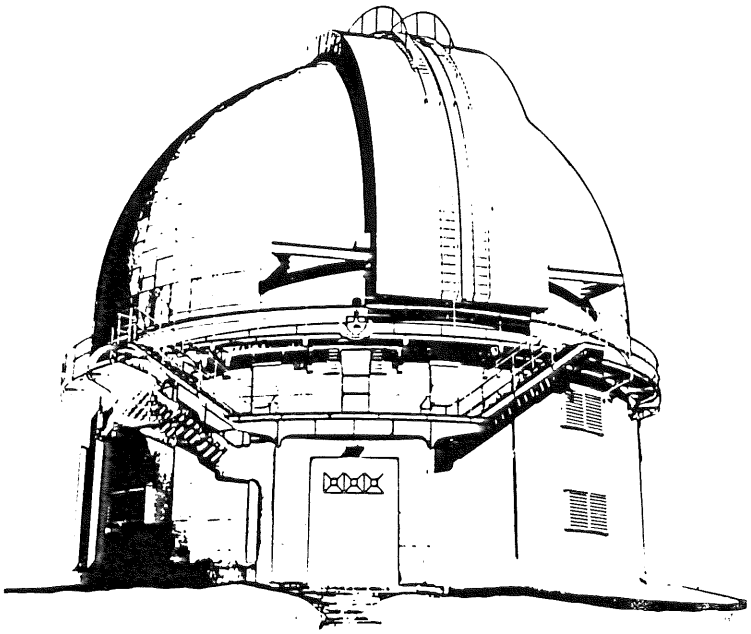

THE DAVID DUNLAP DOINGS

T E L E G R A M

Shelton Duhalde McNaught LMC

1987A Supernova Shelton 19871 87 Feb. 24.333

R.A. 05h35.4m Dec. -69°16'

m_v = 04.5

brightening 0.5 mag in 5 hours

Green 4 Feb. 24/1500

EDITORIAL

On our cover is an item that hasn't appeared in *Time*, *Sky and Telescope*, *New Scientist*, etc. The telegram's brevity is perfectly appropriate: the one word entirely conveys the enormous importance of the event to the knowledgeable reader. And the first name on the list creates special excitement for the reader who is associated with our University. In this issue Bob Garrison reports on the "discovery of the century" and Slavek Rucinski gives us a first–hand account of activity at the UTSO in the days following the event. Take special note of two unique opportunities announced in Bob's article.

We thank the many contributors to this issue for supplying us with interesting news items and reports. To those who haven't contributed recently, please consider submitting material for our summer issue. This is certainly a safer way of having your activities reported than leaving it to our infamous columnist Mike Fieldus!

rG and Rg

On behalf of the Observatory staff and department members,

we offer our condolences

to Sidney van den Bergh whose wife Gretchen died on February 8

and

to the family and friends of Michael Ovenden who died March 15.

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Production: Esther Oostdyk

CONGRATULATIONS

To the following future first-time parents,

Mercedes and Donald Richards who are expecting this May,

Guilhème Pérodeau and Louis Noreau who can hardly wait until August

and Wendy Freedman and Barry Madore who are getting set for May.

To Chris Stagg who will be leaving the department in June to take up a PDF at the University of Manchester, working on the celestial mechanics of the Oort Cloud. Chris worked in the field of celestial mechanics at York University before coming to Toronto to do his Ph.D. in the field of variable stars.

To Louis Noreau (Ph.D. 1984) who has been appointed as Research Associate at Laval University. Louis has been a post-doc there the past two years.

COMINGS AND GOINGS

Tom Bolton visited the Goddard Space Flight Center March 10-12 for the IUE Time Allocation Committee meeting to allocate time for the tenth year of observations of IUE. He chaired the Active Binaries Subcommittee which dealt mainly with proposals to observe cataclysmic variables, novae, and Supernova Shelton 1987A (the pops, booms and bangs subcommittee). Former student Steve Shore was chairman of the subcommittee that reviewed the remainder of the binary star proposals. US1 (low noise) shifts were oversubscribed by a factor of 3, and the high noise US2 shifts were oversubscribed by a factor of 2. The overall quality of the proposals was very high, so the competition was very intense.

Judith Irwin made a presentation to a Zonta Club (professional women's club) in Halifax, N.S. on March 12. It was mostly on spiral galaxies (including a bit on her own research) but she also included some information on SN Shelton.

