

## **Introduction – the new Annual Report**

At the May 2001 Board meeting, one of the decisions to help save staff effort was to suspend the production of the normal 'glossy bound' Annual Report and replace it, on a trial basis, with a downloadable web-based Report, which you will find here. This Report contains links to the standard 'boilerplate' of the JCMT and its rules of operation that featured in previous Reports. Science articles and more detailed descriptions of the facility operations and development programmes for users will now be concentrated in the expanded bi-annual Newsletters. This Report will predominately be an audit of the year's operations and financial management.

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## **Director's Note**

The JCMT reached a major milestone with 100 refereed publications appearing in 2000. This is a fantastic achievement and a significant increase on the publication output for the previous year. However, for the users this was a very frustrating year, mainly due to the very poor weather conditions that prevailed throughout much of the time. In spite of this, the completion of some important SCUBA scan-mapping programmes represented another important step forward in scientific delivery. Indeed, a report at the end of the year for the citation index in the USA for late 1999 revealed two SCUBA papers in the top-ten, an amazing demonstration of the huge impact this instrument has made.

While the facility receivers were far from perfect, upgrades and refurbishments continue to see improvements in performance and reliability. A major item during the year for operations was the resignation of two further long-standing Telescope System Specialists. This caused a major hiatus in the operations during the recruitment process and in May the JCMT Board approved an experiment of support astronomers undertaking the roles of TSS. This helped to minimise the resulting loss of observing time through the restriction of some nights to 12- rather than the normal 16-hour operation.

On the Development front, very good progress was made on ACSIS and HARP and the future looks very positive with the latest developments on the replacement instrument for SCUBA, SCUBA-2. The project plan for this was finalised, with the UKATC being Prime Contractor and the next generation monolithic detector arrays being produced by NIST (Boulder) and the University of Edinburgh. The success of SCUBA-2 however had

its downside for the JCMT operations, with the Telescope Manager, Dr Wayne Holland resigning to take up the post of Project Scientist for this exciting new instrument. This caused yet another management reorganisation, and the Board approved the appointment of an Associate Director, who would take over the tasks of Telescope Manager including responsibility for all instrumentation. Dr Per Friberg was appointed to this position. Progress continues to be slower than hoped for on the link to the SMA, but the MOU should be agreed in 2001.

Overall this year could be seen as a transition year, between the operations of the past, and plans for the future. In these, the facility will be more tightly funded, and savings from general operations may be transferred to support future development. However, these savings should not come at the expense of facility reliability and the fault rate continued to cause concern to the staff in Hawaii as well as the users and JCMT Board. A number of meetings have served to focus on overcoming the problems, but staff turnover and loss of 'corporate memory' is undoubtedly making achieving this more difficult. Focus on staff turnover continued to fail to find a single cause for this, and indeed although staff turnover to other facilities has been occurring, this is not an isolated problem for the JCMT.

One of the main underlying themes of the year was to consolidate the project work and to ensure some of these long-standing operational projects were completed. Attempting to undertake projects with the competing and over-riding requirement for operations is always difficult, but a sharper focus and reduced projects should enable the facility to make inroads on a number of them in 2001. The Observation Management Project is a crucial project for the support of queue-scheduled flexible observing and has been dogged by lack of effort. However, this was revitalised late in the year following the reorganisation of the JAC software and computing support. The theme of 2001 will be to address the quality control of the instrumentation and provide better tools for observers at the telescope and post-hoc for data analysis.

Towards the end of the year, PPARC initiated a requirement that if the UK should join ESO, it is likely that there needs to be significant savings in the ground-based area. This means existing facilities and so the JCMT was asked to come up with a draft savings plan for post-2005. With the desired move to wide-field programmes following the delivery of HARP-B and SCUBA-2, there is potential for savings post 2006. This also includes the planned ability to undertake observing remotely from Hale Pohaku, without the support of a TSS in order to maximise observing time for reduced cost. Needless to say, this will be an area that is expected to continue to attract significant management effort through 2001.

Science output continued to be exciting. SCUBA has become a tour de force overall and two surveys showed the huge impact it has made. During the latter part of 1999, two SCUBA papers were in the top-ten of all cited papers in North America, a tremendous achievement. This was surpassed by a recent study by Georges Meylan, STSci, which showed that in terms of impact, SCUBA was second only to the HST, beating the Keck

Observatory and all other ground and space facilities, let alone any single instruments (see table).

<b>Instrument</b>	<b>Description</b>	<b># of Citations</b>
Hubble Space Telescope	Optical/UV; in space (NASA/ESA)	415
SCUBA	Submillimeter; ground-based	368
ROSAT	X-rays; in space (NASA)	205
Compton GRO	Gamma Rays; in space (NASA)	196
Keck	Optical; ground-based (CalTech and U.Calif.)	180
BeppoSax	X-rays; in space (ESA/NASA)	180
SOHO	Studies the Sun; in space (ESA/NASA)	121
CTIO 4 meter	Optical; ground-based (US)	110
William Herschel Telescope	Optical; ground-based (UK/The Netherlands)	84
Rossi XTE	X-rays; in space (NASA)	83
Hipparcos	Optical; in space (ESA)	72
ASCA	X-rays; in space (Japan/NASA)	68
Palomar 200 inch	Optical; ground-based (CalTech)	65
Kitt Peak Nat.O 4 meter	Optical; ground-based (US)	52

Amongst the highlights noted in 2000 were the completion of the SCUBA 850/450 map of the Galactic Centre regime by Pierce-Price et al. The truly spectacular maps of the thermal dust continuum emission give an unbiased picture of the temperature weighted column-density of material, and hence enable the total masses of the molecular clouds to be derived and the details of individual cloud structures to be investigated.

Large-scale SCUBA mapping was again the theme of D. Johnstone et al., who obtained a 700 square arcminute map of the star-forming complex Rho Ophiuchi. The sensitivity and spatial resolution of the data allows for an unprecedented analysis of the small scale, clumped structure with combined dust and gas masses down to below one hundredth of a solar mass. With this degree of precision, the process of star formation finally became directly observable, revealing both the mass and the size of the clumps from which the stars form. The Canadian Consortium for Star Formation led by George Mitchell made spectacular inroads in their programme with a submillimetre dust and gas analysis of the Orion B molecular cloud. An 800 square arcminute SCUBA 850 map formed the basis for the study, onto which molecular gas observations using RxB3 were added. Sixty-seven discrete continuum sources were identified, with temperatures ranges from 20K to 80K. The gas-to-dust ratio was found to vary substantially between the different sub-regions, with CO freeze-out onto grains being apparent in some areas but not others, the reason for which remains unexplained. A number of other exciting programmes of star formation provided highlights for the September Newsletter.

Moving to more evolved objects, Greaves et al. obtained a SCUBA continuum polarisation map of the Crab Nebula. This was taken using the scan-map technique, one of the first uses of this method with the polarimeter. The resulting map is indeed

spectacular. The SCUBA data show the highest percentage polarizations so far and may give the best high-resolution picture of the magnetic field. The polarization is remarkably uniform across the main part of the synchrotron-emitting nebula, running along the long axis of the structure (the jet axis). However, a major deviation occurs where the vectors appear to circle the cavity north-west of the bright core, confirming a link between the physical and magnetic structures.

In the extragalactic field, the SCUBA deep-field observations continued to be all the rage, with more detailed follow-up and more surveys at various depths and sizes being commenced. Ivison and numerous colleagues undertook SCUBA 850 imaging of high-redshift radio galaxies with SCUBA and serendipitous detections were plentiful. Indeed, at one point it appeared that the rate of detections seemed to far exceed those of blank-field surveys, and it quickly became apparent that there might be an over-density of submm sources in the fields of distant radio galaxies. Indeed, biased galaxy-formation theories predict that massive galaxies at high redshifts should act as ‘signposts’ to high-density environments that subsequently evolve into the cores of the richest clusters seen at the present day. These regions are expected to be characterised by over-densities of young galaxies, probably including a population of dusty, interaction-driven starbursts; the progenitors of massive cluster ellipticals.

