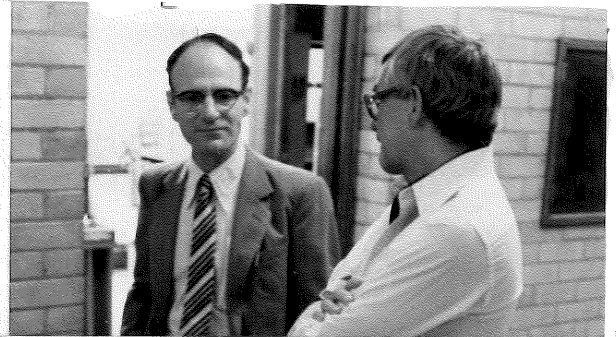
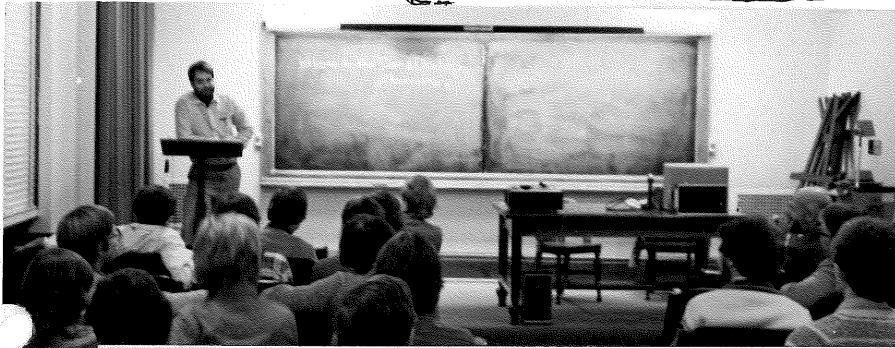


THE ^{DAVID} DUNLAP DOINGS

Vol. 15, No. 1

Feb. 1, 1982



Christmas Countdown 1981 - see page 3.

Photos: Karl Kamper

C O N G R A T U L A T I O N S

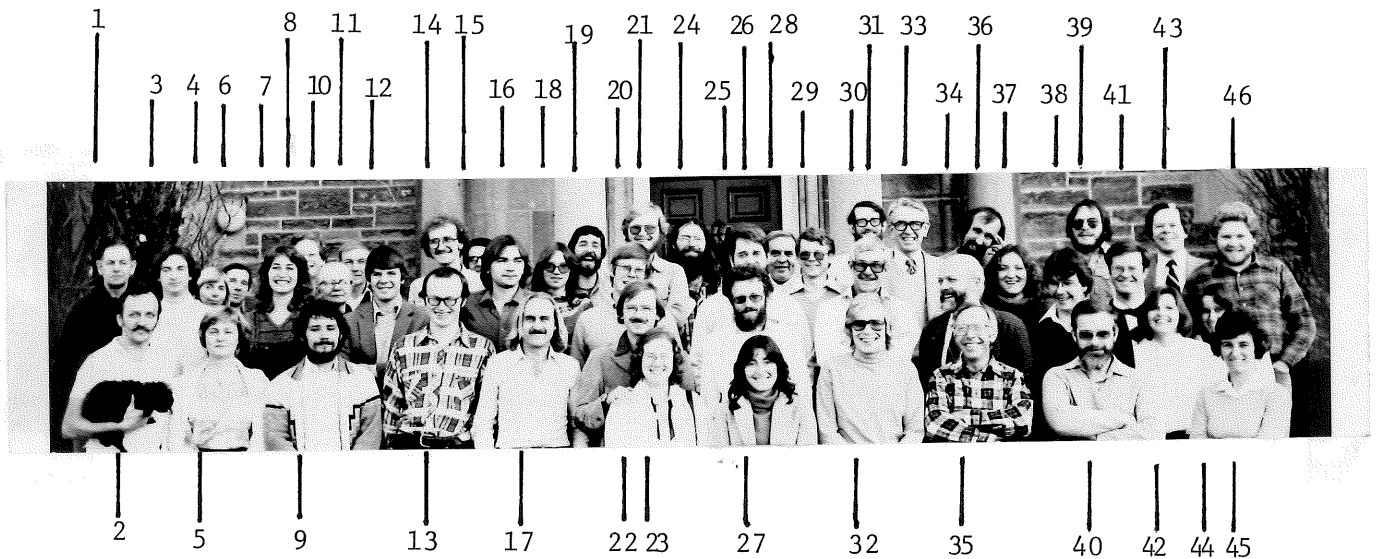
To *Kathleen* and *Stefan Mochnacki* on the birth (26 Dec.) of twin brothers for Alexander. The newcomers, *Timothy Peter* and *Nicholas Lech*, are not identical and reportedly are already displaying different personalities. Fortunately Stefan is an expert on binary evolution, and so we see no difficulty ahead for him in his new duties.

