STAR DUST

National Capital Astronomers, Inc.

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Crocker to Show HST First Light, Early Observations; Science Fair Presentations

MR. CROCKER

Mr. James H. Crocker, Head of Operations for the Hubble Space Telescope (HST) at the Space Telescope Science Institute (STSI), will present the initial observations of the HST at the June 2 colloquium of National Capital Astronomers in the National Air and Space Museum.

The program will include presentation of the annual National Capital Astronomers High School Science Fair Awards.

With the long-awaited launching of the Hubble Space Telescope on April 24, a new era of astronomical discovery is here! It is planned to spend the first few weeks in orbit adjusting, debugging, focusing, fine-tuning, and calibrating. On first light during this process, on preliminary, rough focus, the Wide Field Planetary Camera photographed a well-resolved close double star not resolved by a matching photograph by the Las Campanas Observatory in Chile. Until the time of our colloquium, even during these early phases, we eagerly await the exciting new findings our speaker is likely to report.

James H. Crocker received the Bachelor of Electrical Engineering degree at the Georgia Institute of Technology, the M.S. in EE from the University of Alabama at Huntsville, and the M.S. in Management from Johns Hopkins University. He is responsible for the planning, scheduling and execution of all science-related mission elements on the HST. In 1979, he founded Control Com, Inc., which, after successful product introduction, he sold to a Fortune 1000 company. He designed systems for and supported the three Skylab Space Station missions. He has been recognized by Who's Who in Technology Today, the Burnup and Sims President's Award, and the NASA Skylab Achievement Award. Mr. Crocker is a member of the American Institute of Aeronautics and Astronautics, the Society of Photo-Optical Instrumentation Engineers, and the Institute of Electrical and Electronics Engineers.

JUNE CALENDAR — *The public is welcome.*

Tuesday, June 5, 12, 19, 26, 7:30 pm — Telescope-making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.

Friday, June 1, 8, 15, 22, 29, 7:30 pm — Telescope-making classes at American University, McKinley Hall Basement. Information: Jerry Schnall, 362-8872.

Saturday, June 2, 5:45 pm — Dinner with the speaker at the Smithson Restaurant, 6th and C Streets, SW, inside the Holiday Inn. Reservations unnecessary. Use the 7th Street and Maryland Avenue exit of the L'Enfant Plaza Metrorail station.

Saturday, June 2, 7:30 pm — NCA monthly colloquium in the Einstein Planetarium of the National Air and Space Museum, Seventh Street and Independence Avenue, SW. Enter Independence Avenue side. Annual NCA Science Fair Awards; Mr. Crocker will speak.

Friday, June 15, 29, July 13,27, 9:30 pm — NCA 14-inch telescope open nights with Bob Bolster, 6007 Ridgeview Drive, south of Alexandria off Franconia Road between Telegraph Road and Rose Hill Drive. Call Bob at 960-9126.

Saturday, June 16, 9:00 pm — ***Exploring the Sky,*** presented jointly by National Capital Astronomers and the National Park Service, on Glover Road south of Military Road, NW, near Rock Creek Nature Center. Planetarium if cloudy. See page 143.

For other organizations' events of interest see elsewhere in this issue.

MAY COLLOQUIUM

Dr. Maurice M. Shapiro, Chief Scientist Emeritus, U.S. Naval Research Laboratory, and Visiting Professor of Astrophysics at the University of Maryland, addressed the May 5 colloquium of National Capital Astronomers.

He discussed his recent research on red dwarf star flares as possible sources of seed particles for the cosmic radiation.

Modern theories of cosmic ray origin require, *inter alia*, a scheme for injection of "seed" particles into the interstellar medium. The intense and frequent flares on many red dwarf stars seem to be good injectors. The energy budget required for injecting the bulk of the cosmic rays is modest compared to that for acceleration. With the High-Resolution Spectrograph on the Huble Space Telescope, evidence could be sought for stellar-flare protons at MeV energies. The method involves the charge exchange of downward-moving protons. The H atoms so produced should emit an asymmetric, broadened Lyman-alpha line exhibiting the effect of recession from the observer.

The contents of Shapiro's lecture are based on his very recent research, and are thusfar unpublished.

ROSAT SPACECRAFT TO EXPLORE HIGH-ENERGY UNIVERSE

A joint program between the United States and the Federal Republic of West Germany, the ROENTGEN (X-ray) Satellite (ROSAT) will survey the sky in X-rays and map the sources in high resolution. It will then examine in detail some 1,000 of the 50,000 to 100,000 sources expected to be detected. ROSAT will be launched aboard a Delta II expendable vehicle no sooner than 31 May.

