IRAM Newsletter

Number 28 October 3, 1996

Calendar

October 16-18th, 1996: Program Committee Meeting.

March 3rd, 1997: Deadline for the submission of observing proposals for the period May 15, 1997 to Nov. 15, 1997.

15-17 April 1997: "The Far InfraRed and Submillimetre Universe", An ESA Symposium devoted to the Far InfraRed and Submillimetre Telescope (FIRST) cornerstone mission. IRAM will be responsible for the local organisation.

IRAM telephone numbers are:

	Telephone	Fax
Before Oct. 18:		
Grenoble	(33) 76 82 49 00	(33) 76 51 59 38
Plateau de Bure	(33) 92 52 53 60	(33) 92 52 53 61
After Oct. 18:		
from France:		
Grenoble	0 476 82 49 00	0 476 51 59 38
Plateau de Bure	0 492 52 53 60	0 492 52 53 61
from abroad:		
Grenoble	33 476 82 49 00	33 476 51 59 38
Plateau de Bure	33 492 52 53 60	33 492 52 53 61

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New telephone numbers in France

All french telephone numbers will be extended from 8 to 10 digits on **October 18th, 1996**. All new numbers include a leading zero which should not be dialed when calling from abroad.

New Appointments to the IRAM Programme Committee

After having served for three or more years on the IRAM Programme Committee, the terms of L. Blitz, V. Bujarrabal, P. Cox, and U. Klein have come to an end or will shortly do so.

The IRAM Executive Council, together with IRAM, gratefully acknowledges the valuable advice that these colleagues have given to the IRAM Direction on the scientific merit and timeliness of observing proposals received for both the 30m-telescope and the Plateau de Bure Interferometer.

As new members of the Programme Committee, the Council has appointed J.Alcolea / Alcala de Henares (Madrid), R.Bender / Muenchen, J.H.Black /O nsala, and F.Casoli / Paris, who will start serving on the IRAM P.C. at the next meeting, in October this year, or in the spring of 1997.

Michael GREWING

30m Telescope

Spectral line on-the-fly mapping

Several spectral line one-the-fly (OTF) projects were carried out during the summer semester. Although the observing mode is still experimental (making the active participation of an IRAM Granada astronomer necessary), very good results could be obtained. A number of software improvements were implemented over the past few months. The efforts to make this observing mode more user friendly continue. A memo describing the current capabilities, problems and limitations can be obtained from Hans Ungerechts (`ungerech@iram.es`).

Summer observations

The observations during the summer months went smoothly and without major problems. During certain periods the atmospheric conditions were quite unusual for the time of the year, in the sense that they were too good! On occasions, water vapour values as low as 2 mm were measured.

Wolfgang WILD

Interferometer

Commissioning of Antenna 5

Using an improved holography technique, the surface of antenna 5 has been adjusted to about 60 μm, making it ready for 1.3 mm operation. Receivers have been coaligned to within $2''$ with respect to each other. The pointing accuracy had caused some problem in the early tests: the effect has been traced back to a default in the encoder coupling with the elevation axis, and is now solved.

Antenna maintenance

Maintenance of antennas 2, 3 & 4 has been completed. The electronics of antenna 1 are being interfaced with the VME computer system. The antenna should be back into operation early October.

Surface adjustment

The holography technique developed for antenna 5 has been applied to antenna 4. The surface accuracy measured by holography is now below 50 μm rms. Antenna 2 has also been measured, and the adjustment process is on-going; the subreflector position has already been optimized.

Receivers

The dual-frequency receiver of antenna 4 (which was the first of the series and suffered from a focus offset between both channels) has been replaced by a new one. The co-alignment of the 2 channels was set up in the laboratory, and has been checked to be better than $2''$ on astronomical sources. The new receiver provides significantly better performance than the previous one, specially in the 1.3mm band: $T_{\rm REC}$ is below 40 K DSB over most of the band (32 K DSB at 230 GHz).

The old receiver is being refurbished in the laboratory. It will serve as a spare, or will be used to replace the receiver of Antenna 1 which has a high $T_{\rm REC}$ near 245 GHz.