Marshall McCall spoke exclusively on the supernova to York University on March 17.

Chris Rogers visited the University of Western Ontario March 5 and gave a seminar on work done with Man Hoi Lee about Bok globules.

Tom Bolton went to Texas at the end of March for an observing run at McDondald Observatory with Alex Fullerton and Doug Gies. On the way down, he gave a talk on Circumstellar Matter in the Algol System at the Department of Astronomy at the University of Texas.

John Percy spent Feb. 3-4 at Lakehead University in Thunder Bay, as AAS Harlow Shapley Visiting Lecturer. The host was George Harrower, former president of Lakehead U., and one of the founders of radio astronomy in Canada. His former students include Phil Kronberg, among others.

Bob Garrison visited W.W. Morgan at Yerkes Observatory on the weekend of 20-22 March. He also visited P.C. Keenan at Ohio State University on 9-10 April and gave a colloquium entitled "Organized Serendipity; the MK Process at Work".

Keith Marcus left the department at the end of March to pursue a career in actuarial science. Keith had been working with John Percy for the last several months, funded by a program of Employment Canada. His project involved the analysis of 20 years of AAVSO visual observations of Cepheid variables.

POTPOURRI

Mohamed Dattu has been working with John Percy as part of the Mentorship Program of the Faculty of Arts and Science. In this program, exceptionally talented high school students work with faculty members on research projects. Mohamed has been analyzing ten years of visual and photoelectric observations of Rho Cassiopeiae, for comparison with the spectroscopic observations published by Sheffer and Lambert (PASP 98, 914-921 (1986)).

Phil Kronberg is currently Chairman of the Supercomputer Users' Group at the University of Toronto. In this connection he has been active in planning the SUG activities, which include regular meetings, special seminars of interest to users of the CRAY X-MP supercomputer at the U. of T., and visiting user groups at other Ontario universities. Over the past few months, he has helped to organize visits and presentations on twelve other university campuses in Ontario.

Besides being chairman of the SUG, Phil serves as a member of the Inter-University Advisory Board for the supercomputer facility, and also the Management Board of the Centre for Large Scale Computation.

Victoria College was the site for an NRC–sponsored meeting on Canada's participation in the James Clerk Maxwell Telescope. The March 31 meeting attracted nearly one hundred would–be submillimeter astronomers from across Canada, including many graduates of our department. Ernie Seaquist gave one of the "science" talks.

The new AIPS workstation, based on a Sun-3 computer will be operational very soon. A tape drive, acquired by Phil Kronberg and Ernie Seaquist, will be installed at the beginning of April, and will, together with another large disk to come soon, make it easy to load, back up, and work with large data- sets from the NRAO Very Large Array Radio Telescope. The Sun-3 has recently been connected to the CRAY X-MP via Ethernet, and AIPS routines will be running on the CRAY within the next two months. Patricia Monger is currently writing and adapting code which will permit interactive work with images being computed with AIPS routines. During the last week of March, Robert Lupkin of STScI came up from Baltimore to assist Patricia with AIPS - Sun graphics development.

Phil Kronberg has recently been appointed to a committee struck by the President of U.of T. which will examine and clarify the role of the Innovations Foundation.

Application forms for Las Campanas time have been sent out and are due in mid-May. If you didn't receive one and would like to, please notify Bob Garrison or Esther Oostdyk.

SN SHELTON 1987A

by Bob Garrison

Ian Shelton, U.T.S.O. Resident Observer, made his place in astronomical history on 24 February (0300 Universal Time; 10 pm on the 23rd Toronto time) when he noticed a bright star that shouldn't have been there on a routine photograph of the Large Magellanic Cloud. The photograph was taken with the Carnegie ten-inch astrograph, an old wide-angle telescope especially suited for such observations. After brightening by a factor of 2000 in less than 2 days, the supernova maintained a constant V brightness of about 4.5 mag for almost two weeks, while it steadily reddened. It is now almost as red as a carbon star!

The puzzle continues. Since about 12 March, Supernova Shelton 1987A has been brightening by about 2-3 percent per day, so it is now a factor of 2 brighter than it was during the plateau phase (26 Feb-12 Mar.). The magnitude on 6 April was 3.57 and climbing. This is confusing, because while some predicted that it should have brightened suddenly by an additional factor of 30-50, others predicted that it should have started to fade weeks ago. Neither group predicted this long pause.