Therefore, it seems quite plausible that the mapping of high-redshift AGN has revealed a population of clustered submm galaxies. Very deep 850 SCUBA searches were made in the fields of half-a-dozen radio galaxies and quasars at  $z \sim 4$ , revealing an order-of-magnitude over-density of luminous submm galaxies compared to typical fields. The likelihood of finding such an over-density in random fields is  $<0.002$ . If the redshifts are the same as the ‘signpost’ galaxies then they have bolometric luminosities,  $>10^{13}$  solar luminosities, which implies star-formation rates consistent with those required to form a massive galaxy in a fraction of a Gyr. Identifying these new SCUBA sources continues to prove tricky, requiring extremely deep infrared and radio imaging. When all the data are combined, the ‘photometric’ redshifts plus some very red infrared objects strongly suggests the redshifts are all greater than 2.8, and very probably the same as the ‘target’ AGN. This opens up a whole new area of study; the link between density enhancements in the early Universe, clustering, AGN activity and extremely heavily obscured dust emitting submillimetre galaxies.

Just for fun, SCUBA was also used to map the Moon during periods of exceptionally wet atmospheric conditions in Director’s Time. (It needs to be so very wet to allow the horribly bright Moon not to saturate the detectors even at lowest gain). A number of phases were mapped, including a partial lunar eclipse. Craters and Maria are clearly revealed in the images, and the comparison with the normal optical picture obtained from reflected light becomes highly instructive regarding surface properties.

## **Operations Review**

2000 was one of general frustration, both for the users and for the staff. This has been for three main reasons: the water vapour content above Mauna Kea has continued to be very

poor, indeed one of the worst years ever; the lack of TSSs due to resignations has resulted in some 'blackout' periods from the ensuing 12-hour nights; there have been failures of the facility that were disappointing. On the other hand, the completion and release into service of the new telescope control system (TCS) in August and the completion of the active surface control electronics has been especially welcomed and provided a boost to morale all-round.

The extended periods of poor weather eventually led to the introduction of an upper-limit CSO tau value for observing with RxB3 and RxA3 in order to reduce unnecessary additional work for support astronomers in obtaining data for fallback programmes taken in very poor conditions.

The fault-loss continued to be unacceptably high and there have been numerous meetings to focus on the causes and to attempt to eliminate them. This was dominated by problems with instrumentation and major failures of facility equipment, notably the secondary mirror unit that failed twice (from unrelated causes).

A serious safety violation occurred at the JCMT in May, which had major repercussions for the entire Observatory. The resulting investigation led to the introduction of a new set of policies and procedures for TSSs and those undertaking day-work, including a new certification process for TSSs.

SCUBA continues to dominate the applications for time and the resulting allocations. The fixed-filter (850/450) mode continues after discussions at the ITAC. SCUBA suffered two unplanned warm-ups that lost significant time; the reason for one of these is known and procedures have been changed to eliminate this particular risk. Noise performance has been generally excellent and the release of the new calibration information is a real highlight. Good work has been achieved with the polarimeter.

RxA3 was returned to service following its cryogenic failure and extensive repair in early August and is working satisfactorily. The question of whether to replace the mixer, which has a hump in the middle of the pass-band, is being addressed. Following its overhaul by HIA early in the year, the fault-loss for RxB3 has improved noticeably over the period, although there is still some work to be done in getting this to be a very reliable and work-horse receiver. Again, RxW continues to see little use. When it is scheduled the weather is often poor, even for extended flexible blocks, but good progress has been made on set-up using relative pointing from RxB3. A new block-mode of allocating time on RxW will be tested for semester 01A.

The two holography receivers, RxH2 and RxH3 have both had problems due to a variety of causes. Work on finally commissioning RxH3 has been delayed due to, amongst other things, teething troubles with the new TCS. SPIFI was totally wiped out by weather in May and there was only one night in September (the last) when the weather was adequate for observing and on that occasion the telescope secondary mirror unit failed! The Bonn receiver was also wiped out by poor weather in May, and while the October run did not do much better, but at least some good data were obtained.

Extensive pointing and tracking experiments have revealed some peculiarities around transit that are still not understood, and work continues to track down the problems. The effects are relatively stable and have been taken out in software and so are transparent to users. The surface continues to be in good shape.

Software support continues to be in short supply to solve problems and complete on-going projects and this has been the subject of extensive internal meetings. Excellent progress has been made on the Observatory Control System (OCS) which is akin to the glue that links everything together and which is critical (along with the delayed Observation Management Project) for the arrival of ACSIS.

Following the resignation of the Telescope Manager and subsequent discussions with staff, the Board supported the change of JCMT management by elimination of the Telescope Manager post and subsuming most of the duties in an Associate Director, Per Friberg. Since September, new staff duties have been agreed and the management structure of the support astronomers revised, including a SCUBA support group under Iain Coulson. The Director assumed direct responsibility for overseeing the Development Fund to reduce some of the workload on Per Friberg.

As a morale boosting exercise for support astronomers, encouragement for research by conference participation and dissemination of new results has been augmented by the award of \$500 to all those who have an active research programme. These funds have been provided by PPARC as part of the 'In-house research' and it would be detrimental for morale not to allocate these to Canadian or Netherlands researchers. The staffing turnover continues to remain high, which seems to be a more prevalent feature for all the observatories on Mauna Kea.

- Mary Fuka, Senior Software Engineer, retired after a distinguished 11 years of service at the JCMT, on May 4<sup>th</sup>.
- The JCMT Telescope Manager, Wayne Holland, resigned on September 1<sup>st</sup> to move to the UKATC as Project Scientist for SCUBA-2.
- The Telescope Scheduler and TSS manager, Graeme Watt, resigned on September 15<sup>th</sup>, to take up a career role in PPARC headquarters, Swindon. Graeme had been with the JCMT since its inception apart from a brief return to Edinburgh in the mid-1990's.
- Jeff Cox and Rusty Luthe resigned as JCMT TSSs in June and July respectively after two decades of excellent service. Jeff moved to Gemini South and Rusty moved to the CFHT.
- Teresa Dorward (PPARC) left the JAC in October to move to La Palma as a finance assistant and was replaced by Chelo Barreto Gomez (PPARC) who arrived in October from La Palma.
- Three new Telescope System Specialists were recruited: Scott Mikkelson arrived on January 3<sup>rd</sup>, Jim Hoge arrived on May 15<sup>th</sup> and Jonathan Kemp joined the JCMT on June 5<sup>th</sup>.
- Nick Jessop joined the JCMT as a support astronomer from the University of Lisbon on March 27<sup>th</sup>.

- Kynan DeLorey joined the JAC at the beginning of June to work in the computer group and Mathew Rippa was recruited as a junior software engineer on August 14<sup>th</sup>.
- Ken Brown joined the JCMT on September 5<sup>th</sup> as a senior instrument technician.
- Tomas Chylek joined the JAC on September 18<sup>th</sup> as a senior mechanical engineer.
- Craig Walther joined the JAC on March 28<sup>th</sup> as the manager of instrumentation and telescope software.