To three students who recently defended their Ph.D. theses at Senate orals, *Chris Rogers* (Dec. 9), *Chris McAlary* (Dec. 15) and *Dennis Crabtree* (Jan. 29). Theses abstracts for the two Chris's are published in this issue; because of our space limitations, Dennis' is held over until next issue.

Christmas Countdown 1981

As our front cover indicates, wind, rain and snow failed to stop the assembly of our multitudes for yet another memorable Christmas countdown. The record for travelling the farthest distance goes to *Don Morton* (B.A. U. of T. 1956), currently Director of AAT. Our candid cameraman Kamper caught him seeking advice from Don Fernie on the operation of large observatories (and how installation of a sprinkler system can contribute to safety and science?). Pictured opposite is *Tom Bolton* announcing the "Sirgay awards" to a cowering audience. Other highlights included the famous *Clayton - Crabtree* teamup, this time with Dennis playing the wizard "Sidney the Supernova" and a simulated radio linkup with our Las Campanas Observatory, featuring a series of unlikely catastrophies, and starring *Rick Crowe* and *Peter Wizinowich* at Las Campanas and the Russian Woodpecker at DDO.

Below is the "finding chart" for our cover photo. North is to the left. Notice how the masses are still smiling, before being subjected to the Christmas countdown!



- | | | |
|--------------------------|--------------------|----------------------|
| 1. Frank McDonald | 16. Neb Duric | 31. Ron Lyons |
| 2. Dave Earlam and Susie | 17. Matt Bates | 32. Rick Crowe |
| 3. Dennis Crabtree | 18. Lindsey Davis | 33. Don MacRae |
| 4. Nancy Evans | 19. Geoff Clayton | 34. Bob Garrison |
| 5. Joan Tryggve | 20. Rick McGonegal | 35. Rob Roeder |
| 6. Chris Corbally | 21. Chris McAlary | 36. Barry Madore |
| 7. Petrusia Bojetchko | 22. Raymond Rusk | 37. Julie Busch |
| 8. Alex Fullerton | 23. Ann Rusk | 38. Al Busch |
| 9. Louis Noreau | 24. Peter Martin | 39. Stuart Button |
| 10. Helen Hogg | 25. Harvey Liszt | 40. Charles Dyer |
| 11. Dave Blyth | 26. Tom Bolton | 41. John Percy |
| 12. Doug Welch | 27. Wendy Freedman | 42. Lynda Colbeck |
| 13. Tom Box | 28. Tony Estevens | 43. Maurice Clement |
| 14. Peter Wizinowich | 29. Bob McLaren | 44. Esther McCleary |
| 15. Dieter Bruckner | 30. Don Fernie | 45. Rosemary Diamond |
| | | 46. Gerry Grieve |

Present, but too late for the photograph, were Pamela Sullivan, Mercedes Richards, Doug Gies, Jim Thomson and the Mochnackis.

