUM

A: Accepted, B: Backup, C: Rejected					
A		B			C
007-04	009-04	003-04	005-04	006-04	001-04
012-04	018-04	008-04	010-04	011-04	002-04
020-04	023-04	013-04	014-04	015-04	004-04
031-04	032-04	016-04	017-04	021-04	019-04
033-04	036-04	022-04	024-04	025-04	028-04
038-04	042-04	026-04	027-04	029-04	045-04
044-04	047-04	030-04	034-04	035-04	050-04
049-04	056-04	037-04	039-04	040-04	055-04
057-04	058-04	041-04	043-04	046-04	062-04
061-04	066-04	048-04	051-04	052-04	070-04
071-04	072-04	053-04	054-04	059-04	077-04
074-04	078-04	060-04	063-04	064-04	081-04
085-04	087-04	065-04	067-04	068-04	083-04
094-04	096-04	069-04	073-04	075-04	086-04
099-04	104-04	076-04	079-04	080-04	088-04
		082-04	084-04	090-04	089-04
		091-04	092-04	093-04	103-04
		095-04	097-04	098-04	
		100-04	101-04	102-04	
		105-04			

Table 2: IRAM 30m proposal ratings: Summer 2004

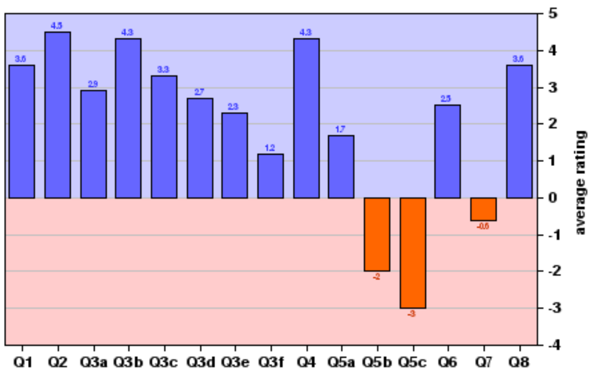

Figure 1: Average result for each poll question.

Pool Poll

Motivation

To evaluate the status and further improve the pooled observations at the IRAM 30m telescope we have carried out a poll among the Principal Investigators who participated in the pools in winter 2002 and summer 2003. Questions addressed the data quality, the information flow between observers and PIs, the overall organization scheme and possible future extentions of the pooled observations (see attached questionnaire for details).

In total we received 21 answers from the pool user community. The poll was evaluated using a scale from -5 (no/bad) to 5 (yes/good). The average ranking for each poll question is shown in Fig 1.

Most importantly, the pool efficiency and the quality of the data obtained during the pooled observations were rated positively. We only received a few complaints on observations carried out during inadequate weather conditions. Most critical comments regarding the data flow were related to a lack of active feedback from the observers when new data were taken for a program (Q3a) and difficulties to install the bolometer reduction software at the home institutes (Q3f) . For the forthcoming pool we will include a messenger service in the database which will inform the PIs via email when new observations have been taken. In this way, we also hope to improve the feedback from the PIs to the observers (Q6). The distribution of the bolometer reduction software was improved by offering the download of MOPSIC and all related calibration files via the pool database since the last winter period. Diverse comments were given concerning the scheme of selecting observers and if more "professional" observers are needed in order to ensure a high data quality (Q5a/b). Problems seem to arise from mixing heterodyne and bolometer observations since only few observers are experienced in both observing techniques. The problem would become even more severe if HERA observations or complex heterodyne programs would be included in the pool (see below). Strong observational support from IRAM staff is clearly needed to deal with the complexity of pooled observations. We received many critical comments on whether the pool observations should be extended with respect to the number of participating projects include e.g. HERA observations (Q7). The main concern expressed by the PIs was, that the observations might get too complicated to carry out for observers other than IRAM staff.

We would like to thank all PIs who participated in the poll and greatly helped to improve this new observing scheme.

Questionnaire

In the context of the poll, the following questions were asked:

Q1: Data quality
Do your data show evidence of poor/imperfect observing?