Stéphane GUILLOTEAU

Scientific results

Shocks and ring in the barred spiral galaxy NGC 1530

D. Reynaud, D. Downes
Institut de Radio Astronomie Millimétrique, F-38406 Saint Martin d'Hères, France

Abstract: We present new CO(1–0) and HCN(1–0) observations of the barred spiral galaxy NGC 1530 at resolutions of $1.8''$ and $3.6''$ respectively. Both CO and HCN are abundant in the nucleus, where we detect two strong, curved shock fronts curling around a possible nuclear ring. The ring is clumpy and may be elongated along the bar. The kinematics of the gas can be fit with a model with infall motions up to 100 $\mathrm{km\,s^{-1}}$ along the shocks and quasi-circular rotation in the ring. We estimate the radii of the two inner Lindblad resonances that correspond to the boundaries of the ring and to the location of shock fronts to be 0.1 and 1.2 kpc. Maximum HCN emission seems to arise at the connections of the shock fronts to the nuclear ring, at a radius of 0.6 kpc from the center of the galaxy.

Millimeter-wave Observations of Diffuse Clouds

R. Lucas([1]), H. S. Liszt([2])
([1]) IRAM, Grenoble (France)
([2]) NRAO, Charlottesville (USA)

Abstract: Using the IRAM instruments (interferometer on Plateau de Bure and 30-m telescope on Pico Veleta) we have made numerous observations of molecular absorption lines in front of extragalactic millimeter wavelength radio sources. Observations of HCO^+, CO and OH show that the lines of sight studied in this way sample the outer edges of molecular clouds or the diffuse clouds with highest column densities. Collisional excitation of the rotational levels is not significant in this density range for most molecular species, and accurate column densities may be derived by assuming radiative equilibrium with the cosmic microwave background. Using this technique we have measured column densities of CO, HCO^+, H_2CO, CN, HCN, HNC, CS, SO, H_2S, C_2H, and C_3H_2 in several lines of sight, intersecting about 20 individual clouds with CO column densities in the range $2\ 10^{14}$ to $\sim 10^{16}$ $\mathrm{cm^{-2}}$. These results confirm that complex molecules achieve dark-cloud abundances at low extinctions, either by formation in the gas phase or on grains.

paper presented at IAU Symp. 178, Molecules in Astrophysics: Probes and Processes, ed. E. van Dishoek, Leiden, July 1996

A survey of CN in circumstellar envelopes

R. Bachiller([1]), A. Fuente([1]), V. Bujarrabal([1]), F. Colomer([1]), C. Loup([2]), A. Omont([2]), and T. de Jong([3])
([1])Observatorio Astronómico Nacional (IGN), Apartado 1143, E-28800 Alcalá de Henares, Madrid, Spain
([2])Institut d'Astrophysique de Paris (CNRS), 98 bis Bd. Arago, F-75014 Paris, France
([3])SRON, Space Research Groningen, P.O. Box 800, NL-9700 AV Groningen, The Netherlands

Abstract: We have conducted a survey of CN N=2–1 and N=1–0 line emission in the envelopes of evolved stars. The sample consists of 42 objects, including C-rich and O-rich envelopes, S-stars, detached envelopes, and proto-planetary nebulae. Confident detections have been achieved in 30 objects. Both CN lines are bright in C-rich envelopes, and the 2–1 line has been detected in 5 O-rich objects (previously, CN had been detected in only one O-rich envelope). The excitation temperature $T_{\rm rot}$, evaluated from the 2–1/1–0 intensity ratio, is $\sim$ 3–6 K in most carbon stars, and $\geq$ 10–20 K in O-rich envelopes.

We find that the CN spectra display anomalies in the rotational, fine, and hyperfine line ratios. Anomalies in the rotational excitation appear in W Ori and UU Aur, two stars which are known to present HCN v=0 J=1–0 masers. The excitation of the CN 2–1 line is unusually high in both objects, and UU Aur may present a weak maser effect in this line. Anomalies are also observed in the intensity ratios of the fine and hyperfine components. If such anomalies were due to the envelope thickness, the required line opacities would be excessively high, in particular for low mass-loss rate objects. We thus suggest that the observed anomalies are the result of an anomalous excitation. Pumping through the optical and near-IR bands seems to play a dominant role in the CN excitation.