COMINGS AND GOINGS

Peter Brogden writes from Ottawa that he has already settled in with the Astronomy section at H.I.A. for the second half of his sabbatical leave from Ryerson. His electronics skills are now being applied to the development of a 3.0-3.5 GHz cooled GaAs FET amplifier, which will replace a paramp at A.R.O. During the first six months of his leave (until Christmas), Peter worked with our Infrared Group on a number of electronics projects connected with the infrared photometer.

Harvey Liszt has returned to NRAO in Charlottesville after what was for all of us a very enjoyable term.

Chris Rogers has taken up his NSERC Postdoctoral Fellowship at the Center for Astrophysics in Cambridge, Mass. Chris reports that he is on the "Smithsonian side"; this agreement has delayed his access to the Harvard swimming pool, but has also given him access to FTS telephone lines.

Matthew Bates has resigned his position as research assistant with Fe, Bln, and KK effective January 18. He has taken a position in the computer field at the Ontario Science Centre, under the direction of Katherine Madore (M.Sc. 1971).

DDO SUMMER TOURS - 1981

Chris Corbally

If last summer is anything to go by, there is no recession in the interest of the general public in astronomy. At the DDO we welcomed 3336 visitors for the "summer" tours, which ran from late April to early October (during the same period in 1980 there were 3067 visitors). An interesting statistic is that proportionately the Tuesday morning tours increased more than the Saturday evening tours: are Canadians becoming less nocturnal?

The Saturday tours followed the hallowed pattern: two groups of up to 80 people each; four graduate students to do the welcoming and demonstration of the 74". Yes, there were the standard UFO tales upon which to pronounce judgement, but this year the International Star Registry (the pin-your-name-on-a-star people) provoked some questions and then disappointment when the guides' responses followed the IAU's lack of interest in the Registry.

Early in the summer we were visited by 15 members of the Hamilton Centre of the R.A.S.C. They were a lively group, managing to count four domes atop the building (most people see only three). They claimed "fair quality" for a colour picture of Jupiter, taken afocal through the visitors' eyepiece (for the interested: 1/15^s, f/8, 400 ASA film). The summer closed with the customary visit of the Toronto Centre of the RASC, whose 100 representatives were given the "fine tooth comb" tour, apparently much appreciated.

We had fourteen guides to share the duties this summer.* Nine were new to the task, but quickly picked up the routine and the 74-inch operation, apprenticing under the anxious eye of Tom Bolton. So, thanks are due all those who helped sustain what seems to be an increasing interest (and possibly also funding?) in astronomical research.

*Lale Akatali, Petrusia Bojetchko, Tom Box, Geoff Clayton, Chris Corbally, Neb Duric, Doug Gies, Gerry Grieve, Kwang-Tae Kim, Mario Pedreros, Mercedes Richards, Raymond Rusk, Lief Schioler, Doug Welch.

ADVERTISEMENT

CONTRACTUALLY-LIMITED APPOINTMENT

DEPARTMENT OF ASTRONOMY
ERINDALE CAMPUS
UNIVERSITY OF TORONTO

DEPARTMENT: Astronomy

1. TITLE: Assistant Professor, one-year term, possibly renewable for an additional year. This position is subject to budgetary approval.
2. QUALIFICATIONS: Ph.D. in astronomy (no particular field preferred).
Post-doctoral training and teaching experience desirable.
3. DUTIES: Undergraduate teaching in astronomy and astrophysics on the Erindale Campus; research in astronomy; opportunities for graduate teaching and supervision may also be available. Excellent facilities are available for observational and theoretical studies in astronomy and astrophysics: The David Dunlap Observatory and its 0.6-m telescope at the Las Campanas Observatory, a VAX computer, and access to various national observing facilities.
4. SALARY: Approximately \$22,000
5. PERSON TO WHOM INQUIRIES SHOULD BE SENT:

Professor John R. Percy
Department of Astronomy
Erindale Campus
University of Toronto
Mississauga, Ontario
L5L 1C6

6. EFFECTIVE DATE OF APPOINTMENT: July 1, 1982
7. CLOSING DATE FOR APPLICATIONS: March 15, 1982

In accordance with Canadian Immigration requirements this advertisement is directed to Canadian Citizens and Permanent Residents.