Q2: Overall efficiency
Considering the grade given by the program committee and the weather requirements of your proposal are you satisfied with the amount of data obtained ?

Q3: Data flow

a: Could you follow the execution of your observations with adequate detail?
b: Could you correctly retrieve your data ?
c: Did you get sufficient information about your observations?
d: For bolometer proposals, do you consider the pipeline reduction as a useful tool for assessing the data quality ?

e: Would similar tools be useful for heterodyne observations?

f: Did you have all software tools available at your home institute for final analysis of your data ?

Q4: Data base
ease of use: ok / sufficient / needs improvement

Q5: Observers

a: the current scheme of selecting observers and their typical stay (one week) at the telescope is: ok / sufficient / needs improvement

b: Do we need more "professional" observers?

c: Are you worried about confidentiality of your proposal/data ?

Q6: Progress of observations
Did the feedback to the observers work correctly?

Q7: Scope of the pool
Should more observing modes be eligible? Should more proposals be included ?

Q8: Overall satisfaction with the pool
ok / sufficient / needs improvement

Axel WEISS, Clemens THUM and Rainer MAUERSBERGER

The Pool Observation Database System (ODS) and the Data Reduction Pipeline at the IRAM 30m Telescope

Pool Observations

Most cutting edge scientific programs carried out at the IRAM observatories require excellent weather conditions. While the service observing mode at the Plateau de Bure interferometer allows a flexible scheduling of demanding programs, fixed scheduled projects at the 30m telescope often suffer from limitations due to inadequate weather conditions. To optimize the observing efficiency given the often quickly changing weather conditions, IRAM offers the pool observing mode at the 30m telescope. In this mode all bolometer and some very demanding spectroscopy programs share the allocated observing time together with some less weather demanding spectroscopy programs. Projects are observed according to the current weather conditions, their ranking from the program committee and the source visibility. This way the chances of all demanding projects have drastically improved: the average success rate of A ranked projects requiring good or excellent weather conditions in the last winter pool was 80%, compared to 20% of good weather conditions during the allocated pool observing time (Fig. 2).

The pool observations are conducted mostly by the astronomers who's programs are included in the pool. They are aided by the IRAM astronomers and telescope operators. There are typically three guest astronomers, one IRAM astronomer, and the telescope operators at the telescope. Given the flexible use of different instruments and the large variety of scientific programs, pooled observations are part of IRAM's training efforts for students.

Pool observations were first tested at the IRAM 30m telescope during the winter 2000/2001, and have now expanded to 12 weeks in the winter semester,and about 4 weeks in the summer. The winter 2003/2004 pool included almost 50 different programs with more than 500 different targets. To manage such a pool requires an efficient organizational structure, so that at any time the status of a program, target priorities and weather/technical requirements can be assessed. This motivated the observational database system described here.

The PHP/MySQL software (http://mrt-lx3.iram.es/-pooldatabase/index.php) system was first conceived by Alexandre Beelen (IAS Paris) and Frank Bertoldi (MPIfR Bonn) in December 2001, and subsequently developed further by Axel Weiss, who as an IRAM astronomer serves as the pool coordinator at the 30m telescope. All data reduction tools have been developed and are maintained by Robert Zylka (IRAM).

Technical Summary ODS

The IRAM pool observation database system (ODS) is based on PHP scripts executed from an apache webserver, which accesses a MySQL database. The database contains detailed information on all projects including technical and metrological requirements. Observational information is read from the fits data headers of each scan. This information is easily associated with the respective projects, and thereby allows bookkeeping, planning, data quality control, and in connection with an external software an automated pipeline data reduction. The system also permits data archiving and the easy access/download of data for the users. The users interactively enter and modify their target lists, observation instructions, and they are able to check the state of the project and the data quality.

