



Connerney to Discuss Magnetospheres of Outer Planets



DR. CONNERNEY

Dr. John E.P. Connerney, NASA Goddard Space Flight Center, will discuss the magnetic fields of the outer planets, with emphasis on the planet Uranus, in the May National Capital Astronomers lecture.

The Pioneer and Voyager space vehicles have brought dozens of scientific investigations to the giant planets Jupiter and Saturn. In January 1986 the Voyager-2 spacecraft encountered the planet Uranus, third of four scheduled encounters along its path through the solar system. The planetary magnetic fields encountered in sequence (Jupiter, Saturn, Uranus, and in 1989, Neptune) have been increasingly surprising: Jupiter's magnetodisk geometry, Saturn's perfectly axisymmetric magnetic field, and the unusual complexity of the magnetic field of Uranus (not to mention its existence!)

Dr. John E.P. Connerney studied applied and engineering physics at Cornell University, working on a thesis in Geophysics. In 1979 he began work at Nasa's Goddard Space Flight Center as a post-doctoral research associate, joining the permanent staff the following year. He is a coinvestigator on the Voyage 1 and 2 magnetic-field investigations, the U.S.-Italian Tethered Satellite, and the recently selected Mars Observer mission. He is author or coauthor of approximately 30 scientific articles, most involving Voyager-related investigations of the outer planets.

MAY CALENDAR — The public is welcome.

- Friday, May 2, 9, 16, 23, 30, 7:30 pm — Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnall, 362-8872.
- Saturday, May 3, 6:00 pm — Dinner with the speaker at the Ding How Restaurant, 1221 E Street, NW. Reservations unnecessary.
- Saturday, May 3, 8:15 pm — NCA monthly lecture at the U.S. Department of Commerce Auditorium, 14th Street and Constitution Avenue, NW. Dr. Connerney will speak.
- Sunday, May 4, 11, 9:30 pm — Special C-14 telescope sessions for Comet Halley with Bob Bolster, 6007 Ridgeview Drive, south of Alexandria off Franconia Road between Telegraph Road and Rose Hill Drive. Call Bob at 960-9126.
- Monday, May 5, 12, 9:30 pm — More special Comet Halley sessions with the C-14 telescope. Call Bob Bolster at 960-9126
- Tuesday, May 6, 13, 20, 27, 7:30 pm — Telescope-making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.
- Saturday, May 10, 9:00 pm — *Exploring the Sky*, presented jointly by NCA and the National Park Service. Glover Road south of Military Road, NW, near Rock Creek Nature Center. Planetarium if cloudy. Information: John B. Lohman, 820-4194.
- Friday, May 16, 30, 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, May 17, 8:00 pm — Discussion group. Department of Commerce Conference Room 1415. See page 35.

APRIL LECTURE

Dr. Rudolph A. Hanel, Principal Investigator for infrared systems experiments on the Voyager spacecraft and a senior scientist at the Laboratory for Extraterrestrial Physics at the NASA Goddard Space Flight Center, presented results from the recent Voyager-2 encounter with Uranus, at the April lecture of National Capital Astronomers.

Dr. Hanel presented an overview of the data returned by Voyager, including some improved photography of the striking features on the surface of Miranda. The close approach to Miranda was fortuitous, being necessary to redirect Voyager on toward Neptune. Much of his presentation, however, concentrated on the results from the infrared radiometer and interferometer spectrometer.

This infrared instrument, along with the other optical sensors, is mounted on the scan platform, which malfunctioned near the end of the Saturn encounter. The slow-scan mode appeared to be functional, so the Uranus was planned to avoid use of the fast-scan system. The infrared radiation was collected by a 50-cm Cassegrain telescope. The visible and near-infrared passed through a dichroic mirror to the radiometer, while the longer wavelengths (4 to 50 micrometers) were reflected to the interferometer for spectral analysis. This long-wave radiation is primarily from emission rather than reflected sunlight. The infrared optics had suffered some misalignment during their long journey, but this affected only the short wavelengths which were expected to be weak at Uranus anyway because of its lower temperature. At 20 micrometers, Uranus was expected to be 2 to 3 orders of magnitude fainter than Jupiter. Because of the poorer signal-to-noise ratio it was necessary to average several spectra to get good data.

The spectral characteristics of an atmosphere are determined by its temperature profile, but are also affected by the presence of clouds and by composition variables such as the helium and methane concentrations and the ortho-para hydrogen ratio. With the aid of independent temperature data from the radio occultation experiment, it was possible to construct an atmospheric model which indicated a helium concentration of 15 volume percent. This is similar to that found for Jupiter and more than that of Saturn, where the atmosphere may be depleted by the condensation of helium.