Advertisement to be sent to:

1. University Affairs
2. C.A.U.T. Bulletin
3. Canadian Astronomical Society job registry
4. American Astronomical Society job registry
5. All Canadian astronomy departments
6. Potential Canadian applicants presently working outside Canada

IUE Time Allocation

Tom Bolton

I was at the Goddard Space Flight Center from Jan. 19-22 to participate in the review of IUE observing proposals for the fifth year of operations, chairing one of the nine specialists panels, Active Binaries (e.g. RC CVn's, symbiotic stars, cataclysmic variables, and x-ray binaries), and participating in the meeting that combined the results from all of the panels. The job was exceptionally difficult this year because the available time was enthusiastically over subscribed by a factor of 2, the largest in the history of IUE. The final results of the competition won't be announced for several more weeks, but the preliminary indications are that the Toronto and former Toronto applicants will be exceptionally successful.

The panelists suggested to NASA that future competitions should be held in the spring, when the weather in the Washington area is better. (There were two episodes of freezing rain and two snow falls totalling 8" during the 3+ day meeting). Tom plans to reemphasize that suggestion in light of his 36 hour "flight" home on Saturday/Sunday.

JUNE INSTITUTE 1982

This year the June Institute will overlap partially with the annual CAS meeting to be held in Toronto. The dates are:

June Institute: Sunday evening May 30 to Wednesday June 2, inclusive.

CAS Meeting : Wednesday June 2 to Friday June 4, inclusive.

Planning for the Institute is well advanced. Watch for further details in our next issue.

The twenty-third meeting of the Associate Committee on Astronomy is scheduled for June 5.

CITA: A Canadian Institute of Theoretical Astrophysics

The idea of a national institute for theoretical studies in astronomy has been repeatedly put forward over the years at meetings of the Associate Committee for Astronomy (ACA) and has as often been passed over in favour of projects to benefit observational astronomers. Now, however, the theoreticians feel their time has come, as Peter Martin briefly noted in our last issue in his report of the Fifth Kingston Meeting. In fact, only a few weeks previously, the ACA had unanimously passed a motion in support of efforts to establish a Canadian Institute for Theoretical Astronomy. In addition over 50 scientists in Canada, theoretical and observational alike, have now signed letters of support for such a project.

Early this month the Committee of the Kingston Meeting set forth in a letter to NSERC the scope and nature of such an Institute. They envisage at the top a general "Institute Membership" of 30 university faculty, identified by their receiving NSERC operating-grant support for theoretical astrophysics research. A Governing Council, elected from this general membership, could oversee operation of CITA. The national facility itself would comprise at any one time (i) of the order of 10 "Funded Fellows" (they would consist perhaps of a Director, one or more visitors from outside Canada, and the rest Canadian Theorists on leave for 1-5 years from their home institutions), (ii) "Visiting Fellows", unspecified as to number, comprising sabbaticants, NSERC Fellows, various Post-Docs, and others with their own support and (iii) supporting staff persons.

The committee feels it would be highly desirable to locate CITA near a dynamic group of more observationally-oriented astronomers because of the important two-way stimulation such contacts could provide. The need for access to a first-class astronomical research library and to computer facilities of the first rank are important additional considerations. The field is wide open. Meanwhile, a Canada-wide association of theoretical astrophysicists (the general "Institute membership") is being planned perhaps to see the light of day as early as the meetings to be held next June here in Toronto.