A comparison with previously published HCN data shows that the CN/HCN ratio of the total numbers of molecules in C-rich stars tends to be larger in the objects with lower mass-loss rate, supporting the idea that CN is mainly formed from the photodissociation of HCN. The average peak abundance of CN is $\sim 1.9\,10^{-5}$ in C-rich objects, and is about 300 times smaller ($\sim 6.6\,10^{-8}$) in O-rich envelopes. The CN/HCN peak abundance ratio is $\sim$0.45 in C-rich stars, in agreement with photodissociation chemical models, and $\sim$0.04 in O-rich objects. This last value is about two orders of magnitude smaller than the predictions of standard chemical models, and suggest that CN is destroyed by additional mechanisms than photodissociation in O-rich envelopes.

Detection of a new linear carbon chain radical: C_7H

M. Guélin([1]), J. Cernicharo ([2]), M.J. Travers ([3]), M.C. McCarthy ([3]), C.A. Gottlieb ([3]), P. Thaddeus ([3]), M. Ohishi ([4]), S. Saito ([5]), S. Yamamoto ([6])

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([6]) Dept. of Physics, The University of Tokyo, Bunkyo-ku, Tokyo 113, Japan

Abstract: Following our discovery of C_8H in IRC+10216 (Cernicharo & Guélin 1996), we report the detection in this circumstellar envelope of another linear carbon chain radical, C_7H. The microwave spectrum of C_7H has been recently observed in the laboratory and its rotational line frequencies are precisely known.

With this new detection, the family of acetylenic chain radicals (C_nH) observed in space is complete up to $n = 8$. The members with even numbers of carbon atoms are consistently more abundant than the odd number members; C_7H is found to be a factor of 4 less abundant than C_8H and a factor of 20 less abundant than C_5H.

