



DUNHAM TO DISCUSS MAY 30 ECLIPSE RESULTS



DR. DUNHAM

Dr. David W. Dunham, President of the International Occultation Timing Association (IOTA), will address the November meeting of National Capital Astronomers on small changes in the radius of the Sun derived from solar eclipse observations.

In 1979, astronomers at Harvard University startled the scientific community with the news that the Sun was shrinking, based on their analysis of two centuries of meridian-circle observations of the Sun.

The Dunhams analyzed their timings, and those of others who observed just inside the 1979 February 26 eclipse, to determine the solar diameter, and compared this with a similar analysis of eclipses observed in 1915 and 1925.

Although the large shrinkage of the Sun was disproved, small variations of the radius were found, which puzzled solar physicists. The Dunhams will describe the methods of analysis and results from recent eclipses. The May 30 eclipse provided an unusual opportunity to record Bailey's beads with a variety of methods to determine which techniques are best for measuring the Sun.

The Dunhams' video recording of the eclipse as well as some observations by IOTA and NCA members will be shown. Dr. Joan Dunham collaborates.

David W. Dunham received his B.A. in astronomy from the University of California, Berkeley, in 1964, and his Ph.D. in celestial mechanics from Yale in 1971. He joined Computer Science Corporation in 1976, where he is involved in dynamic analyses of space missions. Since 1964 he has worked closely with the U. S. Naval Observatory on occultations, and leads the National Capital Astronomers' occultation and eclipse expeditions. Dr. Dunham is a member of the American Astronomical Society, the International Astronomical Union, the American Institute of Aeronautics and Astronautics, and National Capital Astronomers.

Joan Bixby Dunham received her B.S. from the University of Michigan in 1966, and her Ph.D. in Aerospace Engineering from the University of Texas in 1977. From 1966 to 1970 she was an astronomer at the U.S. Naval Observatory. Dr. Joan Dunham is a member of the American Astronomical Society, the American Institute of Aeronautics and Astronautics, a past Vice President and present Secretary Of National Capital Astronomers.

NOVEMBER CALENDAR — *The public is welcome.*

Friday, November 2, 9, 16, 23, 30, 7:30 pm — Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnall, 362-8872.

Friday, November 2, 9, 16, 23, 30, 8:00 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.

Calendar continued on page 10

CALENDAR — Continued

- Saturday, November 3, 6:00 pm — Dinner with the speaker at the Ding-How Restaurant, 1221 E Street, NW. Reservations unnecessary.
- Saturday, November 3, 8:15 pm — NCA monthly meeting at the Department of Commerce Auditorium, 14th and E Streets, NW. Dr. Dunham speaks.
- Tuesday, 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.
- Saturday, November 17, 8:00 pm — Public seminar: *How to Select, Use, and Care for a Telescope.* Department of Commerce Auditorium, 14th and E Streets, NW. This is a free public service of NCA. See page 11.

OCTOBER LECTURE

The October meeting of National Capital Astronomers heard Dr. Joseph F. Dolan of NASA's Goddard Space Flight Center describe the Hubble Space Telescope (HST), its High-Speed Photometer (HSP) on which he is Co-investigator, and a planned HSP program to study images of quasars which are behind gravitational lenses.

The HST is a 92-inch Cassegrain instrument with six observing systems grouped to share its images. It is to be launched from the Shuttle in 1986 or 1987.

In orbit, free of atmospheric distortions, the HST is expected to produce diffraction-limited images of about 0.07-second diameter for point sources. This high performance requires the mirror to be figured to an unprecedented accuracy of 1/80 wavelength, which has been accomplished successfully. The excellent image has advantages beyond simple object resolution. For example, the area scanned can be much smaller than with a ground-based telescope, so that background glow is much lessened. This should permit detection of stars to about 28th magnitude. The HST should thus reach about 350 times the volume of the universe accessible from the ground. Ultraviolet radiation, also inaccessible from the ground, will also be observed.

Dr. Dolan's telephone-booth-sized HSP works in the visible and ultraviolet spectral regions. Because it will be free of atmospheric scintillation noise, which peaks around 30 Hz, very fast intensity variations can be monitored. The principal class of targets planned for the HSP is known ultraviolet sources.

Dolan highlighted a very different class of problem: studying quasars whose images are modified by intervening gravitational lenses. These are galaxies or clusters of galaxies whose mass bends space and thus the path followed by light. The resulting images are both magnified and intensified. Multiple images appear, the number and arrangement depending upon the nature of the intervening lens. Point masses produce simple double images; extended masses produce more complex patterns of images. This study does not utilize the high response speed of the HSP.

As the light paths are curved, they also differ in length unless the lens is precisely centered on the quasar. It can be shown that as a result, the quasar's distance can be measured independently of the assumed value of the Hubble constant. Thus, the Hubble constant can be measured independently of an object's distance.