MR

HETSPEC AT CFHT

Bob McLaren

Early in March (in the bright of the moon) Al Betz (U.C. Berkeley) and I will be using the CFHT coudé focus for infrared *heterodyne spectroscopy* (hence HETSPEC) of circumstellar envelopes at 10 μ m wavelength. As some readers may recall, Al and I have been making observations of this type for the past 3 years using the 1.5-m McMath Solar Telescope at KPNO. A new, portable, infrared heterodyne spectrometer (it works like a radio spectrometer but with a CO₂ laser as local oscillator) has recently been completed at Berkeley and has performed up to expectations at the Lick 3-m coudé. The new instrument will travel to Mauna Kea late in February for a four-night run at the IRTF followed four days later by five nights on the CFHT.

In mid January, I made a quick 4-day trip to the CFHT to finalize the technical details for our run. I left Toronto Friday morning, picked up a rental car at Kona around dinner time, and by 9:00 p.m. the same night was at Hale Pohaku getting acclimatized. It was an ideal time for me to go because Jean-Pierre Maillard (CFHT staff astronomer) was doing infrared spectroscopy at the coudé focus using the Fourier Transform Spectrometer. The telescope configuration was almost identical to what we will use next month. The CFHT coudé normally operates at $f/110$ with two lenses in the optical train. The lenses are opaque in the infrared, but fortunately they can be removed and the telescope refocussed to produce an $f/135$ beam and an unvignetted field of ~ 35 arcseconds - not as big as the optical field but quite adequate for our purpose. Jean-Pierre borrows the coudé camera mirror to reimaging the $f/135$ beam into his instrument at $f/40$. We will do the same thing. Unfortunately the weather was poor on Saturday and Sunday night - in fact there was a blizzard on Sunday night - so Jean-Pierre did not open up. Nevertheless I was able to finalize the arrangements for our run. The weather did not bother the skiers, who were active on the summit over the weekend. Actually, I think people must ski on Mauna Kea more for the novelty than for the quality of the conditions - it certainly isn't cheap either!

On Monday, I retreated to the more tropical surroundings of Waimea to confer with some of the engineers there and to say hello to René Racine and Bruce Campbell. I was pleased to see that the bulldozers were just beginning to clear the site for the new headquarters in the centre of town - at last this project is under way. My CP flight left Honolulu for Vancouver at midnight (6 seats to a row in a DC 8 and every single one filled, just like South America!) and by dinner time I was back in Toronto.

I hope I'll be able to report a successful observing run a few weeks from now. I'm going to allow myself a bit more travel time.

P O T P O U R R I

Nancy Evans spoke to the Leaside - East York University Women's Club on "Stars: their time and space".

Lale Akatli (M.Sc. 1981) has taken a position at Infomart, where *Mary Lane* (Ph.D. 1981) is also employed.

J.L. Yen attended the 159th meeting of the AAS in Boulder, January 10-13.

With the help of a few friends, *Dave* and *Pat Turner* recently moved from their apartment in Sudbury to a three bedroom house. The blizzard that hit the area the morning of the move, *Ron & Lynda Lyons* report, initially aroused concern but it lasted less than an hour and really caused no problems. The rest of the day was sunny but cold. (That night the temperature dipped to -34°C .) Their address now is

218 Stewart Drive
Sudbury, Ontario
P3E 2R5

Their phone number is unchanged (705-522-4543).

George Rybicki from the Center for Astrophysics visited the department Dec. 7-9 to continue collaborative work with Peter Martin. He was also external appraiser for the Ph.D. thesis of Chris Rogers.

Chris McAlary was *Bob McLaren's* first Ph.D. student to graduate. On Chris' exam committee was Boris Storcheff, who supervised Bob's own Ph.D. in physics and Dan Weedman was the external examiner. Following closely on Chris' heels was *Dennis Crabtree*, for whom *Sun Kwok* served as external examiner. We wait with bated breath as Bob ploughs on to set a record: three Ph.D. graduates within 3 months?

A recent issue of "Macleans" contained a feature story on the universe from a Canadian perspective. Drawing attention to the article was a picture of *Barry Madore* in the prime focus cage of CFHT, looking much like a budding (freezing?) talk show host. Also quoted were *C.C. Dyer*, *P.P. Kronberg* and *R. Roeder* from our Scarborough campus, and former student *G. Mitchell* (Ph.D. 1967) of St. Mary's University, Halifax.