The software used in the development of the ODS is part of all Linux distributions. Its main constituents are PHP and MySQL. PHP (recursive acronym for "PHP: Hypertext Preprocessor") is a widely-used Open Source general-purpose C-based scripting language that is especially suited for Web development and can be embedded into HTML (see e.g. Welling & Thomson 2003). The PHP package contains functions which allow to retrieve and store information in a MySQL database. MySQL is the most popular Open Source SQL (Structured Query Language) database management system. It provides an easy way to store and sort large amounts of information and

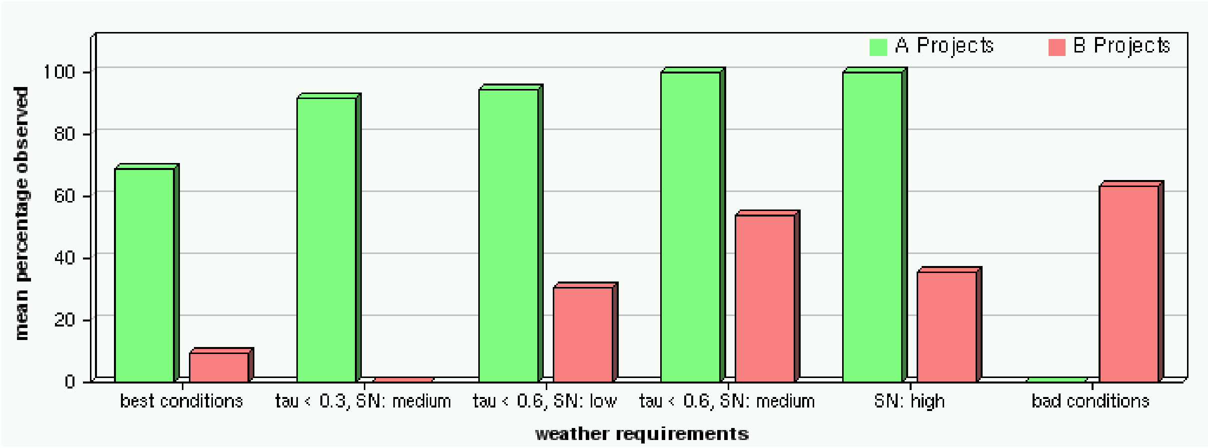

Figure 2: Project and weather statistics during the pool

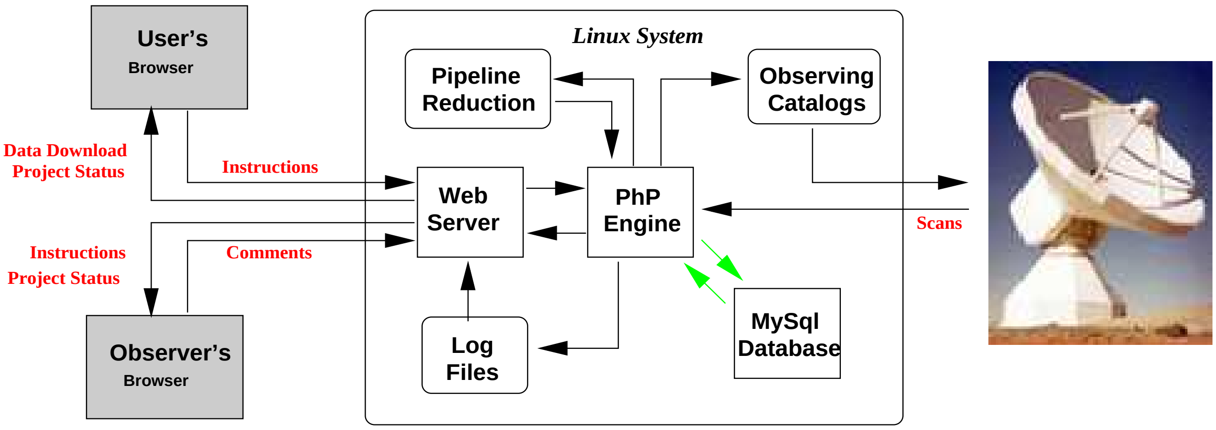

Figure 3: Online database system flow diagram

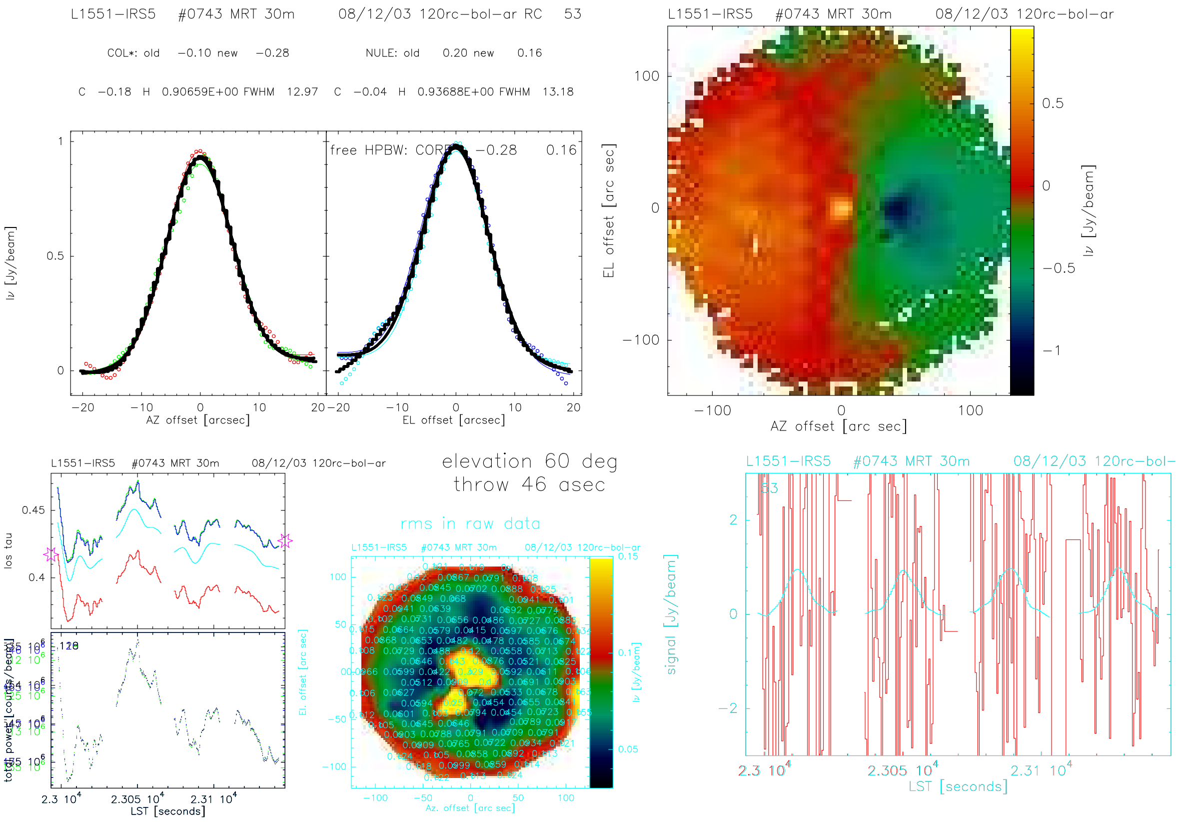

Figure 4: MOPSIC monitor (Pointing)

