IRAM Newsletter

Number 10 July 9, 1993

We are deeply saddened by the terrible news of the death of our colleague,

Dr. Hans Steppe,

in an accident in the mountains near his home in Mittelberg, Kleinwalsertal, Austria.

Hans Steppe was one of the earliest staff members at the 30 m telescope, and has worked at IRAM Granada since 1984.

He was born in 1937 in Oberstdorf, Germany, attended schools in Mittelberg and Bregenz, and went to the University of Innsbruck. Thereafter he worked in the Astronomical Institute in Basel, and from 1979 to 1984 at the Max-Planck-Institut für Radioastronomie in Bonn.

It was at these institutes, before coming to IRAM, that Hans Steppe developed a lasting interest in the radio emission of quasars and active galactic nuclei. However, it was at IRAM where he made his main scientific contribution, publishing more than 25 scientific papers during his IRAM years. The most valuable of these were three major compendia, in Astronomy & Astrophysics Supplements, of the millimeter fluxes of 100 active galactic nuclei, and their variations with time.

For IRAM, his services at the 30m telescope were extremely helpful. Hans Steppe served regularly as astronomer-on-duty at the telescope to aid visitors, and did the detailed telescope scheduling during 1987-1990. Several times per month he would observe about 100 radio sources to continually update the pointing model of the 30m telescope. In doing so, he performed an invaluable service for the IRAM user community.

Those who knew him in his Granada years will remember his friendly smile and the ready help he gave to staff and visitors. In his younger years, Hans Steppe was a mountain guide in the region around Kleinwalsertal. He had a great love of the mountains and the outdoors, and it was this aspect of his character which attracted him to work at Pico Veleta. IRAM and especially IRAM-Granada will miss him a great deal.

The IRAM Direction

and all his IRAM colleagues

Contents

Calendar of IRAM Meetings

– **SIS User Meeting**
October or November, 1993
This meeting is intended for all SIS junction fabrication and receiver groups. Current activities and future project will be discussed.
Location: Grenoble Contact: Thomas Lehnert

– **IRAM User Meeting** and **Meeting of the SAC**
December 6/7th, 1993 (tentative date)
Location: Grenoble Contact: M.Grewing

Interferometer

Antenna 4 is now operational. The surface has been adjusted by holography only, and the current surface accuracy is $\sim 80\mu$m.

Some improvements in the correlator system are currently under test. In particular, we are testing a modification aimed to reduce the importance of the Gibbs phenomenon in the 40, 80 and 160 MHz bandwidths.

In July, a major maintenance period is scheduled for the first 3 antennas, to work on the back–cladding, fork cladding, thermal insulation, and transporter mechanics. The interferometer will operate in 3 antenna mode during this month.

Stéphane GUILLOTEAU

Software

The GILDAS software, which includes GreG and CLASS, is available by anonymous `ftp` from `iraux2.grenet.fr` (`130.190.77.22`), on directory `dist/soft`, for the following UNIX-like operating systems and computers:

- AIX (IBM RS/6000 series)
- HPUX (HP 9000/700)
- Ultrix (DECStation 3100)
- Convex (C220)
- SUN-OS

The code is distributed as compressed archives of the source files, with a `Makefile` for installation and a simple installation guide. The installation has been checked on AIX, HPUX and SUN-OS, and experience on Ultrix and Convex shows that installing on any Unix-like system is normally not a major problem. However, we have no experience of installation either under SOLARIS on SUNs, or under OSF-1 on DEC Alpha computers. In the latter case, the 64-bit architecture is a potentially serious problem.

The software collection also includes CLIC, the calibration package for the interferometer, but usage of CLIC requires a licence for the NAG library. Moreover, because of recent hardware changes CLIC had to be frequently updated until now. Support at the same level as other parts of the package is therefore more difficult. However, in the next two years or so we expect a more stable situation.