Martine Normandin and her husband, Richard have pulled up their California stakes. They returned to Canada last December and have both taken new jobs in Ottawa: Martine with Bell Northern Research, and Richard with the laser optics group of the Physics Division of NRC. Martine had been employed as an American Physical Society Postdoctoral Industrial Fellow at Fairchild Camera and Instrument Corp. in Palo Alto and Richard held a postdoctoral fellowship at Stanford. They have just purchased a house in Ottawa and, we hope, will pay us a visit in Toronto before too long.

Inge-Juliana Sackmann, a faithful correspondent at Cal Tech, has written to tell of a celebration held at the Kellogg Radiation Laboratory last November on the occasion of William Alfred Fowler's 70th birthday. "A wonderful, rare scientist", she writes, "responsible for encouraging and stimulating much of the country's sum total of Astrophysics ... a mentor, a man of vision, a guide and a friend".

In early January *Barry Madore* and *Wendy Freedman* had six perfect nights of observing at the Dupont 2.5 m at Las Campanas. They have begun a survey of the optical spectra of E and SO nuclei using the intensified reticon covering the spectral range 3400 to 7000 Å. Just under 100 galaxies were observed.

A week later Barry attended the workshop on Dwarf Galaxies held at KPNO where he had the opportunity to discuss the dwarf survey being analyzed by Paul Ford at Toronto, and also present more results on the infrared distance scale.

Barry returned with news of several ex-DDOers: during the meeting *Chris McAlary* returned to Tucson from Palomar, having successfully observed a number of Seyfert nuclei simultaneously with optical and infrared spectrometers at the 5 meter; *Lindsey Davis* is working with staff astronomers at KPNO preparing for 15 nights of observing with a new 2-D CCD array including a joint programme with Neb Duric and Ernie Seaquist.

Dominique Barceloux (U. of T. M.Sc. 1980) writes that as of November she has moved to Italy and is continuing her graduate studies in Astronomy. She is now in Padova working with Dr. Bertola and polishing up her Italian

COLLOQUIA*

- January 6 Bob Gauthier and Rick Crowe
G2000 - Current Literature Seminar
- January 13 Dr. Edwin L. Turner, Princeton University
"Statistical Models for the Gravitational Lensing
of Quasars"
- January 20 Petrusia Bojetchko and Kwang-Tae Kim
G2000 - Current Literature Seminar
- January 27 Dr. Gary J. Ferland, University of Kentucky
"The Absorbing Material in NGC 4151"
- February 1 Dr. Sun Kwok, Herzberg Institute of Astrophysics
"The Nature of Novae and Symbiotic Stars"
- February 3 Gerry Grieve and Mario Pedreros
G2000 - Current Literature Seminar
- February 11⁺
(Thursday) Helen Sawyer Hogg, University of Toronto
"Early Days of Astronomy in Toronto"
- February 28['] Dr. R.E. Azuma, University of Toronto, Physics Dept.
"Missing Solar Neutrinos - Do We Understand the Sun?"

*Unless otherwise noted, colloquia are held on Wednesdays at 4:00 P.M. in Room MP 137 with TEA at 3:45 in the Reference Room, MP 1404.

⁺ Joint with The Institute for the History and Philosophy of Science and Technology - Astronomy, at 4:00 P.M. in Room MP 203 with refreshments at 3:30.

['] Part of the lecture programme of the Royal Canadian Institute, at 3:15 P.M. in the Medical Sciences Auditorium.