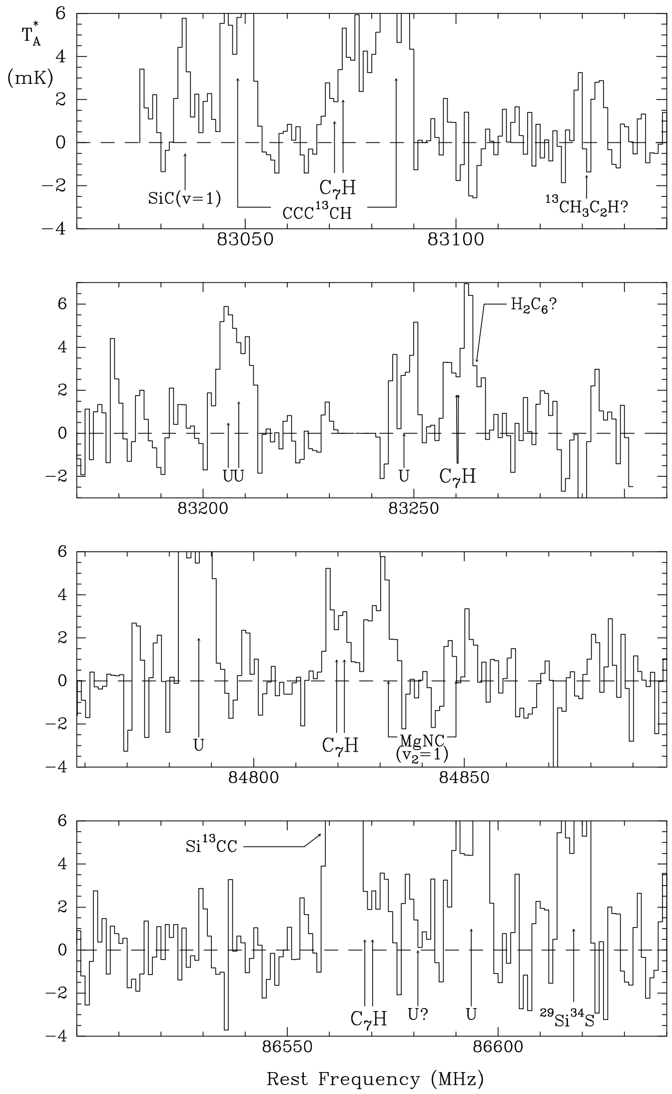

Figure 1: Four 30-m telescope spectra covering 4 rotational transitions of C_7H (the Λ doublet components are indicated by vertical arrows). Two 8 MHz-wide intervals contaminated by strong lines from the upper sideband have been deleted. Unidentified lines are denoted 'U'. Note the N= 7–6 doublet of vibrationally excited MgNC and the possible identification of H_2C_6 at 83264 MHz, on the right side of the C_7H line.

New Preprints

407. The anatomy of an isolated spiral galaxy: NGC 4414
J. Braine, N. Brouillet, A. Baudry
1996, *Astrophys. Journal*

408. Coma correction of a wobbling subreflector
A. Greve, B. LeFloch, J. Penalver
1996, *IEEE Trans. Ant. Propagat.*

409. The mass and temperature distribution in the protoplanetary nebula M1-92:
^{13}CO interferometric observations
V. Bujarrabal, J. Alcolea, R. Neri, M. Grewing
1996, *Astronomy and Astrophysics*

410. Galactic OH absorption and emission toward a sample of compact extragalactic mm-wave continuum sources
H. Liszt, R. Lucas
1996, *Astronomy and Astrophysics*

411. Millimeter-wave observations of diffuse clouds R. Lucas, H.S. Liszt
1996, IAU Symp. 178 on: Molecules in Astrophysics Probes and Processes
ed. E. van Dishoek
Leiden, July 1996

412. Molecular observations of shocks and outflows
R. Bachiller
1996, IAU Symp. 178 on: Molecules in Astrophysics Probes and Processes
ed. E. van Dishoek
Leiden, July 1996

413. A survey of CN in circumstellar envelopes
R. Bachiller, A. Fuente, V. Bujarrabal, F. Colomer, C. Loup, A. Omont, T. de Jong
1996, *Astronomy and Astrophysics*

414. A study of the mutual interaction between the Monoceros R2 outflow and its surrounding core
M. Tafalla, R. Bachiller, M.C.H. Wright, W.J. Welch
1996, *Astrophys. Journal*

The Far InfraRed and Submillimetre Universe

An ESA Symposium devoted to the Far InfraRed and Submillimetre Telescope (FIRST) cornerstone mission, to be held in Institut de Radio-Astronomie Millimétrique (IRAM), Grenoble, France, on 15-17 April 1997.

Background and purpose

The far infrared and submillimetre range remains one of the last major spectral windows still to be fully exploited. This is because of the poor transmission of the atmosphere combined with strong thermal emission, and of the technical difficulties to carry out high sensitivity observations in this window. Ground-based, air- and space borne observations have so far shown that this spectral domain is extremely rich in continuum and line radiation primarily sensitive to cool matter in the Universe such as for example dense interstellar clouds and embedded protostellar condensations, planets, comets, outer atmosphere of evolved cool stars, nuclei of active galaxies and protogalaxies.

From such general considerations it is clear that the next major advance in far infrared and submillimetre astronomy requires a space-based observatory combining good spatial resolution and very high sensitivity over the entire wave band.

In its long-term programme for space science "Horizons 2000", ESA has identified the Far InfraRed and Submillimetre Telescope (FIRST) as its fourth major mission (cornerstone) devoted to high throughput spectroscopy and photometry in the wavelength range 85-900 μm.

Two ESA colloquia have been held on the subject: in Segovia in 1986 and in Liège in 1990. Various studies of the main scientific goals and mission concepts and subsequently system level studies have been carried out by ESA.

In preparation for the confirmation of the mission in June 1997 FIRST is presently in its pre-phase B activities. These include the study of payload cooling concepts (cryocooler and cryostat), the optimisation of the scientific payload (photoconductor, bolometer and heterodyne instruments), the development and qualification of the 3 m telescope and the definition and rationalisation of the science operations concept.