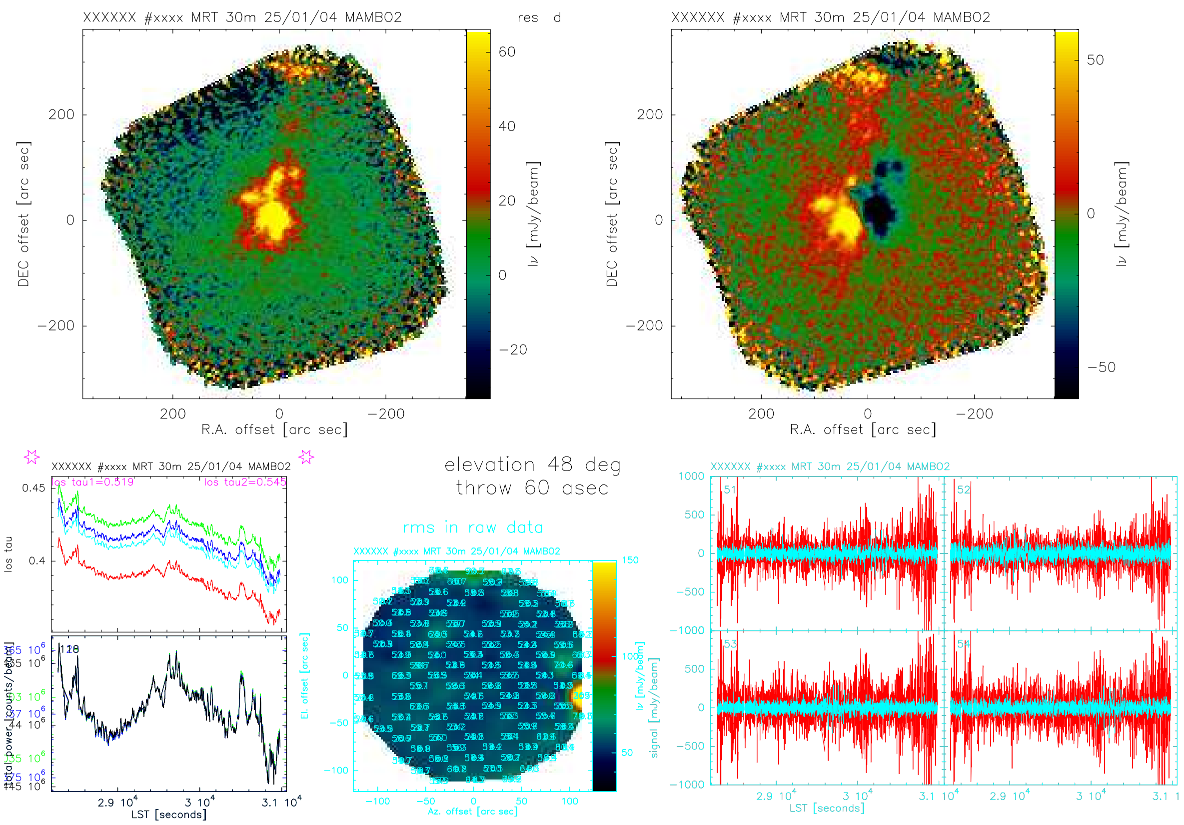

Figure 5: MOPSIC monitor (Mapping)

to give limited access to different users on the MySQL server (e.g. DuBois 2000). MySQL in conjunction with PHP is becoming the most commonly used platform for web-based data access and processing applications. The database system at the IRAM 30m currently runs on PHP version 3 and MySQL 3.23.44 on SuSE Linux distribution, but has also been installed on RedHat.

The main body of ODS is a collection of PHP scripts (the PHP engine) which perform different kinds of operations. Information can be received and/or stored in the MySQL database (e.g. the amount of observing time spent on a specific project). Other PHP scripts generate files associated with the observations such as the observing log-files, the 30m source catalogs or Xephem files for astronomical visualization. PHP also allows to call external programs. This way the PHP engine can parse a list of scans to an external data reduction software, e.g. the IRAM continuum data processing software MOPSIC, and store data information such as the achieved rms in the MySQL database. All PHP scripts are executed by an Apache web-server. Thereby all information can be accessed through the Internet (see Fig. 3). Access is restricted by PHP and by MySQL security applications as well as the Apache web-server configuration. This allows to setup different user accounts in ODS with limited access to specific information. For more information see http://mrt-lx3.iram.es/flexible/ods/

MOPSIC Monitor and Data Reduction Pipeline

The monitor

We have installed a new tool which allows the observer to see online the progress of observations. The data is displayed on mrt-lx10:0.1 at the observing desk. A MOPSIC script reduces automatically incomming data every 15 to 60 sec. The reduced observations are shown in the top left corner of the screen. Other plots show:

