★ STAR DUST

Volume XXXV November 1978 Number 3

WOOD TO REPORT LARGE-AREA X-RAY SKY SURVEY RESULTS

DR. WOOD

The November 4 meeting of National Capital Astronomers will hear Dr. Kent S. Wood of the U. S. Naval Research Laboratory, who will describe the X-ray sky survey being conducted with the HEAO-1 satellite, launched in 1977. This satellite carries four experiments, the largest of these being an array of proportional counters built by NRL.

The high sensitivity achieved with large collecting area makes possible the detection of many new sources. One main objective is the generation of a new all-sky catalog which should roughly double the number of known sources. New sources found thus far include clusters of galaxies (some of them more distant than any previously seen in X-rays), BL Lacertae objects, supernova remnants, and others for which no optical identification is yet established. An X-ray source associated with the clusters Abell 401 and 399 has been positioned to high accuracy, partly by means of a lunar occultation observed from orbit. The centroid of the X-ray emission lies between the clusters. Detection of BL Lac objects in X-rays resolves some dilemmas concerning their distances. X-ray variability is detectable in the brighter BL Lac objects.

In our own galaxy the large area is used with microsecond timing resolution to study rapid source variability. Pulse-to-pulse variations are seen in Her X-1. A new black-hole candidate, GX339-4, has been found. The very rapid rise of X-ray bursts has been resolved for the first time. Other observations which are still in progress will be described.

Kent S. Wood was born in St. Louis, Missouri. He received his B. S. from Stanford University in 1967 and his Ph. D. from MIT in 1972. Dr. Wood began his career at NRL as a National Academy of Sciences-National Research Council Fellow and is now a permanent employee of NRL. For the last three years he has devoted full time to HEAO-1, preparing the experiment and managing data reduction for the A-1 experiment. He is presently Chairman of the HEAO-1 Time Line Committee, which plans the scientific observing program of the satellite.

NOVEMBER CALENDAR — *The public is welcome.*

Friday, November 3, 10, 17, 24, 7:30 PM — Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnall, 362-8872.

Saturday, November 4, 6:15 PM — Dinner with the speaker at the Thai Room II, 527 13th Street, NW, between E and F Streets. Reservations unnecessary.

Saturday, November 4, 8:15 PM — NCA monthly meeting at the Department of Commerce Auditorium, 14th and E Streets, NW. Dr. Kent S. Wood speaks.

Monday, November 6, 13, 20, 27, 7:30 PM — Telescope-making classes at the Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.

SPACE SHUTTLE STATUS

NASA has targeted September 28, 1979 for the first manned orbital flight of the Space Shuttle.

Production and installation of the thermal tile for Orbiter 102 have been accelerated.

Of 13 test firings of two engines in September and October, ten reached full rated power, three were aborted. The first firing of engine 0006 was stopped because of out-of-sequence oxidizer priming, two because of instrumentation problems.

An extensive hardware inspection of engine 0005 was described as "very satisfactory."

Through October 11, 350 engine test firings totaled 26, 530 seconds, 8, 960 at full rated power.

Full-duration testing of the complete main propulsion system, a cluster of three engines, is scheduled for early 1979.

Early data from the third static test firing of a solid booster indicates successful firing and satisfactory nozzle gimbaling.

All elements of a Space Shuttle have been mated for the first time — two solid boosters, external tank, and Orbiter 101 — for vibration testing.

NASA SELECTS EXPERIMENTS FOR GAMMA-RAY OBSERVATORY

NASA tentatively has selected five experiments for its proposed orbiting Gamma-Ray Observatory (GRO), planned for launch in 1984. The instrumentation will detect very high energy gamma rays, nuclear gamma rays, and gamma-ray bursts.

While GRO has not yet been approved by Congress, advance planning is necessary for mission definition and a prompt start upon approval.

Heretofore, most astronomy has observed the emissions of atomic and molecular processes. Because of their nuclear origin, gamma rays will provide a powerful probe into the nuclear processes of the universe.