X-rays are characteristic of very high temperature processes; they can dominate the radiation from high-energy sources such as supernova remnants, quasars, and systems containing neutron stars or black holes. ROSAT will investigate the radiation mechanisms of normal stars, very hot, massive stars, very young stars, supernova remnants, and compact sources, such as white dwarfs, neutron stars, and black holes.

The Einstein Observatory satellite discovered radiating dark gases in a few galaxies. The high spatial resolution of ROSAT will allow study of the sizes and flows of dark gas sources. It is expected thus to detect and measure much dark mass ("missing mass") in the universe.

ASTRONOMICAL SOCIETY OF THE PACIFIC TO MEET IN BOSTON, FIRST TIME IN EAST

The 102nd annual meeting of the Astronomical Society of the Pacific will be held at Boston University, July 13-18, 1990, its first ever East Coast meeting. The meeting schedule includes:

* July 13-15 Symposium on Robotic Observatories.
* July 14-15 Workshop on Teaching Astronomy in Grades 3 — 12.
* July 14-15 The Universe Unfolding. (Popular level lectures)
* July 16-18 Symposium on the Formation and Evolution of Star Clusters.
* Throughout the Meeting: Exhibits of Books, Magazines, Software, Audio-visuals, Observing Aids

Request information from the Astronomical Society of the Pacific, 390 Ashton Avenue, San Francisco, CA 94112, or call the ASP at 1-415-337-1100.

U.S. NAVAL OBSERVATORY TOURS IN JUNE

The next Monday night public tours of the Naval Observatory are scheduled to begin at 20:30 EST on June 4, 11, 18, and 25.

Passes will be issued to the first 100 persons in line at the gate across from the British Embassy, at Massachusetts Avenue and the southeast side of Observatory Circle, at the end of the circular road. Some form of photoidentification will be required. Parking for the tours is not allowed on the grounds except for the handicapped; ample parking is available near the gate. Information: 653-1541.

NCA SCIENCE FAIR AWARDS PROGRAM JUNE 2

The annual National Capital Astronomers Science Fair Awards recognize superior high school science fair projects in astronomy and related sciences in the District of Columbia and the contiguous counties.

NCA is priviledged to award Junior NCA memberships, including all membership publications, for one year, to the following young scientists:

Jonathan C. Bierce 7932 Bolling Drive Alexandria, VA 22308	Thomas Jefferson High School for Science and Technology, Grade 12 "Galactic Hydrogen Distribution"
Andrea Dickens 9812 Summerday Drive Burke, VA 22015-4027	Lake Braddock High School, Grade 12 "Magnetic Interference with Solar Rotation: Proving the R number Theory"
Tommy Kormack 1315 28th Street, NW Washington, DC 20007	Maret School, Grade 8 "Predicting the Positions of Jupiter's Moons"
John Martin 7413 Cliffbourne Court Derwood, MD 20855	Magruder High School, Grade 11 "Micrometeorite Weathering of Icy Moons"
Brian Newbury 16532 Sioux Lane Gaithersburg, MD 20878	Ridgeview Intermediate School, Grade 8 "Distribution of Stellar Classes in a Spiral Galaxy"
Andrew Slutter 7407 Rebecca Drive Alexandria, VA 22307	Sandburg Intermediate School, Grade 8 "Star Rotation"
Padma Shah 3942-B Steppes Court Falls Church, VA 22041	Glascow Intermediate School, Grade 8 "Sinusoidal Sunrise"

NCA welcomes these young people to jinior membership, and thanks our judges, Keith Bell, Robert Bolster, Leith Holloway, Jay Miller, and Jerry Schnall for their services.

NASA GODDARD COLLOQUIA SCHEDULED

During the academic year, Goddard Space Flight Center at Greenbelt, Maryland, holds weekly colloquia, usually on Fridays, and biweekly seminars on alternate Tuesdays, on a wide variety of scientific subjects, frequently astronomy-related.

The following colloquia will be held at 15:30 in Building 3 Auditorium at Goddard Space Flight Center, Greenbelt, MD. Coffee and tea will be served from 15:00. Enter the main gate and obtain a visitor's pass from the guard. Call Tracy Parlate, 286-8543, for further information.