PAPERS SUBMITTED

| | |
|---|---|
| P. Biermann P.P. Kronberg B.F. Madore | The Detection of Hot Intergalactic Gas in the NGC 3607 Group of Galaxies with the Einstein Satellite |
| D.A. Fraquelli | H α Emission in HR 1099 |
| J.D. Fernie | Photometry Among the Climatically Underprivileged |
| J.R. Percy | Photometric Observations of ϵ Persei |

Las Campanas News

Bob Garrison

Some people wonder why we go all the way to Chile to observe. My recent observing run is a good sample of the reasons. The skies were 100% photometric (14 out of 14 nights) and the seeing averaged about 1 second, with less than 1 second on several nights. The telescope worked perfectly - well, almost; two hours were lost due to a relay problem. The only real problem was the observer who, for the first time in almost 40 trips, lost the last half of the first night to "Allende's revenge". (It must have been that fancy restaurant that Antonio Urrutia took me to about 12 hours before I was struck down).

It was a very productive run. I finished the last few observations for Chris Corbally's program of classification spectroscopy of close visual double stars (1-5" separation), which could not have been done elsewhere because of the requirements for good skies and good seeing. A few more image tube spectra were taken of Mira variables, thus finishing Rick Crowe's program of IT spectroscopy of southern Miras around their cycles (or at least terminating the observations phase of this infinite sink). Lots of observations were carried out for my program to find a solar analogue, thus bringing the observational phase of that program to a close. Ah, isn't it wonderful to have a good run?

*Non-astronomical highlights of the trip included the funeral of Eduardo Frei (the Christian Democrat president before Allende, much beloved by Chileans) on Monday, 25 January; the sudden appearance of a huge Tarantula on the wall inside the door during my break for midnight lunch one night (I had seen many before, OUTSIDE, but even Papic had never seen one inside); and a record 30 hour flight home (with a 17 hour delay in Lima due to a bomb scare followed by a mechanical failure after which the pilots refused to fly without rest. This is a brief report in order to made the D³ deadline; more will follow next month.**

**when Bob will tell us how he dealt with the fearsome midnight visitor. - Ed.*

LE COIN DES RÉVISIONNISTES

From Racine, René 1981, J.R.A.S.C., 75, 305:

"Une nouvelle direction ... prit les rennes de la Société le 1^{er} septembre 1980."

Those in the Department who have fulfilled the language requirement will see that this translates as: "A new management ... took the reindeer of the (CFHT) Corporation September 1, 1980."

Peut-être veut-il dire "rênes", au lieu de "rennes".

Louis Noreau (Nru)

The following tidbits were gleaned from a Scarborough A03 term test.

- Q. Describe the spectrum of the incandescent light bulb. What type of spectrum is it?
- A. The incandescent light bulb is a form of light, between 4000 A° and 6000 A°. It is of type M, it is a very cool star.
- Q. Describe the spectrum of a flame of sodium chloride (table salt). What type is it?
- A. Sodium chloride is very bright purple and bright yellow the H and K lines are the purple and the D lines are the yellow. It is a "F" type star as the colors are easy to pick out.

STAR OBSERVATIONS

Val Sears is the newly-appointed Science Editor of the Toronto Star. In a recent Saturday issue he reported some of the highlights of the AAAS meeting at the beginning of January in Washington. He mentioned that the meagre funding for the "once mighty" space program was the subject of much discussion by distressed scientists, and he went on to quote one technology engineer: "More money will be spent this year on space video games than in the entire space program".

Two of Mr. Sears own observations, however, will come as no surprise to our readers:

- "Slide projectors never, ever work"*
- "The best looking female scientists are in astronomy"*

A Bibliographic Index System on the VAX

Dennis Crabtree

Having problems keeping an organized reference list on index cards? Would you like to get a list of all your references on HD 123456 in seconds? Or, how about a list of all your references on LTE line formation? If you answer yes to any of the above questions, the following will be of interest to you.

I have developed an automated bibliographic index system using the indexed file structure available on the VAX 11/780. This system stores basic information such as author, year, journal etc. for each entry as well as a list of objects and pertinent keyword codes. Each entry can be retrieved by author, object or keyword code.

The main effort involved in using the system is the entry of the material into the file. In comparison, once all your current bibliography is entered, keeping your file up to date will be no effort at all.

