IRAM Newsletter

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Contents

Calendar

23 January - 24 January: Workshop on Broad Band Instrumentation for the 30m telescope. For details please contact Clemens Thum (thum@iram.fr)

25 January: IRAM SAC meeting

30 January - 1 February: ALMA Antenna Group meeting at IRAM Grenoble

New Task Assignments, Personnel Changes

It has been decided to create at IRAM a new group for scientific software which consists of a core team and associated team members. The group is headed by Frédéric GUETH. The group is responsible for the development, maintenance and dissimination of scientific software used at the 30m telescope, the Plateau de Bure Interferometer, and also in the ALMA project.

IRAM Grenoble

In September 2001, Sandrine COHEN BOULAKIA has joined the administration group as an accountant.

The receiver group welcomes two new members: Eric MASCIULLI (electronician) has arrived in October, and Julien REVERDY (technician) has started work in November.

Michael BREMER

VLBI Terminal Upgrade at Pico Veleta

During September and October the VLBI terminal at the 30m telescope was upgraded to "VLBA4" specification, which uses two tape heads simultaneously to double the available recording bandwidth. The modifications were carried out by Salvador Sanchez together with Michael Wunderlich and Arno Freihold of MPIfR Bonn. New software was also installed. The increased bandwidth is particularly useful to enhance sensitivity at short mm wavelengths. The enhanced system was then successfully used in the first mm-VLBI session ever carried out with 512Mbit/s recording. Effelsberg, Haystack, Onsala and Metsaehovi observatories also took part, all stations performed as expected and verified the high sensitivity expected.

Further information can be found at http://www.mpifr-bonn.mpg.de/EVN/512CMVA.html

On behalf of the VLBI group D.GRAHAM, MPIfR

IRAM Program Committee recommendations

The IRAM program committee, chaired by Linda Tacconi, convened in Grenoble on October 4 and 5, 2001 to discuss the proposals submitted for the winter 2001/2 scheduling period. A total of 115 proposals requesting 5096 hours were received for the 30m telescope and 64 proposals were received for the interferometer. Considering technical periods, VLBI and, in the case of the interferometer, weather contingencies.

For the 30m telescope, the committee gave the highest rating "A" to 29 proposals, and 42 proposals received a "B" rating. Like last summer, the committee accepted several proposals requesting more than 100 hours. The individual ratings are listed in the attached table (the proposal numbers were communicated to the PI of each proposal shortly after submission).

As usual, only part of the B proposals will be scheduled, depending on the scientific merit, right ascension range, and general aspects of balance. Owing to particularly crowding in some right ascension regions, even A–rated proposals may not always get all the time requested.

For the interferometer, the programs were, as usual, classified as category A, B or C. Programs rated A will be scheduled in priority. Further time, if it becomes available, will go to the B programs, taking into account scientific merit, crowding in certain right ascension ranges and general aspects of balance.

Backup projects which are not scheduled before the end of the winter period, will have to be resubmitted and rated again together with any new programs that come in for the next semester.

Roberto NERI and Clemens THUM

30m telescope proposal ratings

A		B		C	
099–01	170–01	114–01	158–01	100–01	156–01
101–01	174–01	116–01	160–01	102–01	157–01
103–01	175–01	117–01	165–01	104–01	159–01
107–01	178–01	118–01	169–01	105–01	161–01
108–01	182–01	119–01	172–01	106–01	163–01
109–01	190–01	120–01	173–01	110–01	164–01
112–01	191–01	121–01	177–01	111–01	166–01
124–01	192–01	126–01	183–01	113–01	167–01
129–01	201–01	127–01	184–01	115–01	168–01
130–01	203–01	128–01	185–01	122–01	171–01
132–01	204–01	131–01	186–01	123–01	176–01
150–01	205–01	135–01	187–01	125–01	179–01
154–01	207–01	138–01	188–01	133–01	180–01
155–01	209–01	140–01	189–01	134–01	181–01
162–01		141–01	194–01	136–01	193–01
		142–01	196–01	137–01	195–01
		143–01	198–01	139–01	197–01
		144–01	202–01	146–01	199–01
		145–01	210–01	147–01	200–01
		151–01	211–01	148–01	206–01
		152–01	212–01	149–01	208–01
				153–01	213–01