**Staff attributed to the JCMT Shared Operations on March 31st 2001**

(JAC indicates shared ~50/50 between JCMT and UKIRT)

**International**

Ian Robson (JCMT and PPARC)

**PPARC**

Per Friberg (JCMT)  
 Ian Smith (JCMT)  
 Tim Jenness (JAC)  
 Wendy Light (JAC)  
 Ian Midson (JAC)  
 Lindsay Marcer (JAC)  
 Chelo Barreto (JAC)  
 Tim Chuter (JAC)  
 Frossie Economou (JAC)

**Netherlands** (all JCMT)

Fred Baas  
 Remo Tilanus

**RCUH (JAC)**

Sidney Arakaki  
 Desiree Milar-Okinaka  
 Vernon DeMattos  
 David Fuselier  
 Velvet Gonsalves-Nases  
 Dean Shutt  
 Marjorie Dougherty  
 Sharlene Hamamoto  
 Mark Horita  
 Nash Kobayashi  
 Bernadette Leite  
 Neil Oliveira

**RCUH (JCMT)**

Iain Coulson  
 Elese Archibald  
 Donna DeLorm  
 Ken Brown  
 Firmin Oliveira  
 William Lundin  
 James Hoge  
 Thomas Lowe  
 Nick Jessop  
 Robin Phillips  
 Brian Force  
 Neal Masuda  
 Jonathan Kemp  
 Peter Oshiro

Junichi Meguro  
 Felisa Teramoto  
 Kevin O'Connell  
 Nick Rees  
 Ed Sison  
 Henry Stilmack  
 Jay Tsutsumi  
 Tomas Chylek  
 Mathew Rippa  
 Craig Walther  
 Chris Yamasaki  
 Kynan DeLorey

**Canada** (all JCMT)

Henry Matthews  
 Gerald Moriarty-Schieven

## **Development Programme Review**

Good progress has been made on ACSIS although the Critical Design Review (CDR) planned for June slipped to December. This was very successful, although lack of a complete end-to-end system meant that it was not quite at CDR. A major hold-up has been identified in the fabrication of the Down Converter Modules and the IF. The project is now undergoing a major re-costing and re-scheduling following CDR and it is now expected that delivery will not take place until late spring or summer of 2002. However, apart from the delay and cost over-run, the project is looking very good on the technical side and should still be delivered well in time for HARP-B. A very positive outcome of the ACSIS CDR was the focus on the software interfaces, which involve a large number of groups and also impinges on the design of the Observatory Control System and Observatory Management Project. The former has now been incorporated fully into the ACSIS project at the UKATC and the JAC.

HARP-B is making excellent progress and had a very successful Instrument Design Review in November. The contract for SIS-device provision for HARP-B was signed with DIMES earlier in the year but lack of progress on fabrication of junctions after the move of the lab was becoming critical by the end of the year. The project has reported a projected date for delivery of July 2003. This is a slippage of four months and is the first registered for this project.

Progress continues to be slow on the SMA project, understandably due to their own pressure for completion deadlines. However, the fibres have now been spliced and a revised project plan is under discussion with the SMA in an effort to try and get some realistic planning into the project.

Excellent progress was made in Hawaii on working through the project plan and costings for the new wide-field continuum camera, SCUBA-2. A major and expensive part of this exercise was the contractual negotiations regarding the production of the arrays by NIST. The contract provides carefully selected break-points for withdrawal that minimise the degree of financial risk.

It was not possible to hold a CoDR for the proposed high-frequency heterodyne camera, CHAMP-D, and this has been postponed until some time in the future.

The main facility project over the period, the Active Surface Control, saw success in the 'datuming' of the limit switches. This took place in August and marked the completion of the electrical side of the project.

A major milestone for the JCMT was the successful commissioning of the new TCS in late August. Initial niggling problems were quickly overcome and it is now very reliable, offering the basis for efficiency improvements downstream. On the other hand, extensive work by Nick Rees, who has shouldered the responsibility and is personally responsible for the success of completing the TCS, continues to reveal just how complex the interaction of the TCS with the instrument control software has 'grown' over the years.

Firmin Oliveira worked extensively on this project and deserves congratulations and thanks.

### Financial Data

The total available funds for JCMT operations for FY 2000/2001 were \$3,485,620 This was made up of the Board Allocation of \$2,480,000 plus carry-over from 1999/2000 of \$27,369 plus other receipts of \$978,251. The Outturn figure was \$3,259,278, a planned underspend of \$226,342 due to the wish to make savings from operations that can be transferred to development.

<b>Top-level Operations Financial Summary FY2000/2001 (\$)</b>						
<b>Board Heading</b>	<b>Board Allocation</b>	<b>Outturn</b>	<b>Receipts</b>	<b>Outturn After Receipts</b>	<b>Difference From Board Allocation</b>	<b>Diff (%)</b>
<b>1 (MK)</b>	<b>480,000</b>	<b>521,482</b>		<b>521,482</b>	<b>41,482</b>	8.6
<b>2 (HP)</b>	<b>140,000</b>	<b>85,510</b>		<b>85,510</b>	<b>-54,490</b>	-38.9
<b>3 (JAC)</b>	<b>390,000</b>	<b>381,698</b>		<b>381,698</b>	<b>-8,302</b>	-2.1
<b>4 (Staff related)</b>	<b>1,380,000</b>	<b>2,188,147</b>	<b>978,251</b>	<b>1,209,896</b>	<b>-170,104</b>	-12.3
<b>5 (IfA Fellow)</b>	<b>70,000</b>	<b>63,553</b>		<b>63,553</b>	<b>- 6,447</b>	-9.2
<b>6 (IPMG)</b>	<b>20,000</b>	<b>18,888</b>		<b>18,888</b>	<b>-1,112</b>	-5.6
<b>Carry over</b>	<b>27,369</b>				<b>-27,369</b>	
<b>Total</b>	<b>2,507,369</b>	<b>3,259,278</b>		<b>2,281,027</b>	<b>-226,342</b>	-9.0

### Notes

Due to the renting of HP rooms by those facilities that had not purchased rooms of their own, a significant income was obtained in this financial year, which is the reason for the large underspend. This is not expected to continue into FY01/02 as these facilities have now purchased rooms (four from the JCMT). The staffing line shows a notable reduction as expected due to planned savings through freezes on positions (two TSSs and one support astronomer).



**JCMT Development Fund Outturn summary FY 2000/01**

Current Projects	Contractors	Outturn 2000/01 (\$k)
RxA3 upgrade	HIA	-12.6 <sup>(1)</sup>
SIS Junctions	DIMES	63.3
Optics Design	Maynooth	7.3
SCUBA 2	UKATC	585.2 <sup>(2)</sup>
SCUBA 2	JAC	14.1 <sup>(3)</sup>
Active surface control project	JAC	4.6
RxH3	JAC	4.4
ACSIS	HIA	0 <sup>(3)</sup>
ACSIS	UKATC	18.2
ACSIS	JAC	24.5
RFTM	JAC	5.1
OCS	UKATC	26.3
HARP-B	MRAO	65.6
HARP-B	UKATC	60.5
HARP-B	HIA	27.5
HARP-B	JAC	0
Instrument Programme Travel	JAC	7.3
<b>TOTAL</b>		<b>901.4</b>

(1) Repaid from previous 'float'.

(2) Includes staff effort of 2.8 dsy at £54 each charged to the Development Fund under the new rules applied to SCUBA-2.

(3) Invoice received for \$25.046k but HIA already have a previous 'float' of \$30.224k.

## Awards of Telescope Time in Semesters 00A and 00B

The following are the complete allocations made by the ITAC for Semester 00A.