The color is very red and continues to redden, though not as rapdily. It is difficult to estimate color calibrations, because of the lack of stable standards that are as red as the SN, so the colors are extrapolations rather than interpolations. Nevertheless, we probably have as good a calibration as anyone, since everyone has the same problem! As of 6 April, B-V=1.76 and U-B=2.59. According to returning observers, it is a gorgeous red against the silver-gray color of the Large Magellanic Cloud, especially when observed without a telescope.

The spectrum of Supernova Shelton 1987A has evolved from a simple hydrogen spectrum to an extremely complex mixture of lines of many different elements under a variety of excitation conditions. Nothing like it has ever been seen before, though it is beginning now to look more like a traditional supernova.

One of the advantages of the University of Toronto monitoring program is its continuity; we have watched the spectrum evolve from night to night and have seen features develop and disappear, thus helping to unravel the complexity. Because all previous supernovae have been very distant and thus difficult (faint) to observe in detail, and because none have been observed so early in their evolution, we should understand supernova spectra better than ever before.

With the UTSO 60-cm telescope, we have set up a program to monitor the supernova photometrically with UBVRI filters and spectroscopically at 67 Å /mm (1Å resolution). In addition to the monitoring program, several other interesting instruments are being used periodically. During this past week, Santiago Tapia's group has been using a coronagraph-type instrument with a CCD (designed to observe stellar disks!) to occasionally look at the SN. Jerry Kristian has tried a microsecond pulsation signal detector, which uses the Los Alamos computer to analyze the data from tapes. He intends to keep trying once very few weeks until the pulsar at the bottom identifies itself.

A SUPERNOVA CELEBRATION is being set up for 8 pm on 24 April with Ian Shelton as special guest, courtesy of CP Air and the Neil D. Graham/University College Lectureship in the Natural Sciences. Dignitaries will include David Peterson, Premier of Ontario, George Connell, President of the University, and David Dunlap, grandson of the DDO namesake.

The CELEBRATION promises to be a memorable occasion. The CBC show "The Nature of Things" and the US-based PBS "NOVA" series are planning to film the event. It will be held in Convocation Hall at the University of Toronto and the public is invited. More about that later.

The photographs are spectacularly beautiful, with the Large Magellanic Cloud in all its glory and a very bright star where a faint one existed the night before (24 hours earlier, presumably just a few hours before the event). Copies of the discovery and prediscovery photographs are available from the Department of Astronomy at cost ($2.50 plus postage). Ian will be bringing a color negative taken in exceptional seeing (subarcsecond) with the 24-inch telescope and prints from it will also be available.

We are stepping up our fund-raising campaign; we hope to have a 2-meter telescope in place when the SN gets too faint for a mere 60-cm telescope!

The Supernova and My Observations in Las Campanas

by S. M. Rucinski

Frankly, I have extremely mixed feelings about the Supernova. Everybody knows it is an incredibly great thing that it happened *to us* (or – more exactly – to Ian Shelton). But, it did ruin my observations. In fact it is hard to say what was worse: the Supernova or the weather. Here is the story.

Because of the El Niño phenomenon, the weather is quite strange in Chile. The air is incredibly moist with clouds forming on any levels. One can observe on most of the nights, but the whether is definitely non-photometric. The humidity during my run was never lower than 60 %; on some nights it was 100 % with water dripping from everything. Actually, these were the clearest nights because the water was condensing low and cirrus clouds somehow did not want to form. Since the mirror was not scheduled for washing, I did not observe on those nights (but Ian observed the Supernova hoping that intensity of its radiation will keep all the equipment warm and dry – at least for half an hour or so).

Let's hope the El Niño does not stay long. Not only that it is annoying for observations, it makes walking on the mountain somewhat unpleasant; there are many toads there which like to rest on the warm road at night. After some practice I developed a special technique of walking which consisted of sliding my feet very low over the ground. Obviously, one can always resort to driving.

Now back to the main subject. I came to UTSO when the Supernova was one week old. I agreed to observe the Supernova photometrically but it became quickly obvious that Ian felt more comfortable if he made the observations himself. Therefore, I gave him the first 2.5 – 3 hours of my nights; during this time he was able to take a few spectra and do some differential photometry of the Supernova. (I observed the Supernova only on two nights, when Ian was absent).