The purpose of the symposium will be to provide an opportunity for the community to exchange information on the many and varied scientific and technical aspects of the mission, to review the status of evolution of the field considering rapid advances and future plans of ground-based and space-based far infrared and submillimetre astronomy. A particular goal of the meeting will be to focus on the unique scientific targets and possible optimisation of the payload complement of FIRST.

Content of the Programme

The programme will consist of invited introductory talks, oral and poster contributions. Ample time will be allocated for discussion and for viewing posters.

Subjects to be addressed will include:

- The scientific potential of the submillimetre wave band
- Science targets for FIRST
- FIRST technical concept
- FIRST payload complement
- Other infrared and submillimetre astronomy space missions and airborne telescopes
- Future plans fro ground-based submillimetre astronomy

Venue

The symposium will be held at IRAM, St. Martin d'Hères, Grenoble, France on the campus of the University of Grenoble, Saint Martin d'Hères, next to IRAM. Details regarding accommodation and local arrangements will be provided in the second announcement.

Calendar of Events

- September 1996 First Announcement and call for papers
- 1 November 1996 Second Announcement
- 6 January 1997 Deadline for abstracts
- 24 February 1997 Programme announcement
- 15-17 April 1997 Symposium

Participation and Registration

There will be a registration fee (to be defined). Payment of this amount will entitle the participant to admission to the Symposium, participation in the social events and receipt of the book of abstracts as well as a copy of the proceedings which will be published by ESA.

Call for papers

The abstract submission deadline is 6 January 1997. They should arrive before this date, addressed to:
Prof. M. Rowan-Robinson
c/o Dr. S. Volonte
European Space Agency
Scientific Programme Directorate
8-10 rue Mario Nikis
F-75738 Paris Cedex 15
Tel: +33.1.53.69.71.03
Fax: +33.1.53.69.72.36
e-mail: `svolonte%esa.bitnet@vm.gmd.de`

Scientific Organising Committee

M. Rowan-Robinson (Imperial College London, UK) Chairman; A. Franceschini (Osservatorio Astronomico, Padova, I); R. Genzel (Max-Planck-Institut fr extraterrestrische Physik, Garching, D); M. Grewing (Institut de Radio-Astronomie Millimtrique, Grenoble, F); R. Hills (Cavendish Labatory, Cambridge, UK); J. Mather (Goddard Space Flight Centre, Greenbelt, USA); G. Miley (Sterrewacht, Leiden, NL); L. Nordh (Swedish National Space Board, Solna, S); H. Okuda (Institute of Space and Astronautical Science, Sagamihara, J); T. Phillips ((Caltech, Pasadena, US); G. Pilbratt (ESA Astrophysics Division/Space Science Department, ESTEC, Noordwijk, NL); J.-L. Puget (Institut d'Astrophysique Spatiale, Orsay, F); G. Sholomitski (Space Research Institute, Moscow, R); P. Solomon (State University of New York, Stony Brook, USA); E. van Dishoeck (Sterrewacht, Leiden, NL); S. Volonte (ESA Directorate of Scientific Programmes, ESA-HQ, Paris, F); C. Waelkens (Instituut voor Sterrenkunde, Leuven, B);

Local Organising Committee

Members still to be appointed.

Symposium Secretariat

Gisela Matoso (IRAM, Grenoble, F); Ilse Vollgraf (ESA, Paris, F)