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### UK allocation:

<b>PATT Number</b>	<b>PI on Application</b>	<b>Shifts Allocated</b>		<b>Title of Application</b>
U01	Macdonald G H	3	S	Methanol masers and hot molecular clouds - towards an evolutionary sequence for massive star formation
U03*	Barvainis R	2	S	Completing a SCUBA survey of lensed quasars
U06	Dent W R F	3	S	A search for evidence of evolution of the dust around Vega-excess stars
LT/U09*	Iverson R J	6	S	Star formation in high-density environments in the early Universe (+LT=poss 6sh in 00B, and further 6sh in 01A, depending on status reports)
U12	Cawthorne T V	0	Sp	Low radio polarization quasars and high rotation lines of sight (2 shifts deferred till semester 00B)
U13	Greaves J S	2	Sp	The evolution of magnetic fields around Class 0/I/II protostars
U19	Gibb A G	3	A	A survey of SiO emission towards outflows from massive YSOs
U20	Edge A C	1	B/C	Search for C I in cooling flow clusters
U21	Eales S A	3	S	The SCUBA local universe and galaxy survey
U24	Unger S	3	SPIFI	SPIFI investigations of ultraluminous galaxies
U27	Fuller G A	2	S	SCUBA imaging of candidate high mass protostellar objects
U32*	Andre P	3	S	Probing the origin of the initial mass function: wide-field SCUBA imaging of the L1689 dark cloud
U33	Serjeant S	2	S	Dust-shrouded star formation at intermediate redshifts: sub-mm photometry of ELIAS/FIRBACK galaxies
U37*	McMahon R G	3	S	Submillimetre studies of high-redshift quasars and their host spheroids

U41*	Friberg P	2	B/C	Towards a better understanding of SWAS and Odin results?
U43	Stevens J A	3	Sp	A SCUBA/VLBA polarization study of the inner jets of compact radio sources
U56	Stacey G J	2	SPIFI	SPIFI observations of NGC 253: characterising the starburst
U61	Fuller G A	3	A/B	Comparing the gas and dust in the Perseus cloud
U63	Pooley G G	0	Sp	Polarimetry of jets from x-ray binaries (1 shift deferred till semester 00B)
U64*	Holland W S	2	S	Completion of SCUBA Galactic Centre survey
U65	Dunlop J S	3	S	Dust in the host galaxies of radio-loud and radio-quiet AGN
U66	Isaak K G	2	SPIFI	Mapping star formation in the Antennae: CO(7-6) and [C I] observations with SPIFI
U67	Isaak K G	1.5	D	CO(6-5) emission: the warm, dense gas in local luminous infrared galaxies
U68*	Gao Y	4	S	Dust, gas and starbursts along a merger sequence

**Starred carries:**

99A/U01	Holland W S	2.5	S	The dust-planet connection: A search for dust around the parent stars of extrasolar planets
99A/U42	Richer J S	1	S	A SCUBA survey of star formation in the Perseus molecular cloud complex
99A/U45	Rowan-Robinson	8	S	The UK 8-mJy SCUBA/ISO survey: determining the cosmological evolution of starburst activity
99B/U17	Crutcher R	2	Hp	A detailed look at magnetic fields in the OMC1 core
99B/U28	Adamson A J	1	Sp	Emission and absorption polarizations in Heiles 2
99B/U36	Kramer C	3	S	The dust grain opacity at submm wavelengths
99B/U44	Rawlings J M C	3	S	The true nature of class I sources
99B/U68	Holland W S	2	S	The Vega phenomenon around nearby stars

**Long-term allocations:**

LT/99A/U01	Holland W S	4	S	The dust-planet connection: A search for dust around the parent stars of extrasolar planets (LT=completed with this allocation)
LT/99A/U42	Richer J S	6	S	A SCUBA survey of star formation in the Perseus

LT/99A/U45	Rowan-Robinson	8	S	molecular cloud complex (+LT=completed with this allocation) The UK 8-mJy SCUBA/ISO survey: determining the cosmological evolution of starburst activity (+LT=8sh in 00B)
LT/99B/U43	Thommes E	4	S	The role of dust in extremely red galaxies (+LT=completed with this allocation)
LT/99B/U68	Holland W S	4	S	The Vega phenomenon around nearby stars (+LT=completed with this allocation)
	Ukflex	29	A/B	

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**Netherlands allocation:**

<b>PATT Number</b>	<b>PI on Application</b>	<b>Shifts Allocated</b>		<b>Title of Application</b>
N01	van der Werf P	7	A/B/C	Mapping of warm, dense molecular gas in the Antennae system
N03	Israel F P	0.75	S	Dust emission from NGC 1569
N05	Henning Th	6	Sp	Magnetic fields and star formation: Bok globules as a case study
N06	Stark R	4	MPI	Physical properties of warm gas in the inner envelopes of YSOs
N08	Rottgering H	3	S	Star formation in high-density environments in the early Universe
N09	Kemper F	4.5	S/B/C/D	Mass loss history of oxygen-rich AGB stars
N13	Barthel P D	3.125	S	The fraction of starbursts in the FIRST survey
N14	Stark R	2.5	B	Deuterium chemistry in young stellar objects
N15	Boonman A M S	3.125	D/MPI	Physical and chemical structure of the inner regions of massive protostars
N16	Smith I A	3	S	SCUBA observations of gamma-ray burster counterparts (t-o-o)
N22	Best P	8	S	Star forming galaxies in clusters at redshift one
N23	Pickering T E	5	S	Dust properties of disk galaxies as a function of surface brightness

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**Canadian allocation:**

<b>PATT</b>	<b>PI on</b>	<b>Shifts</b>	<b>Title of</b>
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Number	Application	Allocated		Application
C02	Matthews H E	2	C/D	H <sub>2</sub> S in dense cold clouds; the ortho-para ratio
C03	Matthews H E	2	S	A pilot 'unbiased' SCUBA survey of the Galactic Plane: comparison with the mid-IR MSX database
C04	Seaquist E R	2	D	Mapping of M82 in 13CO J=6-5
C05	Kwok S	2	C/D	Carbon chemistry in post-AGB evolution
C06	Fich M	4	S	Dust in M101
C07	Demers S	1	S	The enigma in the heart of Ursa Minor
C09	Petitpas G R	4	A	Do gas properties determine the nuclear structure of barred galaxies?
C10	Redman R O	3	Sp	Magnetic field structures in MSX infrared-dark clouds
C13	Vallee J P	3	B/Sp	Fast rotating Bok globules - differential rotation?
C15	Redman R O	1	Sp	Polarization of the thermal emission from large asteroids
C16	Chapman S C	4	S	Submm counterparts to Lyman-break galaxies
C17	Madden S	3	S	Dust properties in low-metallicity environments
C19	Scott D	4	S	SCUBA follow-up of FIRBACK 175 micron ISO sources
C20	Volk K	2	S/B/C/D	Sub-mm continuum and CO imaging of NGC 6302
C21	Chapman S C	2	S	Highly lensed radio sources - a key to the nature of SCUBA-selected galaxies
C22	Goodman A A	2	Sp	The role of magnetic field structure in YSO outflows
C24	Naylor D A	1	B	A spectral survey of Orion A molecular cloud sources
C25	Lewis G F	2	S	Dusty broad absorption line quasars and unified models of AGN
C26	Bolatto A D	2	SPIFI	A survey for warm, dense, gas in galactic star forming regions
C27	Feldman P A	1	S	Search for cool dust in globular clusters
LT/C28	Lilly S	2	S	Completion of deep sub-mm survey (+LT=4sh in 00B for sources at 3hr RA)
C29	McCutcheon W H	2	A/B	Star formation in NGC 6334
C31	Hasegawa T I	2	A/B	Chemistry in IRAS 21282+5050
C33	Frail D A	1	S	Gamma-ray bursts: the signposts of star formation in the early Universe (t-o-o)
C34	Nikola T	2	SPIFI	Probing the ISM in the interacting galaxy M51

99A/C19	Matthews B	2	Sp	A continuing polarization study of molecular cloud cores and young stellar objects
	Canserv	4	S/A/B/C/D	

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**International allocation:**

<b>PATT</b>	<b>PI on</b>	<b>Shifts</b>	<b>Title of</b>	
<b>Number</b>	<b>Application</b>	<b>Allocated</b>	<b>Application</b>	
I02	Jura M	0.5	S	Continuum emission from stars
I04	Stern A	2	S	Submillimeter brightness temperature measurements of Triton with applications to both Pluto and Triton
I05	Coulson I M	2	S/A/B	The temperature of the CO gas around the Vega-type star SAO112630
I07	Emmanuel D	0.5	C/D	Deuterium enrichment in the massive protostar RAFGL 7009S
I12	Hirano N	2	B/C/D	Search for high-velocity gas towards the L1157 outflow
I13	Clancy R T	0	B	Atmospheric temperature and chemistry above the Venus cloud tops (3 x 5hr daytime periods reserved)
I15	Estalella R	0.25	S	The distribution of dust around the exciting sources of the double H2 bipolar jet in L1634
I20	Bradford C M	5	SPIFI	SPIFI investigations of the circumstellar ring
I23	Goodman A A	0.5	S	Coherence and depletion in TMC- 1C
	Intflex	0.25	A/B	