In case of difficulties, please contact S.Guilloteau (`guillote@iram.grenet.fr`).

IRAM is, at present, not in a position to support GILDAS under VAX/VMS. However, a somewhat out-of-date executable version for VAX/VMS 5.5-1 and later releases is available on Exabyte cassettes in VMS-BACKUP format if directly requested from IRAM, without any installation guide and without any support.

A preliminary version of GreG and CLASS only, for Macintosh (under Mac 7.01) is available directly from S.Radford (`radford@iram.grenet.fr`).

Stéphane GUILLOTEAU

FTP anonymous account

An anonymous account has been opened at IRAM for Internet users. It will enable acess to a read-only public area where one will find :

- recent issues of the IRAM Newsletter in Postcript code (directory `dist/newsletter`)
- documentation on the IRAM telescopes and on reduction software (directory `dist/doc`)
- distribution files for reduction software (directory `dist/soft`)
- Latex files to aid proposal preparation (directory `dist/proposal`)
- status of current observing projects on Plateau de Bure (directory `dist/bure`)

To access those files, please connect through `ftp` to `iraux2.grenet.fr` (or `130.190.77.22`), `cd` to the relevant directory, and read the `README` file.

Scientific Results

CO in the troposphere of Neptune: Detection of the J=1-0 line in absorption

S.Guilloteau[1], A.Dutrey[1], A.Marten[2], D.Gautier[2]
[1]Institut de Radio Astronomie Millimétrique, 300 Rue de la Piscine, F-38406 Saint Martin d'Hères
[2]Observatoire de Meudon, 5 Place Jules Janssen, F-92195, Meudon Cedex

Abstract:
Using the IRAM interferometer, we have detected the CO $J = 1-0$ line in absorption in the atmosphere of Neptune. Since the linewidth predicted from other millimeter observations (Marten *et al.* 1993, ApJ in press) was greater than 5 GHz at half power and the line to continuum ratio should not exceed 10 %, its detection required an observational technique only possible with an interferometer associated to an accurate calibration of the receivers sideband ratio ($< 2\%$). Combining all errors, we have detected the line with a line to continuum ratio of $5.3 \pm 1.5\%$. This detection implies that CO, previously detected in the stratosphere of Neptune, is also present in the troposphere of the planet, in an amount estimated between 0.6 and 1.5×10^{-6}. Implications of this result on the origin of CO in Neptune's atmosphere and on the validity of thermochemical models of the deep atmosphere of the planet are discussed. We conclude to an internal origin for CO.

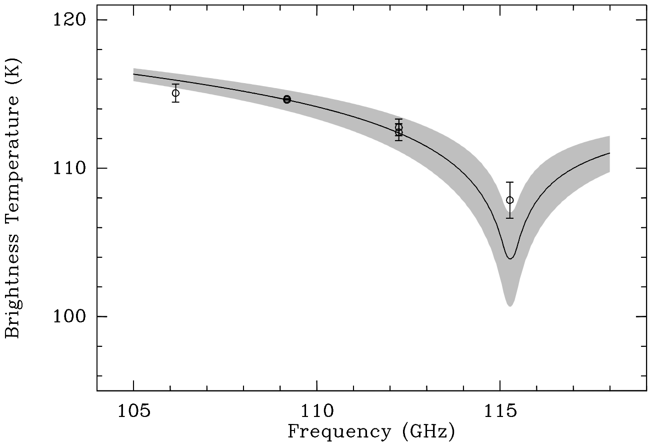

Figure 1: Observed brightness temperatures derived from the "rescaled" flux densities (method DSB). The rescaling model corresponds to a mole fraction of CO $\simeq 1.2 \times 10^{-6}$ and the shaded area represents $\pm 30\%$ abundance variations around this value.