Symposium Editors

S. Volonte (ESA-HQ, Paris, F); Brigitte Kaldeich (ESA/ESTEC, Noordwijk, NL)

Programs Scheduled on the 30-m Telescope in 1996

JAN 2 - 30

Ident.	Title	Freq. (GHz)	Authors
199.95	The spatial extent and abundance of water vapor in molecular clouds	183,86,230,241	Cernicharo, Gonzalez-Alfonso
226.94	The molecular content of prototypical molecular clouds	82,115,130,237	Cernicharo, Guélin, Kahane, Gonzalez-alfonso
201.95	Are optical jets associated to high velocity gas in molecular outflows ?	115, 230	Cernicharo, Neri, Reipurth
205.95	The dust to gas ratio in the darkest regions of cold clouds	109,219,96,144	Cernicharo, Cox, Zylka
194.95	The magnetic field in the MWC349 disk	231	Thum, Morris
181.95	Cold dust in NGC891, M51 and IC342: a key to the molecular gas content of spiral galaxies	bolometer	Zylka, Guélin, Mezger, Garcia-Burillo
180.95	Cold dust in four giant cloud associations of M33	bolometer	Guélin, Viallefond, Neininger, Zylka, Mezger
138.95	FIR/mm properties of extragalactic radio sources	bolometer	Fosbury, Andreani, Wehrle, Freudling, Cimatti
214.95	Systematic study of 1.25mm emission of APM radio quiet QSOs with $z > 4$	bolometer	Omont, McMahon, Cox, Kreysa, Bergeron
215.95	mm continuum studies of QSOs with z = 2 to 3	bolometer	McMahon, Omont, Cox
207.95	1mm search for primeval quasars or galaxies	bolometer	Barvainis, Antonucci, Hurt
96.95	A search for cold dust around pulsars	bolometer	Wolszczan, Reuter, Wielebinski
	VLBI OBSERVATIONS		IRAM staff + MPIfR

JAN 30 - FEB 27

Ident.	Title	Freq. (GHz)	Authors
	VLBI OBSERVATIONS		IRAM staff + MPIfR
210.95	Search for high z elliptical starbursts emitting the diffuse mm background	bolometer	Puget, Omont, Guiderdoni et al.
217.95	Search for small anisotropy of the cosmic microwave background	bolometer	Kreysa, Biermann, Chini, Zylka et al.
183.95	Continuum emission in young outflows	bolometer	Gueth, Neri, Guilloteau, Dutrey, Bachiller
181.95	Cold dust in NGC891, M51 and IC342: a key to the molecular gas content of spiral galaxies	bolometer	Zylka, Guélin, Mezger, Garcia-Burillo
182.95	Mapping the cold dust emission from HI warps	bolometer	Neininger, Guélin, Dumke, Zylka, Wielebinski
149.95	Dust emission from prestellar cores in Bok globules	bolometer	Launhardt, Henning, Osterloh, Zylka
166.95	Cold dust emission in Taurus dark clouds	bolometer	Cox, Cernicharo, Zylka, André, Ward-Thompson

Feb 27 - Mar 12

Ident.	Title	Freq. (GHz)	Authors
182.95	Mapping the cold dust emission from HI warps	bolometer	Neininger, Guélin, Dumke, Zylka, Wielebinski
225.95	Comparison of dust extinction and dust emission in IC 5146	bolometer	Kramer, Sievers, Lada, Walmsley
115.95	HH energy sources, deeply embedded stars and protostellar condensations	bolometer	Chini, Reipurth, Sievers, Ward-Thompson
108.95	Dust at high z	bolometer	Chini, Kruegel
215.95	mm continuum studies of QSOs with z = 2 to 3	bolometer	McMahon, Omont, Cox
177.95	Dust mm-wave emission from evolved stars : AGB envelopes	bolometer	Bujarrabal, Alcolea, Cernicharo, Neri, Cox
204.95	mm emission from dust envelopes around post-AGB stars	bolometer	Alcolea, Bujarrabal, Cernicharo, Cox, Neri
165.95	L 1544 : A collapsing starless core ?	bolometer	Tafalla, Myers, Bachiller, Mardones, Caselli, Benson

Mar 12 - Mar 26

Ident.	Title	Freq. (GHz)	Authors
230.95	Dust continuum structure of pre-protostellar cores	bolometer	André, Ward-Thompson, Motte
227.95	Density structure of protostellar envelopes in clusters: A bolometer mosaic of OphE/F and OphB2	bolometer	André, Motte, Neri, Bontemps
209.95	Survey for circumstellar disks in cluster environments	bolometer	Lada, Mundy, Beckwith
137.95	Confirmation of dust thermal emission in high red shift radio galaxies	bolometer	Freudling, Cimatti
131.95	Investigating the nature of true low-mass protostars	bolometer	Guesten, Wiesemeyer, Zylka
111.95	The recent mass loss rate history of highly evolved stars	bolometer	Groenewegen, Van der Veen, Loup, Habing, Omont
101.95	Submm cutoffs in distant quasars : checking some possible detections from JCMT	bolometer	Antonucci, Barvainis, Coleman
162.95	Dust emission observations of IR-quiet star formation regions	bolometer	Mooney, Mezger, Zylka
97.95	Multi-channel 250GHz bolo. observations of 2060 Chiron at Perihelion	bolometer	Altenhoff , Stern, Weintraub, Festou
112.95	Physical properties of asteroids,derived from light curves at 250GHz	bolometer	Altenhoff, Johnston, Stumpff, Webster
154.95	Attempt to detect Comet C/1995 01 (Hale-Bopp) at 250GHz	bolometer	Altenhoff