Friday, June 8 — Lindsay Lecture: "Venus: A Contrast in Evolution to the Earth," William Kaula, University of California at Los Angeles.

Monday, June 11, Building 26, Room 205 — "Origin and Dynamical Evolution of the Solar System," William Kaula, UCLA.

SUMMER PUBLIC *EXPLORING THE SKY* PROGRAM SCHEDULED

These joint National Capital Astronomers — National Park Service programs for the public are held on Saturday nights approximately monthly through the summer, on Glover Road just south of Military Road, NW, near Rock Creek Nature Center.

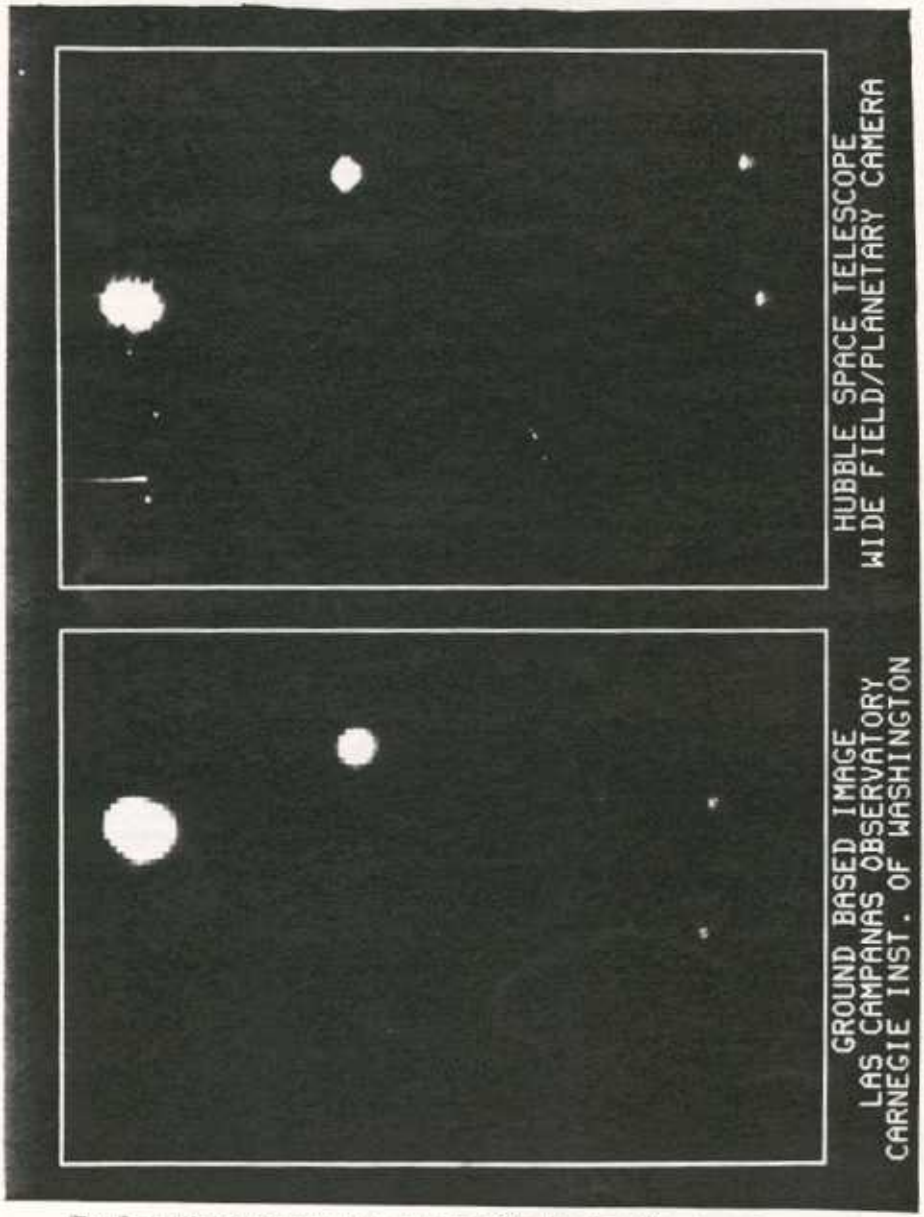
All ages are welcome; there is no charge. Make it a family night and share telescopic views of many cosmic objects. The Moon, planets, colorful multiple stars, nebulae, star clusters, and galaxies are all candidates, depending upon the weather. If it is cloudy, the Nature Center planetarium is used.