Molecular Gas Mass and Far IR Emission from Distant Luminous Galaxies

D. Downes[1], P. M. Solomon[2], and S.J.E. Radford[1]
[1]Institut de Radio Astronomie Millimétrique, 38406 St. Martin d'Hères, France
[2]Astronomy Program, State University of New York , Stony Brook, New York, 11794, USA

Abstract: Molecular line observations suggest the central few hundred parsecs of ultraluminous infrared galaxies have high mean gas densities, $n_{\mathrm{H_2}} \sim 3 \times 10^3$ to 10^4 cm^{-3}, unlike the centers of normal galaxies and very different from the disks of spiral galaxies. The CO line emission may not trace an ensemble of gravitationally bound gas clouds but instead a medium bound by the total potential of the galactic center (gas and stars). This means the CO luminosity no longer measures gas mass alone, as in normal galaxies, but instead the geometric mean of the gas mass and the *dynamical* mass. In practice, molecular gas dominates the dynamical masses of the centers of ultraluminous galaxies, which suggests gas masses estimated from CO luminosities are basically correct. Furthermore, this model indicates the $100\,\mu$m radiation from ultraluminous galaxies is optically thick and the CO line flux is proportional to the $100\,\mu$m flux, with $S_{\mathrm{CO}}\Delta V/S_{100\mu\mathrm{m}} = 2$ to 4 km s^{-1}. We present measurements of CO flux from 35 ultraluminous galaxies that agree with this correlation, providing additional evidence that the gas mass is high, comparable with the dynamical mass. We derive a relation between the $M_{\mathrm{gas}}/L_{\mathrm{CO}}$ ratio and the luminosity distance that we apply to Arp 220.

Plateau de Bure Observations of mm-wave Molecular Absorption toward BL Lac

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[2]National Radio Astronomy Observatory, 520 Edgemont Road, Charlottesville, VA, USA 22903-2475

Abstract: We have used the Plateau de Bure Interferometer to observe λ3mm $1-0$ absorption line profiles of ^{13}CO, HCO$^+$, C$_2$H, CN, HCN, HNC, and N$_2$H$^+$ formed in a nearby molecular cloud occulting BL Lac (2200+420): only N$_2$H$^+$ was not seen. The observed optical depths, typically $0.3 - 1.5$, provide highly reliable total column densities because the excitation is quite weak. The relative abundances of ^{13}CO, HCO$^+$, HCN, CN, and C$_2$H follow those cited for TMC-1 but N$_2$H$^+$ and HNC are deficient toward BL Lac by factors of $3 - 6$. Only ^{13}CO and HCO$^+$ were seen in emission with the 12m NRAO telescope. The latter provides an estimate of the pressure $n_{\mathrm{H_2}}T_{\mathrm{K}} = 4 - 5 \times 10^4$cm^{-3} K.