- the total power and the line-of-sight opacity calculated from it (bottom left plot)
- the rms of the data (bottom centre)
- the time series of a few bolometers before (in red) and after (in blue) the sky noise filtering (bottom right plot)
- the top right plot shows - depending on the observing mode - either the double beam map (for pointing, focus and map), the time series of the on-source bolometer (for OnOffs) or of the total-power bolometers (for skydips)

These additional plots allow to judge the quality of the data and the weather conditions during the observations, and therefore to optimize the observing strategy. The monitor warns if the observational parameters are not valid, e.g. if the map extent in scanning direction is too small, the pointing bolometer is not the central one for mapping, or if an OnOff data set has an odd number of subscans, a.s.o.. In such cases it changes the default reduction mode (if possible) or does not reduce the data.

Two examples of the graphical output of the monitor are shown in Fig. 4 and Fig. 5.

The ODS pipeline

For a quick look at the observations ODS provides the PIs and the observers with a pipeline reduction for all kinds of bolometer observations. The reduction is based on MOPSIC scripts which are developed and maintained by Robert Zylka. The pipeline reduction offers data reduction with and without skynoise subtraction. For maps also a shift & add reduction is available. The reduction scripts are executed by pressing the link associated with each source name as soon as the observations for this source have been carried out. The pipeline reduction window allows to select the scans which should be included in the reduction. For mapping projects the rms in each map as well as the combined rms are computed and entered in the MySQL database. The users can view the combined and individual maps. For OnOff projects the cumulative rms of all observations is determined and saved in the database. Detailed plots of the signal and the rms for individual scans and the sum of all scans are provided. This allows the PIs to continuously optimize the observing strategy during the pool. The online reduction also allows the observers to check the data quality very quickly and to estimate the achieved S/N. Contrary to the monitor which only emits a warning, the pipeline refuses to reduce data with invalid observational parameters, e.g. odd number of subscans for OnOffs, map extent in scanning direction too small (for no shift & add mode).

All pipeline scripts together with necessary calibration files can be obtained via the ODS. For further informations about the pipeline see "About the IRAM Database" at the ODS web page (http://www.iram.es/IRAMES/observing/flexible/-flexible.html) and the README file available with the data reduction scripts.

References

DuBois, P., 2000, MySQL, New Riders Publishing
Welling, L. & Thomson, L., 2003, PHP and MySQL Web Development, Sams

Axel WEISS and Robert ZYLKA

Scientific Results in Press

Fragmentation in Massive Star Formation

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Abstract:
Studies of evolved massive stars indicate that they form in a clustered mode. During the earliest evolutionary stages, these regions are embedded within their natal cores. Here, we show high-spatial-resolution interferometric dust continuum observations disentangling the cluster-like structure of a young massive star-forming region. The derived protocluster mass distribution is consistent with the stellar initial mass function. Thus, fragmentation of the initial massive cores may determine the initial mass function and the masses of the final stars. This implies that stars of all masses can form via accretion processes, and coalescence of intermediate-mass protostars appears not to be necessary.

Appeared in Science 303, 1167-1169 (February 2004)

Ethylene glycol in comet C/1995 O1 (Hale-Bopp)

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Abstract:
We report the detection of ethylene glycol ($HOCH_2CH_2OH$) in comet C/1995 O1 (Hale-Bopp) from the analysis of archival radio spectra. About ten rotational lines of the molecule are observed in spectra obtained at the IRAM 30-m telescope and Plateau de Bure interferometer and at the Caltech Sumillimeter Observatory, in spring 1997. The identification was made just after the rotational lines of this molecule was included in the Cologne Database for Molecular Spectroscopy. The production rate of ethylene glycol is ≈ 0.25% that of water, making it one of the most abundant organic molecules in cometary ices. This detection strengthens the similarity between interstellar and cometary material. It outlines the possible role of cometary impacts in the origin of life by seeding the early Earth with prebiotic molecules.