All are Saturdays:
June 16, 9:00 pm
July 14, 9:00 pm
August 11, 8:30 pm
September 23, 7:30 pm
October 13, 7:00 pm

For further information, call Dr. John Lohman: (703) 820-4194 (Arlington, VA), or NCA: (301) 320-3621 (Bethesda, MD).

HUBBLE SPACE TELES

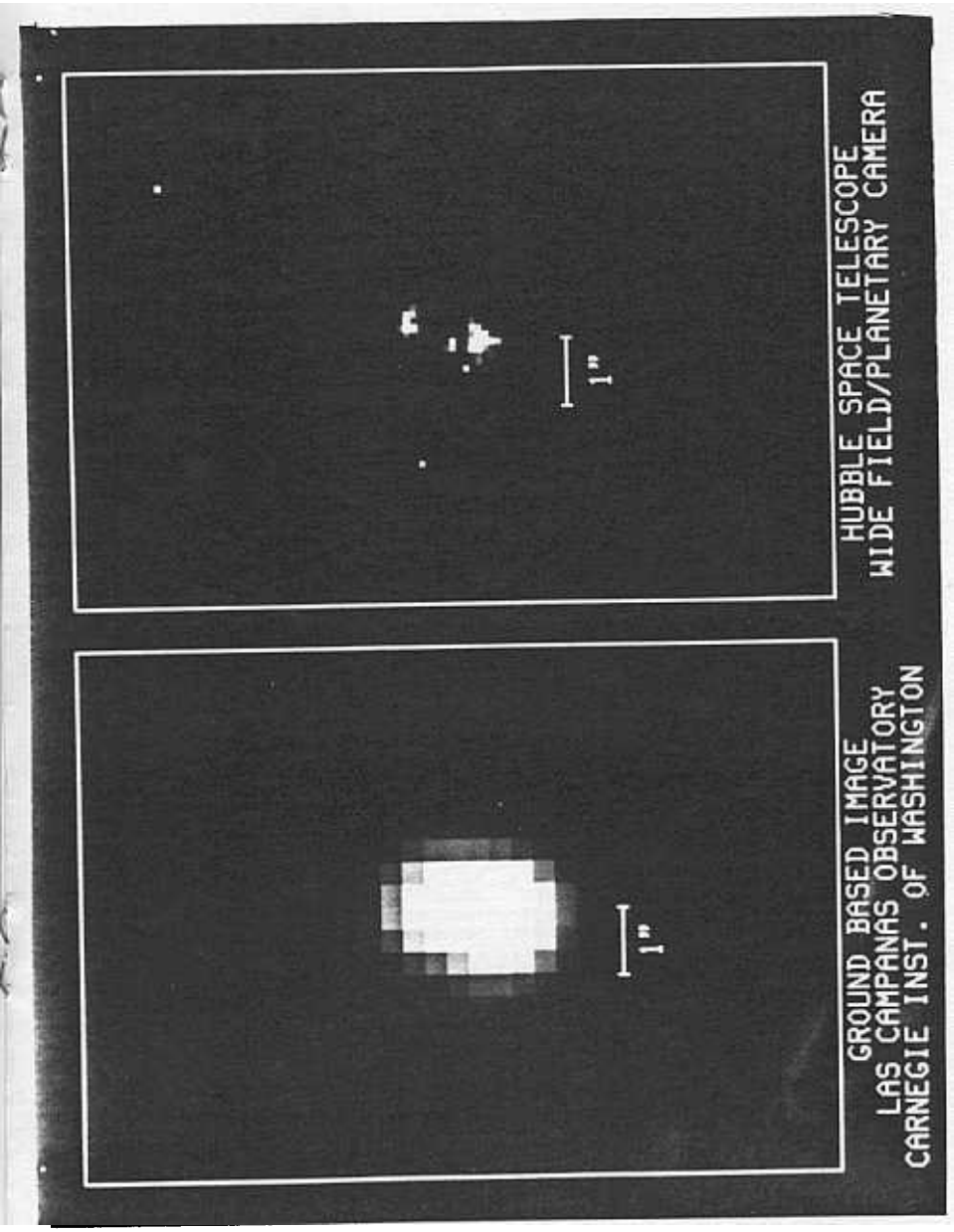
Original Exposures



The first test photograph taken by the HST Wide-Field/Planetary Camera with a preliminary focus setting resolved this double star (largest image on original exposures), shown in comparison with a similar very fine ground-based photograph by the Las Campanas, Chile, Observatory.