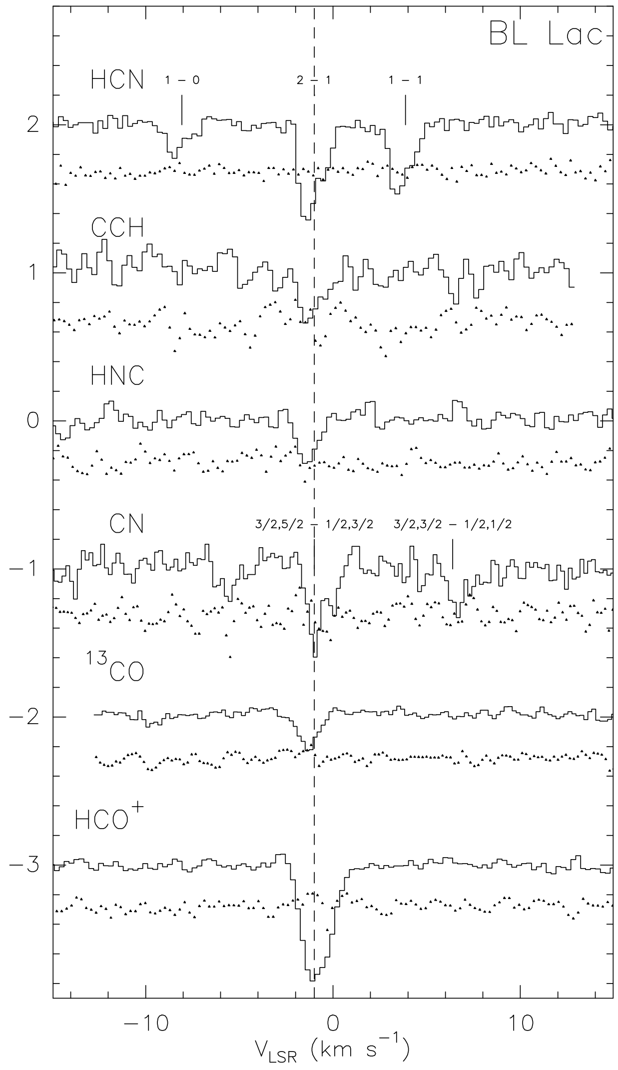

Figure 2: Absorption line profiles (histogram plots) and interferometer phases (points) toward BL Lac. The absorption profiles are presented as line/continuum ratios. The vertical scale for the phase is in radians. The channel spacing is 0.268 km s^{-1}

New Preprints

The following preprints are available from IRAM:

286. Dense Molecular Gas in Ultraluminous and High Redshift Galaxies
S.J.E. Radford
1993, *XIII Moriond Astrophysics Meeting*: Les Arcs March 1993, ed. T. Montmerle, Editions Frontières

287. The Clouds of M82 : I. HCN in the South–West part
N. Brouillet, P. Schilke
1993, *Astron. Astrophys.*

288. A Chemical Study of the Photodissociation Region NGC 7023
A. Fuente, J. Martin–Pintado, J. Cernicharo, R. Bachiller
1993, *Astron. Astrophys.*

Postdoctoral position

Applications are invited for a post-doctoral position in astronomy in Grenoble or Granada. Candidates should have a Ph.D. degree and experience in observational radio astronomy, preferably in spectral line observing. In addition to carrying out research programs, the successful applicant will be expected to assist in running the IRAM observatories, typically spending about one week every two months at either the IRAM interferometer in France or the IRAM 30 m telescope in Spain, depending on whether she/he is stationed in Grenoble or Granada. This work will include aiding visiting astronomers to use the data taking and reduction facilities and participating in the testing of new instrumentation.

To apply, send a résumé, list of publications, a statement of research interests, preference for stationing in France or in Spain, and the names and addresses of three references to the IRAM Director, IRAM, 38406 St. Martin d'Hères, France.