PdBI proposal ratings

Project	Rate	Project	Rate	Project	Rate
L020	C	L021	A‡	L022	C
L023	B	L024	A◇	L025	C
L026	C	L027	B	L028	C
L029	B	L02A	A	L02B	B
L02C	C	L02D	B	L02E	A†
L02F	—	L030	B	L031	B
L032	B	L033	C	L034	B
L035	C	L036	B	L037	A◇
L038	B	L039	C	L03A	B
L03B	B	L03C	A	L03D	B
L03E	C	L03F	C	L040	A
L041	A†◇	L042	B	L043	C
L044	B	L045	A•	L046	A
L047	A†	L048	B	L049	B
L04A	A	L04B	A•◇	L04C	C
L04D	B⋆	L04E	B	L04F	C
L050	B	L051	B	L052	C
L053	C	L054	A⋆	L055	C
L056	C	L057	C	L058	A
L059	B	L05A	A	L05B	B
L05C	B	L05D	C	L05E	C
L05F	A				

‡ program rated B and C in one or more parts.
† program rated B in one or more parts.
⋆ program rated C in one or more parts.
• program scheduling is bound to conditions.
◇ no guarantee on all configurations because of sun avoidance constraints.

Number 50: Ten years of IRAM Newsletters

With the last Newsletter of the year 2001, we reach two round numbers: the 50th edition of the Letter, and ten years of its publication, as the very first Letter was published on January 1, 1992.

It contained the call for proposals on the IRAM instruments; the three-antenna PdBI had just completed its first year of operation at 3mm wavelengths. The 30m was reporting on holography and VLBI results, and already offering remote observing with single-beam receivers at 3, 2, 1.3 and 0.8 mm.

Scientific abstracts discussed SiO emission from evolved stars and HCN in the center of other galaxies, and oxygen isotopic ratios in circumstellar envelopes.

Since then, science with the PdBI and the 30m telescope has built on the early results. Deeper images were obtained and imaging was extended as the technology advanced.

The receiver temperatures have decreased since then by a factor of about three, tuning ranges and bandwidths have increased, and new instruments like the multichannel bolometer (MAMBO) and SIS receiver (HERA) have become available at the 30m. The Plateau de Bure has increased its number of instantaneous baselines by more than a factor of three, and will reach a factor of five relative to its old three-antenna days when antenna 6 becomes operational in the next few months. Baseline tracks have been extended and the resolving power improved, and simultaneous observations at 1mm and 3mm are standard.

Over the numerous issues of the Letter, three editors have taken on the task to compile the various IRAM news items for you: Robert Lucas, Michel Guélin and finally myself. The news have covered moments of great happiness when milestones have been reached in scientific discoveries or new technical developments and moments of extreme sadness when the PdBI was struck by terrible accidents. We thank our readers and user community who have stayed with us in both extremes and the calmer waters in between, and whose interest is essential for the future of the two IRAM observatories.

Both instruments on Pico Veleta and Plateau de Bure are still being extended and improved, so that the variety of feasible science is still increasing. The Newsletter will keep you informed on new developments at the observatories.

Please remember that the "Scientific Results" column of the Newsletter is meant to improve the visibility of the results you have obtained with the IRAM instruments. Just send a copy of the paper title, authors, affiliation, the abstract, and the journal where the paper has been accepted or printed since the previous Newsletter to pub@iram.fr.

Michael BREMER

Scientific Results in Press

Dust emission from the lensed Lyman break galaxy cB58

Baker, A.J.([1]), Lutz, D.([1]), Genzel, R.([1]), Tacconi, L.J.([1]) and Lehnert, M.D.([1]),
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Abstract:
We detect 1.2 mm continuum emission from dust in the gravitationally lensed Lyman break galaxy MS 1512+36-cB58. Our detected flux is surprisingly low: relative to local starburst galaxies, cB58 appears to produce somewhat less far-IR emission than its UV reddening predicts. After comparing several different estimates of the source's dust content, we conclude that the apparent discrepancy is most likely related to uncertainty in its UV spectral slope. Alternate scenarios to account for a far-IR "deficit" which rely on a high dust temperature or differential magnification are less satisfactory. Our result underscores one of the risks inherent in characterizing the cosmic star formation history from rest-UV data alone.