SCOPE – FIRST LIGHT

Enhanced



The recently enhancement-processed versions show the far superior resolution of the Space Telescope photograph. A further improvement of about 10 times is expected with final focus adjustment.

ASTRONOMY AND PERSONAL COMPUTERS

Joan B. Dunham

Crumpled Diskettes — From time to time, we mangle a diskette, or receive a bent, folded, spindled or mutilated disk. Last week, I received a 5.25-inch diskette at work that looked as though it had been clamped in a briefcase hinge. It was mangled enough so that the labels were pealing off, and the media, as well as the case, had creases. The disk would not turn in its case. Also, there was no documentation, so I had no idea what the format was, whether it was a double-density or high-density disk, or how many files were on the disk. The PC support person I gave it to slit the cover of the bad disk, and of a good disk he no longer needed, took the inside disks out of both of them, and put the disk we wanted to read inside the good cover. Then he tried different drives until he found one that would read the disk, and copied the star catalog on it to another (unslit) disk. So far as we know, everything was read from the damaged diskette. I am always astonished at how mangled a disk can be and still be read.

Photography and Computers — The Naval Observatory, on Astronomy Day a few weeks ago, was demonstrating the use of a CCD camera attached to a telescope. The results of this experiment were superb, with images of astonishing quality for an urban location. The images are collected and processed with computers. Multiple images can be combined, and the images can be enhanced to bring out detail that might otherwise be lost.

As I was watching the demonstration, it occurred to me that all of the hardware necessary to process photographic images with computers is commercially available. I would like to see a system which would take a negative or positive (slide) and process the image to a color graphics output device, such as a video disk, a display screen, or color hardcopy printer. I enjoy photography, using a darkroom, and using a computer, but I have never had a way to combine these pursuits. I have software that is supposed to help, things called "darkroom assist" and the like, but I do not want to take my computer into my darkroom. I would rather move the darkroom to the PC

What is needed is a high-resolution color imaging system to digitize the negative, and a good quality output device to produce a final product with the same quality as a photograph. A good CCD camera could do the digitization, in concert with an appropriate lens or lenses. It might be better to have the negative enlarged and scanned, perhaps using an enlarger to focus onto a scanner instead of onto photographic paper. A scanner requires moving parts, but using an enlarged image means the final result would have better resolution at a lower cost.

Once the image is in the computer, the negatives can be reversed, colors balanced, and depending on how elaborate the software is, highlights brought up or down, overexposed Jupiter toned down so as not to distract from the Galilean satellites, etc. I particularly would like being able to adjust the color balance with a computer, and see immediately the adjusted image displayed on a screen. I find color adjustment the most frustrating part of darkroom work. It would be nice to see a good color image displayed on a good color monitor, to get the image onto video, but best to have a hardcopy color print. There are good quality color printers available, although most of the graphics I have seen done with them tend to have more garish colors than are usually considered acceptable for a photograph.

A photograph has far better resolution than current computer graphics devices. A 35-mm Ektadhrome slide, according to Kodak, has the equivalent of 13.5 million pixels, and is capable of showing almost infinite varuation in colors. Today's computer graphics devices are far more limited. However, there are many times when these limits are quite acceptable. If all that is needed are black-and-white images, then the limitations of the computer-generated imnages are not so obvious.

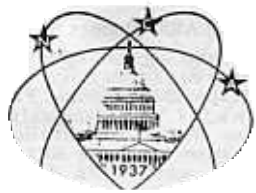
AIR AND SPACE MUSEUM OFFERS PROGRAMS IN JUNE

The following free public programs will be offered during June in the National Air and Space Museum:

Saturday, June 2, 09:30, Albert Einstein Planetarium — Monthly Sky Lecture: "Space, Time, and Gravity: The Fabric of the Universe." Jeff Goldstein, an astrophysicist of the Museum Staff, will present a view of general relativity.

Wednesday, June 6, 19:30, Samuel P. Langley Theater — "A Portrait of the Planets," Dr. Ed Stone, Voyager project scientist, NASA Jet Propulsion Laboratory. Dr. Stone will unveil a Voyager image of the solar system as it has never before been seen. He will recap the Voyager 1 and 2 missions and discuss the uses of the data.

Thursday, June 21, 19:30, Albert Einstein Planetarium — Exploring Space Lecture Series: "The Center of the Galaxy." Dr. K.Y. Lo, professor of astronomy at the University of Illinois at Urbana-Champaign, will discuss the possible existance of a massive black hole at the center of the Milky Way Galaxy.