Programs Scheduled on the 30-m Telescope in January–March 1993

Date	Ident.	Title	Freq. (GHz)	People
Jan 5 - 19	141.92	Mapping of HDO on Mars and search for minor species (NO, SO, ClO)	115,143,250	Encrenaz, Lellouch, Gulkis, Paubert
	268.92	Search for molecular lines in comet Swift-Tuttle 1992t	88,145,225,265	Colom, Crovisier, Bockelée-Morvan, Jorda, Despois, Paubert
	274.92	Observations of 3C 273 at mm wavelengths as part of a multifrequency campaign	90, 210	Staubert, Steppe
	254.92	Mm continuum flux measurements of the 16 detected CGRO sources	90, 150	Steppe, Reuter
	148.92	Molecular oxygen in the z=2.3 galaxy ?	112,129,236	Casoli, Combes, Encrenaz, Gerin, Laurent, Pagani
	199.92	The chemistry of S-type stars	90, 147, 244	Bujarrabal, Omont, Fuente, Alcolea
	140.92	High angular resolution study of molecular chemistry towards photodissociation regions (PDRs)	86, 271	Fuente, Martin-Pintado, Rodriguez
	K003	Key Project : Small scale structure of pre-star forming clouds		Falgarone et al.
	271.92	Correlation between gas density and infrared colors	115, 230	Boulanger, Falgarone
Jan 19 - Feb 2	204.92	Flux densities of the planets at 350 GHz, telescope behaviour at 350 GHz		Greve, Rothermel, Steppe
	290.92	A study of the envelope-outflow interaction region in the proto planetary nebula CRL 618	345	Neri, Cernicharo, Garcia-Burillo, Grewing
	273.92	Search for recombination line masers at 350 GHz	353, 335	Thum, Martin-Pintado, Bachiller
	280.92	Search for the (CII) 158μm line at high redshifts		Guelin, Hills, Lequeux, MacMahon, Omont
	270.92	Probing the different molecular gas components in the nucleus of IC 342	345,330,265,244	Krause, Schulz, Stutzki, Guesten
	275.92	Isotopic CO investigations of cloud dispersal around T-Tauri stars	110,220,330	Schuster, Anderson, Genzel, Harris, Rothermel, Tacconi
	224.92	A search for NaH in circumstellar and interstellar clouds	88, 289	Cernicharo, Guelin, Lazareff, Rothermel
	281.92	A 6 GHz-wide band survey of the 0.8mm spectrum of IRC+10216		Guelin, Cernicharo, Kahane, Lazareff, Rothermel
	128.92	A multiline study of SiO masers in evolved stars	86,129,215,258	Cernicharo, Bujarrabal, Santaren
	282.92	Search for LiH primordial lines	130, 233	De Bernardis, Dubrovich, Encrenaz, Masi, Melchiorri, Signore
	140.92	High angular resolution study of molecular chemistry towards photodissociation regions (PDRs)	86, 271	Fuente, Martin-Pintado, Rodriguez
Feb 2 - 16		*Bolometer tests and MPIfR guaranteed time*		
	208.92	Dust emission from NGC 3627	Bolometer	Sievers, Reuter
	263.92	Extension of dust disk in Vega-type stars	Bolometer Array	Kruegel, Lemke
Feb 16 - Mar 2	205.92	The 230 GHz continuum dust emission of NGC 2146	Bolometer	Greve, Sievers
	221.92	Small scale anisotropy of the cosmic microwave background at 230 GHz	Bolometer	Kreysa, Chini, Biermann
	216.92	Cold dust in M51 and NGC 891 : a key to the molecular gas content of spiral galaxies	Bolometer	Guelin, Garcia-Burillo, Mezger, Kreysa, Haslam, Lemke, Sievers