This system is accessed by running DRCL[ASTRONOMY]BIBLIO which will allow you to enter new references or to add keyword codes to existing entries. One note about the entry of references. Each entry must be unique so this may mean using 1979a, 1979b if you have more than one reference by any author in a given year. To retrieve a list of references you must then run DRCL[ASTRONOMY]READ which will ask a few simple questions before producing the entries you want.

A few notes about the retrieval process. If you want papers by Iben, entering Iben would return all papers by Iben in your file. If you want a list of papers by any authors whose last name starts with "S" then all you do when the system asks for author is give it "S". If you want a list of all your references then simply enter "*" when it asks for author.

THESIS ABSTRACTS

"Radiative Transfer in Spherical Geometry with an Anisotropic Phase Function"

Christopher Paul Rogers

In spherical geometry the angular distribution of the intensity can become very anisotropic. This feature has been the focus of recent approximate solutions to the partial integro-differential equation of the transfer problem. We present a method of solution that treats the boundary conditions exactly and sets a standard of accuracy against which these approximations can be judged. The inward and outward intensities are represented by expansion in half-range or shifted Legendre polynomials. These provide moment theorems that close the set of equations for the half-range moments of the radiation field. This method of solution automatically allows an arbitrarily accurate description of an anisotropic phase function. In the case of strong forward peaking of the intensity the moment theorem can be modified to significantly accelerate the convergence of the solution.

A Ricatti transformation makes possible a very accurate numerical integration of the moment equations. We compare these solutions to those of other methods for the Kosirev problems, the homogeneous sphere with a point source, and clouds with power-law opacities. For practical work, we have devised a very rapid solution based on a finite difference representation of the differential equations for the moments. This numerical method readily incorporates equations corresponding to other physical phenomena for a simultaneous solution.

We apply our method to two problems of astronomical interest: circumstellar envelopes and interstellar clouds. The source of opacity is dust; the coherent scattering and temperature-independent opacity are convenient simplifications that leave unmasked the anisotropic phase function. We calculate the temperature distribution of the dust, the flux spectrum, extinction curve, visibility function, and surface brightness profile for a hypothetical envelope and cloud.

* * *

"A Near-Infrared and Optical Study of X-Ray Selected Seyfert Galaxies"

Christopher W. McAlary

Broadband photometry between 0.35 and 3.5 μm has been obtained for a sample of approximately fifty X-ray selected Seyfert galaxies and quasars. For the nearby objects, multiaperture observations were made. A model-fitting procedure has been used to separate the stellar and non-stellar components of the optical/infrared continua of these objects. The results show that the non-stellar emission of most low- and intermediate-luminosity X-ray galaxies comprises a flat-spectrum (probably nonthermal) component which dominates the optical region, and a very steep spectral feature which is dominant in the near-infrared. I suggest that this latter feature is associated with hot dust in the nuclei of X-ray galaxies.

Analysis of the present data in conjunction with previous work shows that strong correlations exist among the various line and continuum observables associated with the high density regions in active nuclei. In particular, an extremely strong correlation is found between the 3.5 μm luminosities and the X-ray luminosities. Additional correlations exist between the X-ray fluxes and both the 1400 MHz and [OIII] fluxes. This suggests that the nuclear source may affect the star formation processes in the narrow-line regions of active nuclei.

Medium-resolution spectrophotometry of NGC 4151 between 2 and 4 μm has led to the detection of the $B\alpha$ and $B\gamma$ lines of hydrogen in emission. The $B\alpha/H\gamma$ ratio yields an upper limit of $E(B-V)=0.13$ mag for the nuclear reddening. The near-infrared continuum of NGC 4151 is a combination of starlight, hot (600 K) dust emission, and a third component which is either very hot (1500 K) dust emission, or a power-law spectrum, or some combination of these. There is probably enough column density in the hot dust to account for the observed nuclear reddening.