Temperature-versus-pressure profiles for various latitudes on Uranus were constructed which surprisingly indicated that the temperatures were nearly the same at both poles and the equator, despite the present orientation of the planet with its south pole facing the Sun and the north continuously dark. Slight declines in temperature were found at middle latitudes. These colder regions apparently were not due to high clouds, as the radiometer showed no increased reflectance. Atmospheric models had predicted that both poles would have the same temperature due to the considerable thermal inertia, but had predicted 5 to 7 degrees lower temperature at the equator which receives less energy from the Sun than the poles due to the high inclination of the planet's axis of rotation. This indicates that atmospheric dynamics are playing a role in determining the temperature, in addition to radiative gains and losses.

Many people were disappointed by the lack of visible detail in the atmosphere, compared to that of Jupiter and Saturn. Dr. Hanel indicated that this is probably due to the greater depth of the cloud layers, and of haze in the atmosphere, perhaps composed of hydrocarbons.

The ring system was too faint to be observed in the infrared, but some temperature data were obtained from the satellites. Miranda was found to be 84 K at its subsolar point.

Dr. Hanel is looking forward confidently to receiving data from Neptune, despite the darker and colder conditions Voyager will find as it passes this last outpost of the solar system.

Robert N. Colster

OCCULTATION EXPEDITIONS PLANNED

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

UT	Place	Vis Mag	Pent Sunlit	Cusp Angle	Min Aper
Date	Time				
Grazing Lunar:					
05-19-86	03:30	Columbia, MD,	8.2	72	14N 15 cm
05-24-86	08:38	Gateway Interchange, PA	1.2	100	37S 5 cm
Asteroidal:					
		Star Mag	Delta Mag	Name	
05-12-86	09:34	Norfolk, VA	9.1	2.4	(393) Lampetia 8 cm

NOMINATIONS

The nominating committee offers the following candidates for fiscal 1987 NCA officers:

President, Stanley G. Cawelti	Secretary, Pat Trueblood
Vice President, Jay H. Miller	Treasurer, Ruth S. Freitag
Trustee, Richard J. Byrd	Sergeant at Arms, Terrence Losonsky

Other nominations may be made by petition of ten regular members in good standing, presented to the Secretary prior to the May election.

NCA WELCOMES NEW MEMBERS

Robert J. Bruening 5109 White Flint Drive Kensington, MD 20895	I. Stephen Jaworinsky and Family 10088 Shaker Drive Columbia, MD 21045
Mark and Lois Cowles 6801 Yellow Sheave Court Frederick, MD 21701	K. G. Roessler and W. P. Miller 3330 Lowell Lane Ijamsville, MD 21754
David R. Curfman, M.D., 6074-W 4201 Massachusetts Avenue, NW Washington, DC 20016	James H. Talens 5916 15th Street Arlington, VA 22205
Robert C. Hambleton 4216 Pineridge Drive Annandale, Va 22003	

DISCUSSION GROUP ON PLANETARY MAGNETIC FIELDS

Following up on the monthly NCA colloquium topic, the May 17 discussion group will examine various interesting aspects of the magnetic fields of the planets. Dr. Connerney's May 3 talk and related reading will provide background. To derive the greatest benefit from the discussion, do some homework and come prepared to contribute.

The purpose of the NCA discussion groups is to provide an opportunity for members (and guests) to exchange ideas, ask questions, offer answers, and learn, at any level.

AIR AND SPACE MUSEUM OFFERS TALKS, SAFE SOLAR VIEWING

On Saturday, May 3, at 9:30 am, in the Briefing Room of the Air and Space Museum (The planetarium will be closed temporarily.) Ellen Sprouls, of the Museum Staff, will discuss the proposition that the Sun may be a member of a double-star system. Although not taken seriously, some of the implications of the notion will be considered.

Following the talk, weather permitting, safe telescopic solar viewing in hydrogen alpha will be offered on the east deck.

On Wednesday, May 28, at 7:30 pm, in the Einstein Planetarium, David D. Morrison, Institute for Astronomy, University of Hawaii, will discuss the smaller bodies of the solar system discovered and examined by spacecraft.

EXCERPTS FROM THE IAU CIRCULARS

1. March 4 -- C. and E. Shoemaker discovered a comet of 16th magnitude in Coma Berenices with the 46-cm Palomar Schmidt. The parabolic elements by Marsden indicate that 1986b reached perihelion on March 12 at 3.607 au from the Sun.

2. March 15 -- M. Hartley discovered a comet of 17th magnitude in Crater. The orbital elements by Marsden indicate that 1986c has a period of 6.21 years and a perihelion distance of .961 au. It was at perihelion in 1985 June, and may have made a close approach to Jupiter in 1982.

3. March 20 -- Pederson and Vio, European Southern Observatory, observed a concentration of CO⁺ emission 4 min in diameter, 1.92 from the nucleus of Comet Halley, using a wide-field CCD camera. Robser N. Bolster

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