Date	Ident.	Title	Freq. (GHz)	People
	222.92	Mapping the extended, cold dust cloud around PsA : comet cloud or disk ?	Bolometer	Stern, Weintraub, Festou
	243.92	Search for continuum mm emission from QSO's with z 4	Bolometer	Omont, Mac-Mahon, Bergeron, Kreysa, Haslam
	201.92	Anatomy of a PIG II: Studying the dust properties	Bolometer Array	Guesten, Mundy, Serabyn, Wilking
	267.92	A black hole near a molecular cloud ?	Bolometer	Mirabel, Wink, Morris
	210.92	Millimeter continuum maps of Herbig-Haro energy sources	Bolometer	Reipurth, Sievers, Haslam
	266.92	Bolometer observations of the field near W30H at 230 GHz	Bolometer	Wink
	263.92	Extension of dust disk in Vega-type stars	Bolometer Array	Kruegel, Lemke
Mar 2 - 16	267.92	A black hole near a molecular cloud ?	Bolometer	Mirabel, Wink, Morris
	221.92	Small scale anisotropy of the cosmic microwave background at 230 GHz	Bolometer	Kreysa, Chini, Biermann
	209.92	Bolometer survey of Myers cores with no embedded sources	Bolometer	Andre, Ward-Thompson, Hills
	205.92	The 230 GHz continuum dust emission of NGC 2146	Bolometer	Greve, Sievers
	297.92	Circumstellar disk masses as a function of stellar mass and age	Bolometer	Zinnecker
	302.92	A 1.3mm search for extreme class I sources	Bolometer	Henning, Launhardt
	130.92	Mapping the circumstellar dust material around young luminous stars of low to inter. mass	Bolometer	Andre, Cabrit, Montmerle, Menard
	131.92	Mapping of yound rotating cores in spiral arms	98, 147	Greaves, Williams
	261.92	Spatial distribution and mass of the circumstellar material around low-mass embedded YSOs	Bolometer	Andre, Cabrit, Bontemps
	262.92	Bolometer observations of Asteroids	Bolometer	Altenhoff, Johnston, Stumpff, Webster
	237.92	Oxygen isotope ratios and stellar initial mass functions in galaxies	109,220,115,230	Sage, Mauersberger, Brouillet
	223.92	Molecular gas in the central regions of M31	98,109,220,230	Lequeux, Allen
	194.92	The atmosphere of Io	221,146,224,219	Lellouch, Belton, de Pater, Gulkis, Paubert, Encrenaz
Mar 16 - 30	223.92	Molecular gas in the central regions of M31	98,109,220,230	Lequeux, Allen
	183.92	CO emission of the hypergiant HII complexes in M101	115, 230	Viallefond, Boulanger, Cox, Lequeux, Perault
	189.92	A search for the rotational Raman spectrum of SiO in O-rich evolved stars	152,172,173,260	Cernicharo, Gonzalez-Alfonso, Bujarrabal
	173.92	Calibration of the spectral survey made in IRC+10216 with the 30m telescope	89,114,174,265	Guelin, Cernicharo, Kahane
	186.92	High velocity ionized gas near young high-mass stars	92,99,210,231	Jaffe, Martin-Pintado
	154.92	Distribution of SO in the carbon-rich TMC-1 filament	99,138,236	Cox, Cernicharo, Walmsley, Lemme
	200.92	Molecular observations of symbiotic stars	115,130,230	Bujarrabal, Cernicharo, Alcolea
	235.92	Dense gas in absorption line systems towards quasars	151,226,113,161	Wiklind, Combes
	255.92	Molecular line observations of cold compact dust cores in the galactic center	96,110,220,244	Zylka, Lis, Morris

Programs Completed on the Plateau de Bure Interferometer in January 1992–March 1993