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**UH allocation:**

<b>PATT</b>	<b>PI on</b>	<b>Shifts</b>	<b>Title of</b>	
<b>Number</b>	<b>Application</b>	<b>Allocated</b>	<b>Application</b>	
H02	Biver N	3	B/C/D	Interstellar and cometary ices: comparison with L1157 and hot cores
H04	Biver N	2	A/B	Distantly active comets: C/1999 J2 (Skiff)
H05	Jewitt D	3	S	Albedos of distant planetary bodies
H06	Cowie L L	6	S	Studying the evolution of galaxy formation in the Hawaii deep survey field SSA13
H07	Barger A	6	S	Targeted submm observations of

H08	Magnier E	1	S	optically faint micro-Jansky radio sources The spectral energy distributions of transitional young stellar objects
H09	Sanders D B	5	S	SCUBA templates: observations of the most distant ULIGs in the IRAS FSC
H10	Sanders D B	3	S	Identification of ISOPHOT 175 micron deep field sources

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E&C	66
DDT	8
TOTAL =	364

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Total UK =	136
Total CN =	62
Total NL =	50
Total Int =	13
Total UH =	29

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The following are the complete allocations made by the ITAC for Semester 00A.

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**UK allocation:**

<b>PATT Number</b>	<b>PI on Application</b>	<b>Shifts Alloc</b>	<b>Instr.</b>	<b>Weather Band(s)</b>	<b>Application Title (and comments)</b>
U02	Thompson M A	3	B	2/3	Searching for hot cores: confirming SCUBA predictions
U06	Stevens J A	3	Sp	2/3	A SCUBA/VLBA polarization study of the inner jets of compact radio sources
U07	Stevens J A	3	S	2/3	Targetted SCUBA observations of faint hard x-ray sources: looking for proto-QSOs
U08	Page M J	3	S	2/3	Do obscured QSOs live in ULIRGs?
U09	Chrysostomou A	2	Sp	2/3	SCUBA polarimetry of high mass YSOs
U10	Eales S A	3	S	2/3	The SCUBA local universe and galaxy survey
U14	Isaak K G	2	D	1	CO(6-5) emission from the archetypical local interacting system, the Antennae

U21	Friberg P	3	S	2/3	Dust in planetary debris disks
U25	Nagar N M	2	S	1/2	Testing for advection-dominated accretion in the nuclei of a well-defined sample of nearby galaxies
U31	Crawford C S	3	S	2/3	The AGN fraction of faint SCUBA sources
U34	Serjeant S	2	S	2/3	Do violent starbursts power hyperluminous galaxies?
U38	Peacock J	4	S	1/2	Gravitational lensing of high-redshift starburst galaxies by A2218
U42	Hatchell J	2	B	3	Testing the density-accretion link in Perseus
U43	Unger S	3	SPIFI	1	SPIFI investigations of ultraluminous galaxies
U45	Maiolino R	1.5	S	2/3	Testing the relation between the far-IR and x-ray background
U48	Thomas H C	1	S	2/3	Extended dust emission in NGC7465
U51	Amure M	2	S	1/2	Dust and gas in spiral galaxies
U52	Rawlings S	3	S	1/2	A fundamental test of radio source unified schemes
U53	Archibald E N	3	S	1/2	The role of dust in extremely red galaxies
U55	Stacey G J	4	SPIFI	1	SPIFI observations of NGC253: characterizing the starburst (+LT=7sh in 01A, to be used for weathered out 00A projects)
U56	Greaves J S	1	Sp	3	Magnetic confinement in planetary nebulae
U57	Holland W S	2	S	3	Completing the first submillimetre dust map of M31
U59	Millar T J	2	A/S	3/4	DCO+/HCO+ ratios in continuum clumps
LT/U60	Isaak K G	1	B	1/2/3	A CO(3-2) survey of a merging sequence of nearby luminous infrared galaxies (+LT=1sh fallback in 01A, no report required)

**Starred carries:**

99A/U01	Holland W S	2.5	S	1/2	The dust-planet connection: A search for dust around the parent
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99A/U42	Richer J S	6	S	1/2	stars of extrasolar planets A SCUBA survey of star formation in the Perseus molecular cloud complex
99A/U45	Rowan-Robinson	5	S	1/2	The UK 8-mJy SCUBA/ISO survey: determining the cosmological evolution of starburst activity
99B/U36	Kramer C	3	S	1/2	The dust grain opacity at submm wavelengths
99B/U68	Holland W S	4	S	1/2	The Vega phenomenon around nearby stars
00A/U12	Cawthorne T V	0	Sp		Low radio polarization quasars and high rotation lines of sight (2 shifts deferred until repair of SCUBA filter drum)
00A/U63	Pooley G G	0	Sp		Polarimetry of jets from x-ray binaries (1 shift deferred until repair of SCUBA filter drum)
00A/U03	Barvainis R	2	S	1/2	Completing a SCUBA survey of lensed quasars
00A/U09	Iverson R J	3	S	1/2	Star formation in high-density environments in the early Universe
00A/U37	McMahon R G	3	S	1/2	Submillimetre studies of high-redshift quasars and their host spheroids
00A/U41	Friberg P	2	B/C	1/2	Towards a better understanding of SWAS and Odin results?
00A/U68	Gao Y	4	S	1/2	Dust, gas and starbursts along a merger sequence
<b>Long-term allocations:</b>					
00A/U09	Iverson R J	6	S	1/2	Star formation in high-density environments in the early Universe (+LT=poss 6sh in 01A, depending on status reports)
99A/U45	Rowan-Robinson	6	S	1/2	The UK 8-mJy SCUBA/ISO survey: determining the cosmological evolution of starburst activity (+LT=completed with this allocation)
	Ukflex	46	S/A/B	3/4	

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**Netherlands allocation:**

<b>PATT Number</b>	<b>PI on Application</b>	<b>Shifts Alloc</b>	<b>Instr.</b>	<b>Weather Band(s)</b>	<b>Application Title (and comments)</b>
N04	Israel F P	4.875	A/B	3	12CO/13CO ratios in galaxies
N06	Henning Th	2.5	S	3	A search for massive protostellar objects towards luminous IRAS sources
N07	Tielens A G G M	5.75	A/B	3	Using methanol lines to trace infall
N09	Higdon J	7.5625	A	4	The radial distribution of molecular gas in M33
N11	van der Werf P	4	S	2	Gravitational lensing of high-redshift starburst galaxies by A2218
N12	van der Werf P	3	S	2	Completion of the SCUBA cluster survey
N15	van der Werf P	3	S	1	Completion of the SCUBA survey of the NTT Deep Field
N16	Thi W -F	3	B	3	Physical and chemical structure of circumstellar disks in the TW Hya association
N17	Best P	6	S	1	Star forming galaxies in clusters at redshift one
N18	Israel F P	4.5	SPIFI	2	Very warm gas in NGC6946 and IC342
N19	Kemper F	3.75	B/C/D/S	1/2	Mass loss history of oxygen-rich AGB stars
N22	Smith I A	3	S	2/3	SCUBA observations of gamma-ray burster counterparts (t-o-o)
N25	Stark R	1.875	B	1	Deuterium chemistry in young stellar objects
N26	Boonman A M S	2.2	D/MPI	1	Physical and chemical structure of the inner regions of massive protostars

**Canadian allocation:**

<b>PATT Number</b>	<b>PI on Application</b>	<b>Shifts Alloc</b>	<b>Instr.</b>	<b>Weather Band(s)</b>	<b>Application Title (and comments)</b>
C02	Seaquist E R	2	D	1	Mapping of M82 in 12CO J=6-5
C05	Moriarty-Schieven G	2	Ap	3	Mapping emission line polarization in IRC+10216
C06	Kwok S	1	B	3	Multipolar energetic flows in NGC2440
C07	Matthews B	1	Sp	2	Completion of polarimetry studies of YSOs and their surrounding environment in NGC1333