Quasars often vary in brightness with time, typically over about a month. Path lengths of the different images vary by around 5 light years. Therefore, images' intensities are to be remeasured after a time of say, 5 years, with a window of perhaps a few weeks. As the angles of bending are small, the time delays bear a linear relation to the distance differences. The analysis is much complicated by the mass distribution of the lens, but this also permits (complicated) analysis of the lensing object itself.

Time resolution of the HSP is 16 microseconds over a useful spatial area. It has no moving parts, and can image about a hundred filter/aperture pairs on its detectors. These include a photomultiplier tube as well as imaging detec-

OCCULTATION EXPEDITIONS PLANNED

Dr. David Dunham is organizing observers for a variety of occultations occurring in November, including grazing lunar, planetary, asteroidal, and one by Halley's Comet. For further information, call him at 585-0989.

Grazing Lunar:

UT		Place	Vis	Pcnt	Cusp	Min
Date	Time		Mag	Sunlit	Angle	Aper
11-10-84	15:08	Clarksburg, MD	6.0	95	12N	8 cm
11-16-84	02:24	Los Angeles, CA	3.6	47	5S	3 cm
11-16-84	21:57	Stonecrest, MD	8.5	38	.4N	12 cm
11-17-84	23:53	Thornburg, VA	8.7	26	6S	15 cm
11-26-84	13:51	Suffolk & Norfolk, VA	8.0	19	13S	8 cm

Planetary:	Star Mag	Delta Mag	Name	
11-18-84 15:35	Vancouver I., BC 2.8	0	Venus	12 cm

Asteroidal:

11-12-84 18:43	Florida & Mex.	10.3	0.1	(1) Ceres	25 cm
11-23-84 23:27	Mexico	11.1	1	(751) Faina	15 cm
11-27-84 21:15	Mid Atl. States	9.0	2	(747) Winchester	5 cm

Cometary:

11-22-84 21.03	Florida	12.9	8	Comet Halley	30 cm
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NCA WELCOMES NEW MEMBERS

Charles Baker
11904 Whistler Court
Rockville, MD 20854

Stewart Young
6176 Edsall Road #75
Alexandria, VA 22304

John A. Kunkel
13002 New Parkland Drive
Herndon, VA 22071

ANNUAL PUBLIC TELESCOPE-SELECTION SEMINAR NOVEMBER 17

Free guidance for the layman in the selection, use, and maintenance of a first telescope will be offered to the public on Saturday, November 17, at 8:00 pm at the U.S. Department of Commerce Auditorium, 14th Street and Constitution Avenue, NW.

Experts will dispell the many myths and misconceptions that often lead to disappointment when telescopes or binoculars are purchased naively, and will offer simple, concrete information that will enable the beginner to purchase with confidence.

An open question-and-answer period will follow; afterward, actual hands-on experience with telescopes of several representative types will be offered.

For those who would like to grind and polish the glass for a fine telescope, our telescope-making classes will be described.

NCA thanks John Redlich, Redlich Optical Company, Arlington, Virginia, and Martin Cohen, Company Seven, Laurel, Maryland, for providing telescopes for the seminar.

tors. Among its tasks is the establishment of faint brightness-standard objects.

Other HST instruments are the Wide-Field Planetary Camera, which covers a 2.7-minute-square field, the Faint-Object Spectrograph, the High-Resolution Spectrograph, and the Fine-Guidance Optical Control Sensors. The latter have a principal task of pointing the telescope, but they are also intended to make highly accurate astrometric measurements.

The HST is designed to fit into the Space Shuttle's bay, and to be launched into a 500-mile-high orbit. Its instruments can be replaced or repaired from the Shuttle, and the whole spacecraft can be returned to Earth if desired.

John B. Lohman

EXCERPTS FROM THE IAU CIRCULARS

1. September. — R.S. Harrington and C.C. Dahn, U.S. Naval Observatory, reported that the red dwarf star G208-44 in Cygnus has an unseen companion with a mass a few percent that of the Sun and a period of more than 2 decades. This discovery resulted from an analysis of plates taken over the past 12 years with the 1.55-m astrometric reflector.

2. September 18 — Rolf Meier, Ottawa, Canada, discovered a comet (1984 o) of 12th magnitude on the border between Serpens Caput and Bootes, using a 40-cm reflector.

3. September 25 — W. Liller, Vina del Mar, Chile, discovered a nova of 11th magnitude 80" south of SAO 185906 in Sagittarius.

4. September 27 — C.S. and E.M. Shoemaker discovered a comet (1984 q) of 13th magnitude in Pegasus with the 46-cm Schmidt at Palomar. The orbital elements by Marsden indicate that it has a period of 7.7 years. Robert N. Bolster

NATIONAL AIR AND SPACE MUSEUM OFFERS FREE PROGRAM

On Saturday morning, November 3, at 9:00 am, NASM Guggenheim Fellow and NCA member Joseph Tatarewicz will lecture on the Hubble Space Telescope in the Albert Einstein Planetarium of the Museum. He will discuss the HST's background, potential, and operation, and how its program will contribute to modern astronomy.

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★ S T A R D U S T

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