Proj.	Conf	Title	Authors	Molecules	Object	Type
A047	BC	HCN in Maffei 2	Nguyen-Q-Rieu J.Lequeux F.Casoli F.Combes M.Gérin J.Jackson F.Viallefond Truong-Bach	HCN	Maffei-2	Gal
A056	CD	Morphology and Kinematics of Circumstellar Disks around Outflow sources	S.Cabrit C.Bertout P.André A.Baudry D.Despois S.Guilloteau	$C^{18}O$	B335	YSO
B005	B1,B3	AFGL 2343 evolving to a non spherical planetary nebula	N.Doll R.Neri M.Grewing	CO	AFGL 2343	CSE
B008	BC or CD	Dense and Schocked Gas in the inner part of M 82	P.Schilke N.Brouillet G.Pineau-des-Forêts A.Baudry	HNC	M 82 (SW)	Gal
B009	BC or CD	Dense and Schocked Gas in the inner part of M 82	P.Schilke N.Brouillet G.Pineau-des-Forêts A.Baudry	HCN	M 82 (NE)	Gal
B010	BC or CD	Dense and Schocked Gas in the inner part of M 82	P.Schilke N.Brouillet G.Pineau-des-Forêts A.Baudry	HNC	M 82 (NE)	Gal
B025	CD	What is the threshold of self-similar hierarchy in cold molecular gas	E.Falgarone F.Boulanger J.L.Puget	CO	Perseus	Mol
B026	BC	SiS and HC_5N in IRC+10216	R.Lucas M.Guélin C.Kahane J.Cernicharo	SiS HC_5N	IRC+10216	CSE
B027	CD	Chemical Processes and their localisation in CRL 2688	R.Lucas A.Omont C.Kahane	SiS HC_5N	CRL 2688	CSE
B028	C1 C2 D1	The spatial extent of SO_2 in O-rich circumstellar envelopes	R.Lucas A.Omont M.Morris	SO_2	IRC+10011, IRC+10420 OH26.5+0.6	CSE
B035	BC	Distant merging galaxies	S.Radford D.Downes P.Solomon	CO	1056+24	Gal
B042	BC	Survival of Dusty Disks in Pre-MS multiple systems	M.Simon S.Guilloteau	Cont.	UZ Tau CG Tau	YSO
B046	C2	mm-to-cm spectrum of 6 radio-bright RS CVn binaries	M.Guedel E.Fuerst S.L.Skinner J.L.Linsky A.Dutrey A.Brown	Cont	UX Ari V711 Tau BH CVn TZ CrB AR Lac II Peg	Oth.
B047	Any	Radio Continuum emission from stellar wind	P.Planesas J.Martin-Pintado J.Gomez-Gonzalez	Cont.	Vy 2-2 P Cyg Wr 147 HD193793 Cyg OB2-12	Oth.
B049	BC	The high velocity gas of NGC 7027	P.Cox S.Guilloteau A.Omont R.Bachiller T.Forveille P.G.Huggins	HCO^+ H41α	NGC 7027	CSEs

Proj.	Conf.	Title	Authors	Molecules	Object	Type
B051	C2 C1	Searching for disk around young intermediate mass stars	P.Harvey N.Evans L.Mundy C.M.Walmsley	Cont.	LkHα 198 AB Aur MWC 137 BD+404124 V1686 Cyg V645 Cyg	YSO
B052	CD	HCN and HNC chemistry in Orion KL	P.Schilke C.M.Walmsley	$HN^{13}C$	Orion	Mol
C002	BC	Small scale physical and chemical structure in the S140 HII region/molecular interface	J.Stutzki C.Degiacomi U.Corneliussen	HCO^+ $HC^{15}N$ $H^{13}CN$	S140	Mol.
C003	BC	Small scale physical and chemical structure in the S140 HII region/molecular interface	J.Stutzki C.Degiacomi U.Corneliussen	HC_5N $C^{34}S$	S140	Mol.
C004	CD	The exciting source of the molecular outflow near the FU Orionis	B.LeFloch H.J.Staude Th.Neckel S.Guilloteau B.Lazareff	CO $C^{17}O$	RNO1B	YSO
C005	C2	IRAS 22036+5306 : a Young planetary nebula ?	M.Grewing R.Neri	HCO^+	IRAS 22036+5306	CSE
C006	CD	Confirming the detection of low mass protostars	R.Gusten D.Fiebig	CS	GF9	YSO
C007	C2	Continuum Observations of Uranus and Neptune	A.Marten D.Gautier S.Guilloteau A.Dutrey	CO	Uranus Neptune	Sol
C008	CD	The center of a cluster cooling flow: CO in NGC1275	C.Henkel H.Lesh H.P.Reuter S.Radford B.Lazareff	CO	3C84	Gal
C015	BC	Detailed photometry of the M 87 at 90 GHz	D.Fraix-Burnet A.Lannes E.Antérrieu	HCN Cont.	M 87	Oth
C017	C2	Millimeter Wavelength Interferometric Observations of 5 dMe Stars	M.Guedel A.O.Benz J.Lim L.Belkora	Cont.	V371 Ori Gl 723 V1285 Aql UV Cet EQ Peg	Other
C018	B2	The distribution of SiO Maser spots around evolved star	J.Cernicharo A.Baudry V.Bujarrabal	SiO	NML Tau R Cas R Leo R Aqr	CSE
C019	BC	Dense gas in M82 – the N_2H^+ mystery	C.Henkel S.Radford J.Wink R.Mauersberger	N_2H^+	M 82	Gal
C020	BC	Distribution and dynamics of dense gas in the nucleus of NGC 1068	L.Tacconi N.Anderson R.Genzel A.Harris S.Madden	HCN	NGC 1068	Gal
C027	BC	The molecular counterpart of the dust disk in the multiple star GG Tau	M.Simon S.Guilloteau A.Dutrey	^{13}CO $C^{18}O$	GG Tau	YSO
C029	CD	The radial distribution of long carbon chains in IRC+10216	R.Lucas M.Guélin C.Kahane J.Cernicharo	C_4H C_6H C_3H C_3S CS	IRC+10216	CSE
C031	B2	^{13}CO absorption in interstellar clouds	H.S.Liszt R.Lucas	^{13}CO	0212+735 0355+508 2200+420	Mol