C08	Matthews H E	2	A/B/D	1/2/3	Accretion disks around massive stars: K3-50A
C10	Mitchell G F	9	B/Sp	1/2/3	Submillimetre imaging of star-forming molecular clouds
C12	Wilson C D	4	S	2	The dusty interstellar medium of IC10: clues to star formation in the early universe
C13	Madden S	4	S	2	Dust properties in low-metallicity environments
C15	Johnstone D I	4	S	2	Continuation of SCUBA scan-mapping the southern portion of the Orion A molecular cloud
C17	Brar R S	2	S	2	Dust emission observations of edge-on spiral galaxies
C19	Naylor D A	2	FTS	1	Vertical mixing in the atmospheres of Jupiter and Saturn
C20	Naylor D A	1	B	2/3	A spectral survey of Orion A molecular cloud sources
C21	Gregersen E M	4	A/S	1/2/3	The necessary condition for star formation
C24	Pritchett C J	4	S	1/2	Interacting galaxies and galaxy evolution at intermediate redshifts
C27	Moriarty-Schieven G	1.5	S	1/2	LDN1551: a starburst molecular cloud in Taurus
C30	Borys C	5	S	1/2/3	Submm counterparts to optically faint radio galaxies
C31	Scott D	2	Sp	1/2	SCUBA polarimetry of Arp 220
C32	Wolf-Chase G A	2	S	2	Characterizing YSOs and magnetic field morphology in massive CS cores in the Mon OB1 dark cloud
C36	Matthews H E	2	C	1/2	A search for HDO in cold molecular clouds
99A/C19	Matthews B	0.5	Sp	1/2	A continuing polarization study of molecular cloud cores and young stellar objects
00A/C09	Petitpas G R	4	A	2/3/4	Do gas properties determine the nuclear structure of barred galaxies?
00A/C28	Lilly S	4	S	1/2	Completion of deep sub-mm survey (+LT=completed with this allocation)
	Canserv	6	S/A/B/C/D		

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**International allocation:**

<b>PATT Application Number</b>	<b>PI on Application</b>	<b>Shifts Alloc</b>	<b>Instr.</b>	<b>Weather Band(s)</b>	<b>Title of (and comments)</b>
I02	Oka T	2	C/D	1/2	A search for interstellar protonated acetylene C <sub>2</sub> H <sub>3</sub> <sup>+</sup>
I04	Pierini D	2	S	1/2	Cold dust emission in the normal Virgo cluster giant galaxy NGC4178
I05	Braine J	2	C/S	1/2	Atomic to molecular gas transformation in tidal dwarf galaxies - the link to dust and atomic carbon
I06	Takakuwa S	3	A/B	2/3/4	Temperature structure of the shock interaction associated with the outflow from IRAM 04191+1522
I07	Popescu C C	2	S	1/2	Emission and distribution of the cold dust in the edge-on galaxy NGC4013
I11	Lee C W	2	S	1/2	Radial density structures of starless cores with and without infall asymmetry
I15	Womack M	0	B		Search for chemical diversity in comets (daytime allocation for August)
I16	Stark R	4	MPI	1	Warm gas in the inner envelope-disk regions of YSOs

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**UH allocation:**

<b>PATT Number</b>	<b>PI on Application</b>	<b>Shifts Alloc</b>	<b>Instr.</b>	<b>Weather Band(s)</b>	<b>Application Title (and comments)</b>
H01	Biver N	2	A/B		Post-perihelion observations of comet C/1999 S4 (LINEAR)
H04	Barger A	8	S		Submm detections and multiband study of faint galaxies behind lensing clusters
H05	Cowie L L	8	S		Studying the evolution of star formation and AGN activity with radio and hard x-ray selected

H06	Aussel H	3	S	galaxy samples Star formation and the nature of the far-IR dichotomy in Seyfert 2 galaxies
H07	Sanders D B	9	S	Identification of the far-infrared (90-200 micron) extragalactic background population
H08	Owen T with JCMT	3	B	H2CO and C18O on Titan

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E&C	33
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DDT	8
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TOTAL =	366
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Total UK =	151
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Total CN =	69
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Total NL =	55
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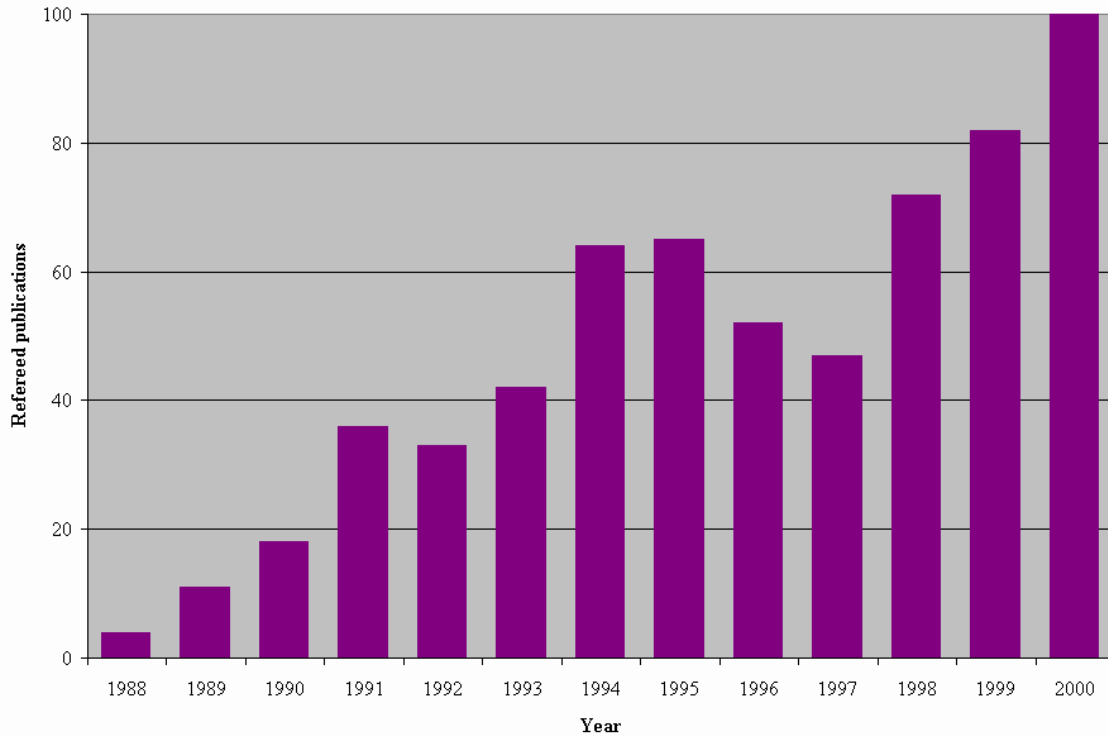
Total Int =	17
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Total UH =	33
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## Publications

There were 100 papers published in refereed journals during the year, a notable improvement on last year.