Accepted for publication in A&A Letters

Dense gas in nearby galaxies XVI. The nuclear starburst environment in NGC 4945

M. Wang(1,2), C. Henkel(1), Y.-N. Chin(3), J. B. Whiteoak(4), M. Hunt Cunningham(5), R. Mauersberger(6), and D. Muders(1)
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Abstract:
A multi-line millimeter-wave study of the nearby starburst galaxy NGC 4945 has been carried out using the Swedish-ESO Submillimeter Telescope (SEST). The study covers the frequency range from 82 GHz to 354 GHz and includes 80 transitions of 19 molecules. 1.3 mm continuum data of the nuclear source are also presented. An analysis of CO and 1.3 mm continuum fluxes indicates that the conversion factor between H_2 column density and CO $J = 1-0$ integrated intensity is smaller than in the galactic disk by factors of 5-10. A large number of molecular species indicate the presence of a prominent high density interstellar gas component characterized by $n_{H_2} \approx 10^5 \mathrm{cm}^{-3}$. Some spectra show Gaussian profiles. Others exhibit two main velocity components, one at ≈ 450 km s^{-1}, the other at ≈ 710 km s^{-1}. While the gas in the former component has a higher linewidth, the latter component arises from gas that is more highly excited as is indicated by HCN, HCO+ and CN spectra. Abundances of molecular species are calculated and compared with abundances observed toward the starburst galaxies NGC 253 and M 82 and galactic sources. Apparent is an 'overabundance' of HNC in the nuclear environment of NGC 4945. While the HNC/HCN $J = 1-0$ line intensity ratio is ≈ 0.5, the HNC/HCN abundance ratio is ≈ 1. From a comparison of $K_a = 0$ and 1 HNCO line intensities, an upper limit to the background radiation of 30 K is derived. While HCN is subthermally excited ($T_{ex} \approx 8$ K), CN is even less excited ($T_{ex} \approx 3-4$ K), indicating that it arises from a less dense gas component and that its $N = 2-1$ line can be optically thin even though its $N = 1-0$ emission is moderately optically thick. Overall, fractional abundances of NGC 4945 suggest that the starburst has reached a stage of evolution that is intermediate between those observed in NGC 253 and M 82. Carbon, nitrogen, oxygen and sulfur isotope ratios are also determined. Within the limits of uncertainty, carbon and oxygen isotope ratios appear to be the same in the nuclear regions of NGC 4945 and NGC 253. High $^{18}O/^{17}O$, low

$^{16}O/^{18}O$ and $^{14}N/^{15}N$ and perhaps also low $^{32}S/^{34}S$ ratios (6.4 ± 0.3, 195 ± 45, 105 ± 25 and 13.5 ± 2.5 in NGC 4945, respectively) appear to be characteristic properties of a starburst environment in which massive stars have had sufficient time to affect the isotopic composition of the surrounding interstellar medium.

Accepted for publication in A&A

Rotating Disks in High-Mass Young Stellar Objects

Beltrán M. T.(1), Cesaroni R.(1), Neri R.(2), Codella C.(3), Furuya R. S.(1,4), Testi L.(1), Olmi, L.(5)
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Abstract:
We report on the detection of four rotating massive disks in two regions of high-mass star formation. The disks are perpendicular to known bipolar outflows and turn out to be unstable but long-lived. We infer that accretion onto the embedded (proto)stars must proceed through the disks with rates of $\approx 10^{-2} M_\odot yr^{-1}$.