MAR 26 - APR 9

Ident.	Title	Freq. (GHz)	Authors
δ03.96	Observations of Chiron and comet B2 (Hyakutake)	bolometer	Altenhoff
δ08.96	Study of 1.25mm emission of APM radio quiet QSOs with z	bolometer	Omont
δ15.96	Make up time for lost bolometric observations	bolometer	Fosbury
δ09.96	Cold dust emission in Taurus dark clouds	bolometer	Cernicharo
211.95	Dust emission in the DR21 outflow	bolometer	Liechti, Sievers
188.95	An independent estimate of the mass in merging galaxies	bolometer	Braine
δ11.96	Dust continuum structure of prestellar cores	bolometer	André
δ10.96	Make up time for bolometer programs affected by bad weather	bolometer	Osterloh
δ14.96	L1544 : A collapsing starless core ? : Make up time	bolometer	Tafalla, Myers, Bachiller, Mardones, Caselli, Benson
δ01.96	Bolo. observations of the z = 1.93 hyper-luminous IRAS galaxy TXFS0321+009	bolometer	Roettgering, Van Breugel, de Breuck, Dey
δ07.96	Confirming the detection of dust warps in NGC 4013 and NGC 5907	bolometer	Neininger, Guélin, Dumke, Zylka, Wielebinski
δ12.96	Additional bolometer observing time	bolometer	Wolszczan
δ16.96	Additional bolometer observing time	bolometer	Mooney, Mezger, Zylka
δ13.96	bolometer observing time for CepE object	bolometer	Lazareff
δ06.96	Search for primeval galaxies at ultrahigh red shifts	bolometer	Barvainis, Antonucci, Hurt

APR 9 - APR 23

Ident.	Title	Freq. (GHz)	Authors
197.95	Multifrequency monitoring of the gamma-bright blazar 0716+71	230,90,150	Wagner, Witzel, Krichbaum, Wild, Kramer, Quirrenbach
δ04.96	Observations of Comet C/1996B2 Hyakutake at the 30m telescope	bolometer	Bockelee-Morvan, Biver, Colom, Crovisier, Gerard, Rauer, Despois
203.95	mm wave recombination lines from external galaxies	99,135,231	Viallefond, Anantharamaiah, Goss, Zhao
236.95	A search for a new Fe-containing radical, FeCO	137,154,163	Kasai, Kawaguchi
122.95	NGC 2146 : Kinematic evidences of a merger-triggered starburst	110,220	Neininger, Greve, Klein, McKeith
235.95	Observation of the $H^{13}CN$ and $HC^{15}N$(3-2) lines on Titan	88,115,220,258,259	Marten, Hidayat, Paubert, Bezard
159.95	On the origin of high velocity SiO maser emission from late-type stars	86,129,230	Baudry, Alcolea, Cernicharo, Herpin