In addition to "real" observations, I could see the Supernova almost every night. At the end of my stay, it looked definitely red, like a K-type star. Its visual magnitude stabilized close to about four but colours have undergone dramatic changes during the two weeks of my stay at Las Campanas.

In addition to the Supernova, I observed a stream of journalists visiting, photographing and generally bugging Ian. One day I witnessed their concentrated attack (*Discovery, Omni, something else*) which lasted from 12 Noon to well after midnight – **continuously**. He was able – somehow – to make his observations between 9 PM and midnight (while still talking to journalists, responding to their questions, being photographed unexpectedly with a flash at night, etc. etc.), but he was a destroyed man afterwards. Let's hope he survives all that.

I have not brought many observations back with me this time, but it has been an unforgettable run ...

GASA GOSSIP

by Mike Fieldus

This month's column should be quite short. After the last two issues, nobody is talking to me anymore. Little did people expect when they elected me to this esteemed position that I would actually do it. Surprise, surprise.

First, the news you have all been waiting for: the volleyball update. Since my last report, we have managed to win two games with Ed present (and all of them when he isn't) and at press time we are in a tie with two other teams for second spot in the standings. With two games left, we must win at least twice more to ensure ourselves of a spot in the playoffs (top four teams make it to this spring classic). Coach Bob, however, keeps reminding us that when the tough get going, the going gets tough, so we may have our hands full with this drive for post season play.

Now for the juicey stuff. Not everybody has ceased talking to me. Judith related a dream she had about Dale which defies any reasonable explanation. In strictest confidence, she told me (and anyone else listening) that she has dreamed of Dale giving her a tour of the Arecibo dish. In this dream, the dish is flooded, so the tour was conducted while the two swam underwater, avoiding sharks. While Freud would have had a field day with this, I absolutly refuse to make any perverse reference to wet dreams. The most amazing thing about the entire situation was Jim Picha's reaction, when he found out it was only a dream and not true!

One of the most remarkable developments in the department this year involves the undergraduate course AST321 (Solar System Astrophysics). A phenomenom often seen amongst rock stars, but seldom (if ever) amongst Astronomy professors, has developed. Bob Garrison, taking over the teaching duties this year from Tom Bolton, has developed a collection of groupies who follow him around just about everywhere! How he did this, and what he intends to do with them, is anybody's guess. This should be a lesson to all professors on what happens when you take over one of Tom's courses.

I will mention this here, because it probably won't make it to the coming and goings section. The woman whom Rob Straker turned his desk into a shrine for has arrived in town. Most people met Alison at the Vernal Equniox party, and everyone agrees that as long as she keeps playing volleyball very well, that she is a nice girl. Don't expect to see Rob putting in the long hours of a Masters student with courses anymore.

Finally, I would like to thank whoever put the photo copy in my mail box of the dictionary, showing that the correct spelling of titbits is in fact t-i-t-b-i-t-s. The hysteria surrounding that episode was in no way due to my perversion (even if it was about my perversion).

Revisionist's Corner

The following letter has arrived, the first of the REAL cranks:

Feb. 26, 1987

Dear Prof. Garrison,

Re Supernova Shelton, I'm excited about this event, the moreso because I had, in fact, declared the event and location in June, 1984 and subsequently saw the whole thing in detail in several very unusual dreams, since last July!

As with Prof. Shelton, I had to abandon doing any work on the details due to no funds, hardship, and lack of support.

However, in view of having publicly written and declared the event both in Edmonton and in letters to U.S.A. correspondents, I feel it would be fair to ask you to re-name the Supernova after it's rightful owner, myself. Please write to the above address, letting me know what can be done about this. Thank you very much for having confirmed me so well to my associates, and good luck to us all! Thank you!

Truly,

[not clear,ed]

Canada Culture,

Exploration grant for 1987

LIBRARY NEWS

by Marlene Cummins

Many people have been asking me about the central library's automation program. Briefly, this is the situation regarding accessing their database. Phase I is currently being implemented. This involves 100 terminals, most of them to be placed within the central libraries. It is hoped that Phase II will be implemented in 1987-88 and will involve terminal access for those locations currently holding the microcatologue (e.g. the DA library). The projected cost of Phase II is $865,700.

Phase III will include on-line access to anyone and may be implemented in 1988-89. All of the above is subject to budget constraints. Details may be obtained from me.