National Capital Astronomers, Inc.

is a non-profit, public-service corporation for advancement of the astronomical sciences. NCA is the astronomy affiliate of the Washington Academy of Sciences. For information, call NCA: (301) 320-3621.

SERVICES AND ACTIVITIES

A Forum for dissemination of the status and results of current work by scientists at the horizons of their fields is provided through the monthly NCA colloquia held at the National Air and Space Museum of the Smithsonian Institution. All interested persons are welcome; there is no charge.

Expeditions frequently go to many parts of the world to acquire observational data from occultations and eclipses which contribute significantly to refinement of orbital parameters, the coordinate system, navigation tables, and timekeeping. Other results of this work under continuing study include the discovery of apparent satellites of some asteroids, discovery of apparent small variations in the solar radius, and profiles of asteroids.

Discussion Groups provide opportunities for participants to exchange information, ideas, and questions on preselected topics, moderated by a member or guest expert.

Publications received by members include *Sky & Telescope* magazine and the NCA newsletter, *Star Dust*.

The NCA Public Information Service answers many astronomy-related questions, provides predictions of the paths and times of eclipses and occultations, schedules of expeditions and resulting data, assistance in developing programs, and locating references.

The Telescope Selection, Use, and Care Seminar, held annually in November, offers the public guidance for those contemplating the acquisition of a first telescope, and dispells the many common misconceptions which often lead to disappointment.

Working Groups support areas such as computer science and software, photographic materials and techniques, instrumentation, and others.

Telescope-Making Classes teach the student to grind and polish, by hand, the precise optical surface that becomes the heart of a fine astronomical telescope.

NCA Travel offers occasional tours, local and world-wide, to observatories, laboratories, and other points of interest. NCA sponsored tours for comet Halley to many parts of the southern hemisphere.

Discounts are available to members on many publications and other astronomical items.

Public programs are offered jointly with the National Park Service, the Smithsonian Institution, the U. S. Naval Observatory, and others.

PLEASE ENROLL ME IN NATIONAL CAPITAL ASTRONOMERS MEMBERSHIP

[ ] Regular ($32 per year) Each regular member receives *Sky & Telescope* and *Star Dust*.

[ ] Junior (Only open to those under age 18.) Date of birth_____

Junior members pay a reduced rate and may elect not to receive *Sky & Telescope*.

[ ] *Sky & Telescope* and *Star Dust* ($25 per year)

[ ] *Star Dust* only ($10 per year)

_____ ( ) -

First name or initial | Middle or initial | Last | Telephone

Street or box | Apartment | City | State | Zip

If family membership, list names of additional participating immediate family members in same household, with birthdates of all those under 18 years old:

NOTE: If you already subscribe to *Sky & Telescope*, please attach a recent mailing label, or indicate expiration date: _____. An adjustment will be made. Make check payable to National Capital Astronomers, Inc., and send with this form to: Nancy Byrd, Secretary, 4215 Holborn Avenue, Annandale, VA 22003.

The following information is optional. If you would like to participate actively in NCA affairs, please indicate briefly any special interest, skills, vocation, education, experience, or other qualifications which you might contribute. Thank you, and welcome!

EXCERPTS FROM THE IAU CIRCULARS

Robert N. Bolster

1. April 21 - A team of researchers from Johns Hopkins University obtained ultraviolet spectra of comet Austin by means of a sounding rocket launched from White Sands Missile Range. The detection of CO and ionized O, C, and S was reported, and the CO abundance was found to be about 2% that of water.

2. May 7 - Infrared spectroscopy and photometry data obtained by Space Sciences Laboratory and Jet Propulsion aboratory researchers with the NASA Infrared Telescope Facility showed no silicate emission from comet Austin.

3. May - An international team from Palermo, Manchester, and Macquaire Universities; Carnegie Institution of Washington; CSIRO; and the NRAO Very Large Array reported the detection of a 23-ms pulsar in globular cluster NGC 6539. It appeared to be in a binary system with a period of 2.62 days.

4. May - California Institute of Technology and Arecibo Observatory astronomers reported the detection of a 3.6-ms binary pulsar in globular cluster NGC 6760.

FREE TO A GOOD HOME

Three-inch Newtonian Telescope, wooden tripod, no eyepieces (takes standard 1.25-inch). Free to someone who will put it to good use. John Godby (703) 799-4492.

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