Satellites OSO, SAS-2, COS-B, and HEAO-1 have provided basic data which the GRO experiments will exploit.

A broad-line gamma-ray spectrometer will perform detailed spectral and temporal studies of intermediate-energy gamma-ray sources, including gamma bursts, solar flares, and broad-line sources.

A narrow-line gamma-ray spectrometer will measure gamma-ray line intensities, continuum spectra and their time-varying objects, and the diffuse galactic and extragalactic emission.

The high-energy gamma-ray detector will search for discrete gamma-ray sources and measure their intensities, spectra, positions, and time variability, obtain better positions for known sources, and study the spectrum and structure of the high-energy galactic emission and the isotropic diffuse background.

The medium-energy double Compton telescope will study the spectra and time variability of medium-energy point sources, investigate the diffuse galactic and isotropic diffuse flux in this energy range, and search for broadened line emission from both point and diffuse sources.

A transient-gamma-ray monitor will measure the frequency versus size distribution of gamma-ray bursts, provide single-station burst locations to within several degrees, provide precise timing of stronger bursts to obtain arc-second positions in conjunction with other satellites, measure variations in intensity and spectrum of bursts and other transient events with temporal resolution of 0.1 millisecond, and continuously monitor the stronger X-ray and gamma-ray sources for transient phenomena.

NCA SPEAKER'S DINNER MOVED TO THAI ROOM II

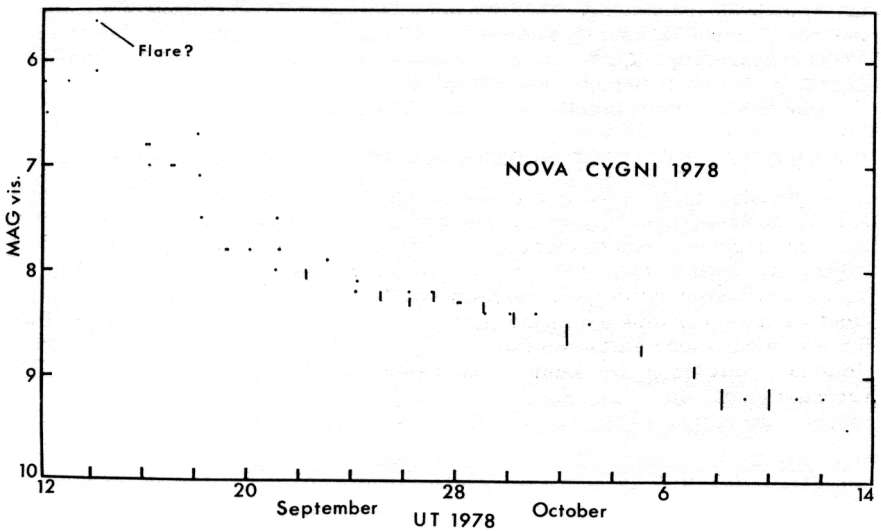
Note that the dinner for the speaker will be at the Thai Room II, 527 13th Street, NW, between E and F

NOVA CYGNI 1978 OBSERVATIONS REPORTED; IN SAME FIELD AS SS CYG

Nova Cygni 1978, discovered September 10 by Morrison and Collins and reported in IAU Circulars (October *Star Dust*), has been under surveillance by Walter Nissen, Daniel Costanzo, and George Kelly. Nissen reports short-term variability with an irregular period of 0.3 to 2 minutes. He reports frequent variations of 0.1 to 0.2 magnitude, each such observation indicated by a short vertical datum on the accompanying plot. Costanzo noted some difficulty in fixing magnitudes relative to comparison stars, indicative of short-term variation. Kelly reported a possible flare, indicated on the plot. This plot combines the data of Costanzo, Kelly, and Nissen, unweighted for differences in observers, instrumentation, locations, and conditions.

Morrison and Collins are members of the American Association of Variable Star Observers (AAVSO). Collins' discovery was made during his systematic AAVSO Nova Search.