Appeared in: ApJ 601, L187-L190

A search for evolved dust in Herbig Ae stars

Natta A.(1), Testi L.(1), Neri R.(2), Shepherd D. S.(3), Wilner D. J.(4)
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Abstract:
We present observations of six isolated, pre-main-sequence, intermediate mass stars selected for shallow spectra at submillimeter wavelengths at 1.3, 2.6, 7.0, and 36 millimeters from the IRAM PdBI and the VLA. We analyze the new observations of these stars (HD 34282, HD 35187, HD 142666, HD 143006, HD 150193, HD 163296) together with similar observations of three additional stars from the literature (CQ Tau, UX Ori, TW Hya), in the context of self-consistent irradiated disk models. Our aim is to constrain the wavelength dependence of the dust opacity and the total dust mass in the disks. The shallow wavelength dependence of the opacity is confirmed and for a few stars extended to significantly longer wavelengths. For any plausible dust properties, this requires grain growth from interstellar sizes to maximum sizes of at least a few millimeters, and very likely to several centimeters or more. For four of the stars (HD 34282, HD 163296, CQ Tau, TW Hya), the millimeter emission has been spatially resolved, and the large disk radii (¿100 AU) rule out that high optical depths play a role. The mass of dust that has been processed into large grains is substantial, and in some cases implies a disk mass comparable to the mass of the central star.

Appeared in: A&A 416, 179-186

L1157: Interaction of the molecular outflow with the Class 0 environment

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Abstract:
We present high angular resolution interferometric observations of the dust continuum at 2.7 and 1.3 mm, and of the HC_3N (J=12-11) and $C^{18}O$ (J=2-1) emission around L1157-mm, a Class 0 object that drives a spectacular molecular outflow. The millimeter dust emission is clearly resolved into two components, a flattened compact source of $\approx 450 \times 250$ AU at 1.3 mm, and mass $\approx 0.1 M_\odot$, plus an extended envelope of ≈ 3000 AU at 1.3 mm, and mass $\approx 1.1 M_\odot$. The millimeter spectral index varies throughout the region, with the lower value found toward the compact protostar, possibly indicating grain growth in the denser regions. A strong interaction between the molecular outflow and the close protostellar environment is taking place and affects the structure of the innermost parts of the envelope. This is shown by the spatial coincidence between the molecular outflow and the dust (1.3 mm continuum) and HC_3N emission: both tracers show structures associated to the edges of the outflow lobes. Basically, the global picture sketched for the Class 0 object L1157-mm by Gueth et al.(1997) is supported. We find possible evidence of infall, but we do not detect any velocity gradient indicative of a rotating circumstellar disk.

Appeared in A&A 416, 631-640

Registration form

Registration form

Fourth IRAM Millimeter Interferometry School

IRAM headquarters, Grenoble, November 22 to 27, 2004.

Please complete the registration form and send it (by EMail, FAX or mail) to:

Mrs. Cathy Berjaud -- Scientific Secretariat -- IRAM
300, Rue de la Piscine -- F-38406 Saint Martin d'Hères, France

Fax : +33 476 42 54 69
EMail : berjaud@iram.fr (please specify "IRAM School 2004" in the subject field)

Name : ______________________________

Institute : ______________________________

EMail : ______________ Phone : ______________

☐ I want to attend the school and register now. I took note of the cancellation policy (see the practical information section of the school's webpage).

☐ I am interested in the school and wish to receive further information.
I may want to register at a later time.

☐ I would like to present a poster (please join an abstract, not more than 10 lines).
Title :
Author(s) :

☐ I would like to apply for financial support (please join a CV and a reference). I noticed the funding policy (see the practical information section of the school's web page).

☐ I want to participate in the exercises.

☐ I would like to visit the laboratories.

Room reservation from 2004 November 21 (arrival) to November 27 (departure) :

☐ I will make my own appointment (please read the funding policy).

☐ Please reserve me a single room (rates as indicated on the school's web page, please read the funding policy).

☐ Please reserve me a shared double room (rates as indicated on the school's web page).
Your gender : ☐ Female ☐ Male . I am smoker ☐ non-smoker ☐ .

☐ I would like to have breakfast at the hotel (rate as indicated on the school's web page).

For an extension of your stay, please contact the hotel directly.

The IRAM Newsletter is edited by Michael Bremer at IRAM-Grenoble (e-mail address: `bremer@iram.fr`).

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Please keep M. Bremer informed of any problem you may encounter.

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