Appeared in: A&A, 372, L37

Cometary molecular clouds around RNO 6. On-going star formation near the double cluster h and χ Persei

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Abstract:
We present molecular line observations of the star-forming cloud around RNO 6 along with a newly discovered nearby molecular cloud that we name RNO 6 NW. Both clouds display striking similarities in their cometary structures and overall kinematics. By using ^{13}CO line observations, we estimate that these clouds have similar sizes (~4.5 pc) and masses (~200 $M_\odot$).
Both molecular clouds RNO 6 and RNO 6 NW are active in star formation. From new high resolution near-IR narrowband images, we confirm that RNO 6 hosts an embedded IR cluster that includes a Herbig Be star. A conspicuous H_2 filament is found to delineate the dense cometary head of the globule. RNO 6 NW hosts at least two IR sources and a bipolar molecular outflow of ~0.9 pc of length and ~0.5 $M_\odot$ of mass.
We show that the cometary structure of both clouds has been created by the UV radiation from numerous OB stars lying ~1.5° to the north. Such OB stars are associated with the double cluster h and χ Persei, and are probably members of the Per OB1 association. Thus star formation inside these clouds has been very likely triggered by the Radiation Driven Implosion (RDI) mechanism. From comparison to RDI theoretical models, we find that the

similar kinematics and morphology of both clouds is well explained if they are at a re-expansion phase. Triggered sequential star formation also explains the observed spatial distribution of the members of the near-IR cluster inside the RNO 6 cloud, and the morphology of the H_2 filament. We conclude that the RNO 6 and RNO 6 NW clouds are high-mass counterparts to the cometary globules of smaller masses which have been studied up to now. Thus our observations demonstrate that the RDI mechanism can produce, not only low mass stars in small globules, but also intermediate mass stars and clusters in massive clouds.

E-mail contact: bachiller@oan.es. Preprints can be obtained at http://www.oan.es/preprints/bachiller.ps.gz.

Accepted by Astronomy & Astrophysics

A search for radio supernovae and supernova remnants in the region of NGC 1569's super star clusters

A. Greve([1]), A. Tarchi([2]),([3]), S. Hüttemeister([4]),([5]), R. de Grijs([6]), J.M. van der Hulst([7]), S.T. Garrington([8]) and N. Neininger([2])
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Abstract:
We have used MERLIN, at 1.4 and 5 GHz, to search for radio supernovae (RSNe) and supernova remnants (SNRs) in the unobscured irregular dwarf galaxy NGC 1569, and in particular in the region of its super star clusters (SSCs) A and B. Throughout NGC 1569 we find some 5 RSNe and SNRs but the SSCs and their immediate surroundings are largely devoid of non-thermal radio sources. Even though many massive stars in the SSCs are expected to have exploded already, when compared with M 82 and its many SSCs the absence of RSNe and SNRs in and near A and B may seem plausible on statistical arguments. The absence of RSNe and SNRs in and near A and B may, however, also be due to a violent and turbulent outflow of stellar winds and supernova ejected material, which does not provide a quiescent environment for the development of SNRs within and near the SSCs.

Accepted by Astronomy & Astrophysics

Design and characterization of 225-370 GHz DSB and 247-360 GHz SSB waveguide SIS mixers

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Abstract:
We report on the design and characterization of two full height waveguide SIS mixers for astronomical applications: a Double Side Band (DSB) fixed-tuned mixer covering the 225-370 GHz band, and a tunable Single Side Band (SSB) mixer covering the 247-360 GHz frequency range. The lowest DSB receiver noise temperatures we have measured are 37 K at 320 GHz for the DSB mixer, and 63 K at 350 GHz for the SSB mixer. The measured image gain rejection of the SSB mixer is around -15 dB over most of the frequency range. The ≈ 50 % bandwidth of the DSB mixer is, to our knowledge, the widest ever reported.
Both mixers use similar chips that integrate a parallel tuning inductor with a radial microstrip stub to compensate for the junction capacitance of 75 fF (junction size 1 μm^2). The junction is mounted on a 80 μm thick quartz that stretches only part way across the waveguide. In the SSB mixer the image rejection is achieved by using a mechanically rugged noncontacting backshort with a circular cross-section that can be moved inside a circular waveguide. A stability criterion for intrinsically DSB and SSB mixers under typical operating conditions has been derived. The receiver design has been optimised in order to guarantee a low mixer noise temperature while maintaining adequate gain and stable operation over the whole frequency band of interest.

To be published in: *Proceedings of the 26th. International Conference on Infrared and Millimeter Waves*, Toulouse, France, 10/09/2001-14/09/2001.

New Preprints

561. A SEARCH FOR RADIO SUPERNOVAE AND SUPERNOVA REMNANTS IN THE REGION OF NGC 1569's SUPER STAR CLUSTERS
A. Greve, A. Tarchi, S. Hüttemeister,
R. de Grijs, J.M. van der Hulst,
S.T. Garrington, N. Neininger

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