Nova Cygni 1978 is within 2 degrees of SS Cyg, a recurrent 50-day dwarf nova, magnitudes 8 to 12, thus visible in the same field. Earlier this year, Costanzo participated with a group of AAVSO volunteers in an intensive, two-month observation of SS Cyg to alert the operators of three satellites, HEAO-1, IUE, and Ariel-V, making possible simultaneous observation over a broad spectrum, and directly resulting in the discovery of X-ray oscillations in SS Cyg.



GRAZING OCCULTATION EXPEDITIONS PLANNED

Dr. David Dunham is organizing observers for the following grazing lunar occultations in November. For further information, call Dave at 585-0989.

UT Date	UT Time	Place	Vis Mag	Pcnt Sunlit	Cusp Angle	Min Aper
11-05-78	22:55	Largo, MD	9.3	30	2S	20 cm
11-05-78	22:56	Frederick, MD	9.1	30	2S	13 cm
11-06-78	01:07	Croom, MD	9.0	31	4S	13 cm
11-07-78	02:09	Largo, MD	7.0	43	4S	5 cm
11-08-78	04:28	Spotsylvania, VA	6.8	55	2S	10 cm
11-17-78	03:27	Utica, MD	5.3	94	17N	5 cm
11-21-78	06:34	Ladysmith, VA	7.0	64	7N	5 cm
11-26-78	10:05	Princeton, NJ	7.1	17	1S	20 cm

EXCERPTS FROM THE IAU CIRCULARS

1. September — Griffiths and Briel, HEAO-A3 Group, have identified a 14th-magnitude object as the probable optical counterpart of the new X-ray source H 2155-304. Wade, Szodky, and Cordova, Cal. Tech., found the optical spectrum to be featureless.

2. September — Patterson, McDonald Observatory, detected a regular variation of 2 percent with a period of 63.633 seconds in the brightness of V533 Herculis, which was a nova in 1963.

3. October 1 — D. A. J. Seargent, The Entrance, New South Wales, discovered a 5th-magnitude (1978m) in Centaurus.

4. October 8 — Holt, Kaluzienski, Mushotzky, Boldt, and Serlemitsos, Goddard Space Flight Center, observed an X-ray outburst at the position of the source 4U 1630-47 with the Ariel V all-sky monitor. A similar level of activity was detected in September with the HEAO-A2 experiment. This series of outbursts, first detected in November 1977, is the longest observed X-ray flaring episode of a transient source.

This listing courtesy R. N. Bolster.

AAVSO ALERT NOTICE 24

Dr. Edward Ney has observed infrared emission from Nova Cyg 1978, and the emission is increasing. This indicates the formation of a dust shell around the nova, which is usually followed by a significant decrease in visible light. This is expected in N Cyg 78. Observations are urged. Epoch 1950 coordinates of N Cyg are: ra 1h40m38s, dec 43°48'10".

For further information, call Daniel Costanzo, (703) 841-0051 (Arlington).

TOTAL OCCULTATION OF ALDEBARAN BY FULL MOON IN NOVEMBER

A locally visible total occultation of the bright star Aldebaran (magnitude 1.1) by the 98-percent full, waning Moon will occur Wednesday night, November 15. The brightness and orange color of the star may permit naked-eye observation; any optical aid, such as binoculars, will help. For accurate timing, high magnification (with good tracking) will both increase contrast and help put most of the lunar disk out of the field, and will probably be necessary. Find the star a half-hour early and follow it in. Because the cusp angles are indefinite near full Moon, Dr. Dunham has calculated the selenographic latitude of reappearance: -40°. Disappearance will occur about UT 11-16-78, 03:34, reappearance, 11-16-78, 04:36. (EST 11-15-78, 22:34; 23:36).

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* STAR DUST WASHINGTON, D. C.

Published eleven times yearly for NATIONAL CAPITAL ASTRONOMERS, INCORPORATED, a non-profit, public-service organization promoting interest and education in astronomy and related sciences. President, James H. Trexler. *Star Dust*: Robert H. McCracken, 5120 Newport Avenue, Washington, DC 20016. Deadline: 15th of preceding month.