You are probably all aware that an important new service has been recently added to the library's "repertoire". Because of the supernova, special arrangements were made with Brian Marsden to access the IAU circulars online. This is done via a telephone link to the CFA computer. Currently we are checking for new circulars daily but the flow has decreased (unevenly) from as many as four a day to as few as two a week. This service will be provided as long as required but is not intended to be permanent.

THE HRT

by Marshall L. McCall

On February 21, 1987, there was a meeting in Vancouver on the High Resolution Telescope (HRT). To jog your memory, this is a proposal by René Racine to build a 2-meter class telescope with adaptive optics for high-spatial-resolution imaging and spectroscopy, specifically 0.5 arcsec routinely and 0.25 arcsec frequently (the latter over a one arc minute field). I attended the meeting as a representative of the University of Toronto. Although a report on the meeting appears in the latest issue of Cassiopeia, I thought that an independent assessment of the meeting from someone less closely tied to the project would be of some value.

According to John Rice of the University of Manitoba, NSERC is feeling sorry for astronomers because of the demise of the CLBI, and he believes that there is a desire to fund a big astronomical project. Based on our past experience, John Hutchings of the D.A.O. believes that the HRT is small enough in scope and unique enough in its capabilities that it may have a good chance of being funded. Bill Harris and I added that the telescope also serves to satisfy Canada's need for an intermediate-class telescope at a good site, while at the same time being exciting enough to have a hope of government funding. However, Harvey Richer does not think that the telescope is competitive with other telescopes coming in the near future, specifically the Space Telescope and giant ground-based telescopes at good sites. On the other hand, he believes that the HRT is better for Canada than only 20% of an 8-meter telescope. Concerns were expressed that the project would divert effort from improving CFHT. However, Bob MacLaren pointed out that 2 full-time equivalent people are already devoted to seeing improvements there. He does not feel that large telescopes will ever work at the high resolution envisioned for the HRT.

Canada has been ruled out as a site for the telescope. The consensus was that it should be built at a good site where Canadians already have a presence, i.e. Mauna Kea or Las Campanas. The two sites are comparable as far as seeing goes (outside of a dome). One problem with Mauna Kea is that the University of Hawaii has its own ideas about putting a high resolution telescope there, and has some say about who else puts anything there. A collaborative effort would appear to be the only option for Mauna Kea.

The biggest problems with the proposal concerned the aperture and the cost. The original plan called for a 1.5 meter telescope, based on the trade-off between aperture and resolution (bigger mirrors cover more turbulent cells, and thus are harder to compensate). However, few people were willing to invest a large sum of money in a telescope this small. René Racine is sensitive to this, and now realizes that to gain wide support the telescope aperture must be larger. At the meeting, there seemed to be a consensus that 2.5 meters would be the best choice.

At present, there is absolutely no idea about the cost of the project. René Racine suggested only that the lower limit might be $5 million and the upper limit $25 million. This is a major stumbling block, since I believe that community support will only come if the cost is not overwhelming. Of particular importance is the unwritten rule that a price tag greater than 20 to 25 million dollars requires cabinet approval (i.e. if the cost isn't lower, forget the project). It is not believed that the HRT will compete for funds with space projects. However, no source of funding is yet identified. To get money from NRC, something else would have to be given up. If the cost is very high, support from outside the astronomical community, e.g. physics, would be required.

Although the astronomers attending the Vancouver meeting were generally enthusiastic about the HRT, I must point out that opinions within the broader astronomical community are mixed. There are a number of astronomers who would simply like us to get a cheap mid-sized telescope to take some of the load off CFHT. The HR aspect of the T is seen to be of value to few astronomers, but perhaps acceptable if the cost isn't too high. Others are skeptical about what the telescope will ultimately be able to do, or don't see a factor of two gain in resolution to be anything to get excited about. Although I don't have any political experience, I do not believe that the government will fund an everyday instrument for which support will be required for time immemorial. The HR may just be the glamour required to get any funding at all for a mid-sized telescope.

PULSARS OVER PUERTO RICO

by Dale Frail

I shivered as I got off the plane. A drop of 50 C from San Juan to Toronto. My shorts and T-shirt were not in keeping with the -20 C weather and I looked out of place with my sunglasses on. "I wonder what the drop is in dB", I thought. I had been observing TOO long.

I had just returned from a one month observing run in sunny Puerto Rico at the Arecibo Observatory. It was pure coincidence that my time was allocated during the "best" part of our Canadian winter; a pleasant concidence.