The IRAM Newsletter is edited by Robert LUCAS at IRAM-Grenoble (e-mail address: `lucas@iram.grenet.fr`).

The IRAM Newsletter is available in electronic form:

- by means of an anonymous `ftp` account, opened at IRAM for Internet users, containing in a read-only public area the most recent issues of the IRAM Newsletter, as well as documentation on the IRAM telescopes and on reduction software, distribution files for reduction software, files for proposal preparation. ... etc.
  To access those files, please connect through `ftp` to `iraux2.grenet.fr` (or `130.190.77.22`) and read the `README` file.
- by means of an electronic mail file server installed at IRAM. This file server is a file distribution service that uses electronic mail facilities to deliver files. To communicate with it you should send a message to the electronic address:
  `newsserv@iram.grenet.fr` For instance, to obtain a copy of the May 1992 issue, just send the one line message:
  `SENDME MAY92.PS`
  to the above electronic address. You will receive later a mail message containing the IRAM Newsletter in Postscript code. Please discard all the e-mail header information with a text editor, and send the file to a Postscript laser printer.
  More information may be obtained by sending the one line message:
  `HELP`
  Note that this file server also contains Postcript files of the proposal forms and of Plateau de Bure documentation.

We also start to compile a list of e-mail addresses of IRAM users (e.g., in order to send warning messages when the Newsletter is available, but also to provide fast information, if needed). If you feel your address should be on this list, please send the one line message:
`SUBSCRIBE`
to the following e-mail address:
`iramusers-request@iram.grenet.fr`
Both addresses are valid on Internet, EARN-Bitnet and EAN .... Please keep R. Lucas informed of any problem you may encounter.

IRAM Addresses:

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Grenoble	Institut de Radioastronomie Millimétrique 300 rue de la Piscine, Domaine Universitaire 38406 St Martin d'Hères Cedex, France	(33) 76 82 49 00	(33) 76 51 59 38
Plateau de Bure	Institut de Radioastronomie Millimétrique Observatoire du Plateau de Bure 05250 St Etienne en Dévoluy, France	(33) 92 53 85 20	(33) 92 53 85 23
Granada	Instituto de Radioastronomía Milimétrica Avenida Divina Pastora 7, Núcleo Central 18012 Granada, España	(34) 58 27 95 08	(34) 58 20 76 62
Pico Veleta	Instituto de Radioastronomía Milimétrica Estación Radioastronómica IRAM-IGN del Pico Veleta Sierra Nevada, Granada, España	(34) 58 48 02 11	(34) 58 48 08 60

E-Mail Addresses:

- IRAM-Grenoble: `username@IRAM.GRENET.FR`, or through SPAN: `IRAM04::username` or `17805::username`
- IRAM-Granada: `username@IRAM.ES`, or through SPAN: `IRAMEG::username` or `16494::username`

The `username` is generally the last name of the person to be contacted.