### Publication History



Aitken, D.K., Greaves, J.S., Chrysostomou, A., Jenness, T., Holland, W.S., Hough, J.H., Pierce-Price, D., Richer, J.S. "Detection of polarized millimeter and submillimeter emission from Sagittarius A\*". *Astrophys. J.*, 534, L173, 2000

Alton, P.B., Xilouris, E.M., Bianchi, S., Davies, J., Kylafis, N. "Dust properties of external galaxies; NGC 891 revisited". *Astron. Astrophys.*, 356, 795, 2000

Andersson, B-G, Wannier, P.G., Moriarty-Schieven, G.H., & Bakker, E.J. "The nature of the IRAS ring G159.6-18.5 in Perseus and its exciting star HD 278942". *Astron.J.*, 119, 1325, 2000

Barger, A.J., Cowie, L.L., Richards, E.A. "Mapping the evolution of high-redshift dusty galaxies with submillimeter observations of a radio-selected sample" *Astron. J.*, 119, 2092, 2000

Bekki, K., Shioya, Y. "LMSA and High-Redshift Dusty Starburst Mergers" *PASP*, 52, L57, 2000

Berger, E., Sari, R., Frail, D.A., Kulkarni, S.R., Bertoldi, F., Peck, A.B., Menten, K.M., Shepherd, D.S., Moriarty-Schieven, G.H., Pooley, G., Bloom, J.S., Dierks, A., Galama, T.J., & Hurley, K. "A Jet Model

for the Afterglow Emission from GRB 000301C" *Astrophys.J.*, 545, 56, 2000

Bertoldi, F., Carilli, C. L., Menten, K. M., Owen, F., Dey, A., Gueth, F., Graham, J. R., Kreysa, E., Ledlow, M., Liu, M. C., Motte, F., Reichertz, L., Schilke, P., Zylka, R. "Three high-redshift millimeter sources and their radio and near-infrared identifications" *Astron. Astrophys.*, 360, 92, 2000

Bianchi, S., Davies, J., Alton, P., Gerin, M., Casoli, F. "SCUBA observations of NGC 6946" *Astron. Astrophys.*, 353, L13, 2000

Biver, N., Bockelee-Morvan, D., Crovisier, J., Henry, F., Davies, J.K., Matthews, H.E., Colom, P., Gerard, E., Lis, D.C., Phillips, T.G., Rantakyro, F., Haikala, L., Weaver, H.A. "Spectroscopic Observations of Comet C/1999 H1 (Lee) with the SEST, JCMT, CSO, IRAM, and Nançay Radio Telescopes" *AJ*, 120, 1554, 2000

Blain, A.W., Frayer, D.T., Bock, J.J., Scoville, N.Z. "Millimetre/submillimetre-wave emission-line searches for high-redshift galaxies" *M.N.R.A.S.*, 313, 559, 2000

Bolatto, A.D., Jackson, J.M., Wilson, C.D., Moriarty-Schieven, G.H. "Submillimeter observations of IC 10: the dust properties and neutral carbon content of a low metallicity starburst" *Astrophys. J.*, 532, 909, 2000

Brown, D.W., Chandler, C.J., Carlstrom, J.E., Hills, R.E., Lay, O.P., Matthews, B.C., Richer, J.S. Wilson, C.D. "A submillimetre survey for protostellar accretion discs using the JCMT-CSO interferometer" *MNRAS*, 319, 154, 2000

Carey, S. J., Feldman, P. A., Redman, R. O., Egan, M. P., MacLeod, J. M., Price, S. D. "Submillimeter Observations of Midcourse Space Experiment Galactic Infrared-Dark Clouds" *Astrophys. J.*, 543, L157, 2000

Carilli, C. L., Yun, Min S. "The Scatter in the Relationship between Redshift and the Radio-to-Submillimeter Spectral Index" *Astrophys. J.*, 530, 618, 2000

Ceccarelli, C., Loinard, L., Castets, A., Tielens, A.G.G.M., & Caux, E. "The hot core of the solar-type protostar IRAS 16293-2422: H<sub>2</sub>CO emission" *Astron. Astrophys.*, 357, L9

Chandler, C.J., Richer, J.S. "The structure of protostellar envelopes derived from submillimeter continuum images" *Astrophys. J.*, 530, 851, 2000

Chapman, S.C., Scott, D., Steidel, C. C., Borys, C., Halpern, M., Morris, S.L., Adelberger, K. L., Dickinson, M., Giavalisco, M., Pettini, M. "A search for the submillimetre counterparts to Lyman break galaxies" *M.N.R.A.S.*, 319, 318, 2000

Clark, T.A., Naylor, D.A., Davis, G.R. "Detection and limb brightening of the H I n=20-19 Rydberg line in the submillimetre spectrum of the Sun" *Astron. Astrophys.*, 357, 757, 2000

Clark, T. A., Naylor, D. A., Davis, G. R. "Detection of the H I n=22-21 Rydberg line in emission at the solar submillimetre limb" *Astron. Astrophys.*, 361, L60, 2000

Claude, S. M. X., Avery, L. W., Matthews, H. E. "Excitation Analysis of SO and SO<sub>2</sub> in the Proto-Planetary Nebula OH 231.8+4.2" *Astrophys. J.*, 545, 379, 2000

Clemens, M.S., Alexander, P., Green, D.A. "Ram-pressure stripping of the interstellar medium in NGC 4485" *M.N.R.A.S.*, 312, 236, 2000

Coppin, K.E.K., Greaves, J.S., Jenness, T., Holland, W.S. "Structure, star formation and magnetic fields in the OMC1 region" *Astron. Astrophys.*, 356, 1031, 2000

Davis, C.J., Chrysostomou, A., Matthews, H.E., Jenness, T., Ray, T.P. "Submillimeter polarimetry of the protostellar outflow sources in Serpens with the submillimeter common-user bolometer array" *Astrophys. J.*, 530, L115, 2000

Davis, C. J., Dent, W. R. F., Matthews, H. E., Coulson, I. M., McCaughrean, M.J. "Observations of a curving molecular outflow from V380Ori-NE: further support for prompt entrainment in protostellar outflows" *M.N.R.A.S.*, 318, 952, 2000

Dent, W.R.F., Walker, H.J., Holland, W.S., Greaves, J.S. "Models of the dust structures around Vega-excess stars" *M.N.R.A.S.*, 314, 702, 2000

Devriendt, J. E. G., Guiderdoni, B. "Galaxy modelling II. Multi-wavelength faint counts from a semi-analytic model of galaxy formation" *Astron. Astrophys.*, 363, 851, 2000

Duari, D., Hatchell, J. "HCN in the inner envelope of  $\epsilon$  Cygni" *Astron. Astrophys.*, 358, L25, 2000

Dunne, L., Clements, D.L., & Eales, S.A. "Constraining the radio-submillimetre redshift indicator using data from the SCUBA Local Universe Galaxy Survey" *MNRAS*, 318, 813, 2000

Dunne, L., Eales, S.A., Edmunds, M.G., Ivison, R.J., Alexander, P., Clements, D. "The SCUBA Local Universe Galaxy Survey - I. First measurements of the submillimetre luminosity and dust mass functions" *M.N.R.A.S.*, 315, 115, 2000

Eales, S., Lilly, S., Webb, T., Dunne, L., Gear, W., Clements, D., & Min, Y. "The Canada-UK Deep Submillimeter Survey. IV. The Survey of the 14 Hour Field" *Astron.J.*, 120, 2244, 2000

Fabian, A.C., Smail, I., Iwasawa, K., Allen, S.W., Blain, A.W., Crawford, C.S., Ettori, S., Ivison, R.J., Johnstone, R.M., Kneib, J.-P., Wilman, R.J. "Testing the connection between the x-ray and submillimetre source population using Chandra" *M.N.R.A.S.*, 315, L8, 2000

Fender, R.P., Pooley, G.G., Durouchoux, P., Tilanus, R.P., Brocksopp, C. "The very flat radio-millimetre spectrum of Cygnus X-1" M.N.R.A.S., 312, 853, 2000

Fiege, J. D., Pudritz, R. E. "Polarized Submillimeter Emission from Filamentary Molecular Clouds" Astrophys. J., 544, 830, 2000

Frail, D.A., Berger, E., Galama, T., Kulkarni, S.R., Moriarty-Schieven, G.H., Pooley, G.G., Sari, R., Shepherd, D.S., Taylor, G.B., & Walter, F. "The Enigmatic Radio Afterglow of GRB 991216" Astroph.J.Lett., 538, L129, 2000

Frayer, D.T., Smail, I., Ivison, R.J., & Scoville, N.Z. "The identification of the submillimeter galaxy SMM J00266+1708" Astron.J., 120, 1668, 2000

Fuller, G.A., Wootten, A. "Small-scale structure of the circumstellar gas around the very young outflow-driving source L483-FIR" Astrophys. J., 534, 854, 2000