Apr 23 - May 7

Ident.	Title	Freq. (GHz)	Authors
159.95	On the origin of high velocity SiO maser emission from late-type stars	86,129,230	Baudry, Alcolea, Cernicharo, Herpin
106.95	Hot and cold interstellar gas in galaxies : The CO distribution in the Sa system NGC 2775	229	Hogg, Roberts, Bregman
231.95	Completing zero-spacing data for HL Tau in $^{13}CO(1\text{-}0)$	110	Cabrit, Schuster, Guilloteau, André
197.95	Multifrequency monitoring of the gamma-bright blazar 0716+71	230,90,150	Wagner, Witzel, Krichbaum, Wild, Kramer, Quirrenbach
189.95	Isotopic CO observations towards X-ray scattering halos	110,115	Predehl, Schuster, Lucas
δ04.96	Observations of Comet C/1996B2 Hyakutake at the 30m telescope	bolometer	Bockelee-Morvan, Biver, Colom, Crovisier, Gerard, Rauer, Despois
147.95	Deriving an upper limit to $T_{\rm CMB}$ at $z = 0.886$	94,98,103,148	Wiklind, Combes
104.95	CO observations of radio quiet quasars	108,109,218,219	Colina, Planesas, Raluy
1.96	Time-delay measurements in the gravitational lens PDS1830-211	94	Combes, Wiklind, Kramer
148.95	A search for molecular absorption lines with unknown red shift	80,149	Wiklind, Combes
141.95	Search for the HCCNC isomer of HC_3N toward IRC+10216	89,139	Gensheimer
228.95	Follow up to 203 GHz observations of $H_2{}^{18}O$	203,80,225	Gensheimer, Wilson

May 7 - May 21

Ident.	Title	Freq. (GHz)	Authors
141.95	Search for the HCCNC isomer of HC_3N toward IRC+10216	89,139	Gensheimer
228.95	Follow up to 203 GHz observations of $H_2{}^{18}O$	203,80,225	Gensheimer, Wilson
158.95	Imaging the jet working surfaces in the RNO43 outflow: a multi-wavelength study	110,130,230	Richer, Cabrit, Bally, Bence, Padman
54.96	Search for the HCCNC isomer of HC_3N toward IRC+10216	84,102	Gensheimer, Wilson
92.96	A thorough radio spectroscopic investigation of comet Hale-Bopp	88,96,116,241	Crovisier, Biver, Bockelee-Morvan, Colom, Lellouch, Rauer, Despois
20.96	SgrA* : Is the -180 kms^{-1} gas close to the centre?	115,230	Wilson, Dahmen, Lemme, Pauls, Marr, Rudolph
23.96	Cold molecular gas toward Cassiopeia A	115,220,109,219	Wilson, Kalberla, Gensheimer
4.96	Neutral carbon in IRAS 10214+4724	107,149,245	Radford, Downes, Braine, Kramer, Solomon
128.95	Probing the H1/H2 transition layer in PDRs (II)	235,86	Fuente, Martin-Pintado
212.95	A new class of molecular clouds in the galactic center region	89,130,217	Martin-Pintado, Fuente, de Vicente
77.96	On-the-fly mapping of M31 in CO	115,230	Neininger, Guélin, Wielebinski, Hoernes, Berkhuijsen, Berk, Garcia-Burillo
179.95	Did we detect Aluminum 26 in IRC+10216 ?	167,234,267	Guélin, Ziurys, Apponi, Cernicharo
156.95	A search for interstellar/circumstellar FeF and FeCl	143,165,210,93,103	Ziurys, Allen, Guélin

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Ident.	Title	Freq. (GHz)	Authors
100.96	Post-perihelion observations of comet Hyakutake	88,145,168,230	Bockelee-Morvan, Biver, Colom, Crovisier, Gerard, Rauer, Despois, Moreno
128.95	Probing the H1/H2 transition layer in PDRs (II)	235,86	Fuente, Martin-Pintado
212.95	A new class of molecular clouds in the galactic center region	89,130,217	Martin-Pintado, Fuente, de Vicente
156.95	A search for interstellar/circumstellar FeF and FeCl	143,165,210,93,103	Ziurys, Allen, Guélin
179.95	Did we detect aluminum 26 in IRC+10216 ?	167,234,267	Guélin, Ziurys, Apponi, Cernicharo
85.96	30m observations of CO(7-6) and (5-4) in the QSO BR1202-07 at $z = 4.7$	101,141	Omont, Solomon, McMahon, Downes, Petitjean
26.96	^{13}CO in ultraluminous galaxies	110,115	Solomon, Downes
116.96	Compact flat-spectrum radio cores in nearby galaxies	86,138	Reuter, Lesch
35.96	A detailed study of selected infall candidates	93,140,225	Bachiller, Tafalla, Myers, Mardones

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