The observing went well. I was down doing HI absorption/emission observations toward a number of interesting pulsars. The new pulsar observing system worked well and our data reduction software could produce results on the same day we acquired raw data.

It was a nice comfortable pace. I would wake up, have some breakfast, observe with the telescope for five hours, have some lunch, reduce the data, and work on proposals in the evening. No all-night observing for me. Just a couple of hours in the morning, fresh from a good night's sleep.

Using the Arecibo telescope was quite a change over the pampered existence I am used having at the VLA. In Socorro the closest they let you get to the telescope is writing the observe file. At Arecibo they hand you the coaxial cables and tell you to wire it up! Scared the hell out of me at first but it got to be a lot of fun. There is nothing like a signal averager to give one a feeling for the awesome power of the radiometer equation. There is a world of difference between a 0.01 K signal at 40 MHz and one at 1.25 MHz.

I went to the beach once. The minute I put my foot on the sand it started raining and it didn't stop for FIVE days! I took this as a warning from the Reinhardt travel committee and spent the rest of my trip on the observatory grounds. However, I did manage to get a nice faint green tan from the graphics terminals.

PAPERS SUBMITTED

R. Crowe and R.F. Garrison. The visible spectra of southern-hemisphere Mira variable stars. 87.3.10.

Frail, D.A., E.R. Seaquist and A.R. Taylor. Extended emission around the variable radio star LSI+61°303. 87.3.5.

Gray, R. and R.F. Garrison. The early A-type stars: refined MK classification, confrontation with Stromgren photometry, and the effects of rotation. 87.3.10.

Hogg, Helen Sawyer. Shapley's era. 87.02.20.

Lane, M.C. and John B. Lester. The atmospheric abundances of classical metallic-line A stars: the visual spectral region. 87.3.12.

Lester, John B. On the colours of Am stars. 87.02.11.

Martin, P.G. and C. Rogers. Carbon grains in the envelope of IRC+10°216. 87.03.03.

Noreau, L., P.P. Kronberg. The amorphous galaxy NGC 3448, II: continuum radio emission, the discovery of a population of starburst associated radio sources. 87.02.03.

Rucinski, S.M. UBVRI photometry of the open cluster Collinder 359, alleged to contain W UMa systems. 87.02.13.

Woosley, S.E., P.A. Pinto, P.G. Martin and Thomas A. Weaver. Supernova 1987A in the Large Magellanic Cloud: the explosion of a 20 M star which has experienced mass-loss? 87.03.06.

UNIVERSITY OF TORONTO
DAVID DUNLAP OBSERVATORY & DEPARTMENT OF ASTRONOMY

COLLOQUIA

April 1	Dr. Timothy Beers Michigan State Univ., Dept. of Physics and Astronomy	Search For Extremely Low Metallicity Stars
April 8	Dr. John Caldwell York University, Dept. of Physics & Astronomy	Infrared Aurorae on Jupiter
April 15	Dr. Alan Boss Carnegie Institution of Washington, Dept. of Terrestrial Magnetism	The Origin of the Moon
April 22	Dr. Douglas Whittet Lancashire Polytechnic, Preston, U.K.	IR Spectroscopy of Interstellar Dust
April 29	Dr. Lindsey Smith Univ. of Wollongong N.S.W., Australia	Wolf-Rayet Stars
May 6	Dr. Marshall McCall University of Toronto	The Universe After Supernova Shelton
May 13	Dr. James Pringle Cambridge University	Self-Gravitating Accretion Disks

CITA NEWS

Visitors to CITA

Kayll Lake, Queen's University January, February, April
Jim Bardeen, University of Washington - March 21-27
Alan Boss, Carnegie Institute of Washington - April 13-16
Gerry Gilmore, Institute of Astronomy - April 21-May 17
Rosie Wyse, - April 21-May 17
Peter Schneider, JILA - May 24-May 30
Joe Monaghan, Monash University - May 11-25
John Madore - May 17-30

UPCOMING CITA COLLOQUIA

Tuesday April 14: Theory of Protostellar Collapse, Alan Boss
Tuesday May 7: Archaeoastronomy Studies at Machu Picchu, Dave Dearborn

All sessions are at 2:30 pm.
1203 means the seminar is in room 1203
T-Rm means the seminar is in the Tea-Room