Gear, W.K., Lilly, S.J., Stevens, J.A., Clements, D.L., Webb, T.M., Eales, S.A., & Dunne, L. "High spatial resolution observations of CUDSS14A: a SCUBA-selected ultraluminous galaxy at high redshift" M.N.R.A.S., 316, L51, 2000

Gibb, A.G., Little, L.T. "Discovery of a dense bipolar outflow from a new class 0 protostar in NGC 2068/LBS 17" M.N.R.A.S., 313, 663, 2000

Girart, J.M., Estalella, R., Ho, P.T.P., Rudolph, A.L. "A multi-transition HCO+ study in NGC 2264G: anomalous emission of the J=1-0 line" Astrophys. J., in press, 2000

Granato, G. L., Lacey, C. G., Silva, L., Bressan, A., Baugh, C. M., Cole, S., Frenk, C. S. "The Infrared Side of Galaxy Formation. I. The Local Universe in the Semianalytical Framework" Astrophys. J., 542, 710, 2000

Greaves, J.S., Coulson, I.M., Holland, W.S. "No molecular gas around nearby solar-type stars" M.N.R.A.S., 312, L1, 2000

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Greaves, J.S., Holland, W.S., Jenness, T., Hawarden, T.G. "Magnetic field surrounding the starburst nucleus of the galaxy M82 from polarized dust emission" Nature, 404, 732, 2000

Greaves, J.S., Mannings, V.G., Holland, W.S. "The dust and gas content of a disk around the young star HR 4796A" Icarus, 143, 155, 2000

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## **Membership of the JCMT Board and Advisory Panel**

### **JCMT Board as at December 2000**

#### **Chairman:**

Prof. E. Seaquist                      University of Toronto, Canada

#### **Vice Chairman:**

Prof. P.E. Clegg                      Queen Mary & Westfield College, London, UK

Dr. L. Avery                      HIA, NRC, Victoria, Canada  
Prof. M. Birkinshaw              University of Bristol, UK  
Dr. W. Boland                      NWO/GBE, The Hague, The Netherlands  
Mr. G. Brooks                      PPARC, Swindon, UK  
Prof. W. K. Gear                      Cardiff University, UK  
Prof. R. Waters                      University of Amsterdam, The Netherlands  
Prof. G.C. Wynn-Williams        University of Hawaii, Honolulu, USA

#### **Secretary:**

Dr. C. Vincent                      PPARC, Swindon, UK

### **JCMT Advisory Panel as at December 2000**

#### **Chairman:**

Prof. W.K. Gear                      University of Cardiff, UK

Dr. M. Fich                      University of Waterloo, Canada  
Dr. R. J. Ivison                      University College London, UK  
Prof. T. J. Millar                      University of Manchester, UK  
Dr. R.O. Redman                      HIA, NRC, Victoria, Canada  
Dr. J.S. Richer                      MRAO, Cambridge, UK  
Dr. D.B. Sanders                      University of Hawaii, Honolulu, USA  
Dr. R.P.J. Tilanus                      JAC, Hilo, Hawaii, USA  
Dr. P.P. van der Werf              Sterrewacht Leiden, The Netherlands

#### **Secretary:**

Dr C. Vincent                      PPARC, Swindon, UK

Two meetings of the JCMT Board were held in 2000, on May 22 & 23 at the HIA in Victoria, Canada and on November 16 & 17 at the JAC in Hilo, Hawaii. The JCMT Advisory Panel met twice in 2000, on May 15 via telephone conference call and on November 6 & 7 at the University of Cardiff, Wales.

## **1. The James Clerk Maxwell Telescope Facility**

### **1.1 Introduction**

Situated at an altitude of 4092 m close to the summit of Mauna Kea, Hawaii, the 15-metre James Clerk Maxwell Telescope is the largest facility in the world designed specifically to operate in the submillimetre region of the spectrum. It is operated by the United Kingdom, Canada and the Netherlands (the 'Partner Countries') on behalf of astronomers worldwide. It is managed by the PPARC's Joint Astronomy Centre (JAC) in Hilo, Hawaii. The JAC is also responsible for the operation of the United Kingdom Infrared Telescope (UKIRT).

Development and operation of the JCMT is overseen by the JCMT Board.

### **1.2 Telescope**

The 15-metre diameter primary reflector of the JCMT is made up of 276 individual lightweight panels. Each panel consists of a thin aluminium skin bonded to an aluminium honeycomb and is attached at three points to the backing structure of the antenna. The alignment of the mechanical panels can be adjusted by means of stepper motors at the mounting points. The backing structure is designed to maintain a parabolic figure as gravity distorts the antenna as it tips to different elevations. The surface accuracy is routinely measured and adjustments required to each panel are calculated by making observations of a coherent millimetre source located on top of the UKIRT building or by utilizing the in- and out-of-focus images of a bright planet. The sub-reflector or secondary mirror can be adjusted in three axes to compensate for changes in focus as well as changes in the figure of the primary. In addition, the secondary can be tilted or chopped in two axes in order to perform sky background cancellation.

### **1.3 Carousel**

The JCMT carousel co-rotates with the antenna and is designed to protect the telescope from the elements and to provide a safe and comfortable working environment for astronomers and engineers. An important feature of the carousel is the membrane which is deployed in front of the antenna at all times and is transparent at millimetre and submillimetre wavelengths. In addition to providing protection from the wind, the membrane performs the useful function of reflecting the visible and near-infrared radiation, providing protection from the solar 'heat' which could damage the antenna, thereby allowing daytime astronomical observations including direct observations of the Sun itself.

### **1.4 Instruments**

Receivers for the telescope can be located either in one of the bays of the Cassegrain cabin or on the two Nasmyth platforms located at the ends of the elevation bearing.

A number of receivers can be and are accommodated on the telescope at the same time and are selected by a movable tertiary mirror located in the centre of the Cassegrain cabin. The heterodyne receivers, covering the atmospheric windows between 215 and 680 GHz, are mounted in the cabin while the continuum bolometer array instrument, SCUBA, occupies one of the Nasmyth platforms.

### **1.5 Tripartite Agreement**

Under the terms of the Tripartite Agreement, the partner countries jointly undertake the operation, maintenance and development of the facility with the resources provided for this purpose in the proportion UK: 55%, Canada: 25% and the Netherlands: 20%. In accordance with the Operating and Site Development Agreement, 10% of the total observing time is set aside for use by the University of Hawaii (UH).

The JCMT Development Fund provides resources for the development of state-of-the-art instrumentation and for enhancing the capability of the JCMT.

### **1.6 Time Allocation**

All observing time, except UH, is allocated by the Panel for the Allocation of Telescope Time (PATT) on the basis of scientific merit and technical feasibility. Use of the telescope is not restricted to applicants from partner countries. National Time Allocation Groups (TAGs) referee, assess and nominate allocations for applications from their own countries. These time allocations are later combined and awarded by an International Time Allocation Committee (ITAC). Applications from outside the partner countries are assessed and nominated by the ITAC. The ITAC is composed of the Chairs of the national TAGs and is a sub-committee of the PATT.

### **1.7 The JCMT Board**

The international partners set up the James Clerk Maxwell Telescope Board to oversee the operation of the JCMT, to foster and develop collaboration between their astronomers in the use of the facility, and to endeavour to maintain the JCMT in the forefront of world astronomy. In particular, the JCMT Board (i) oversees the development of the facility; (ii) determines (with the advice of users and of the Director JCMT) the programme of operation and maintenance of the facility; (iii) approves annual budgets and forward estimates, and (iv) determines the arrangements for the allocation of observing time.

The JCMT Board comprises four persons appointed by the PPARC, two appointed by the NRC, two appointed by the NWO, and one appointed by the University of Hawaii.

### **1.8 The JCMT Advisory Panel**

The JCMT Board has set up the JCMT Advisory Panel to advise it and the Director on the scientific operation and development of the facility.

