★ STAR DUST

Volume XLII | January 1986 | Number 5

VON ROSENVINGE TO DETAIL NEW ICE-GZ RESULTS

DR. VON ROSENVINGE

Dr. Tycho T. von Rosenvinge, Project Scientist for the International Cometary Explorer (ICE), NASA Goddard Space Flight Center, will address the 4 January meeting of National Capital Astronomers. He will present the further results now available from the phenomenally successful 11 September ICE penetration of Comet Giacobini-Zinner (G-Z). (Dr. John C. Brandt reported some of the early results to NCA in December; see inside pages.)

The ICE passed through the center of the ion tail of G-Z 7800 km from the nucleus, thus becoming the first spacecraft ever to encounter a comet. The primary goal of the mission was to study the interaction between the solar wind and the comet's atmosphere. Although many predicted features were verified, the interaction was found to be unexpectedly strong. The approaching comet was first detected by the ICE when it was 2.3 million km away from the spacecraft. The origins of the mission will also be discussed.

Tycho von Rosenvinge received his Ph.D from the University of Maryland in 1970. He is the Project Scientist for the International Cometary Explorer, and Principal Investigator of its Medium-Energy Cosmic-Ray Experiment. He is also head of the Low-Energy Cosmic-Ray Group in the Laboratory for High-Energy Astrophysics at Goddard SFC. His primary scientific focus has been on the composition and acceleration of energetic particles in solar flares and in interplanetary space. He is currently involved in a project at Kitt Peake National Observatory to detect optical transients associated with cosmic gamma-ray bursts. Dr. von Rosenvinge is a member of the American Physical Society and of the American Geophysical Union,

JANUARY CALENDAR -- *The public is welcome.*

Friday, January 3, 10, 17, 24, 31, 7:30 pm -- Telescope-making classes at American University, McKinley Hall basement. Call Jerry Schnall, 362-8872.

Saturday, January 4, 6:00 pm -- Dinner with the speaker at the Ding How Restaurant, 1221 E Street,NW. Reservations unnecessary.

Saturday, January 4 8:15 pm -- NCA monthly meeting at the U.S. Department of Commerce Auditorium, 14th Street and Constitution Avenue, NW. Dr. von Rosenvinge speaks.

Tuesday, January 7, 14, 21, 28, 7:30 pm -- Telescope-making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 362-8872.

Friday, January 17, 31, 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. Saturday, January 18, 8:00 pm -- Discussion group at the Department of Commerce, Conference Room D: NCA nova search program, new techniques, instrumentation.

DECEMBER LECTURE

Dr. John C. Brandt, Chief of the Laboratory for Astronomy and Solar Physics, NASA Goddard Space Flight Center, discussed NASA's plans for the International Halley Watch (IHW), and some of the early results of NASA's 11 September 1985 penetration of Comet Giacobini-Zinner by the ICE spacecraft.

Brant reviewed the early evolution of comet science from the discovery of comet orbits by Halley by application of Newton's laws, and the sketches by Bessel, which showed day-to-day changes, to the advent of photography which accurately records rapid changes.

Using three 1910 Halley photographs taken at Yerkes Observatory at Williams Bay, Wisconsin, Hawaii, and Beirut, he illustrated the overnight changes, in this case, tail-disconnection events. Changes on a time scale of minutes have been observed, and much more rapid ones seem to occur. Observed features lose their identity from one day to the next. Such observations clearly indicate the need for continuous monitoring, hence the IHW plans for a world-wide network of observatories in the Southern Hemisphere, including island observers in the southern oceans (for some of which NCA has recruited island-resident scientists), for 24-hour coverage.

A number of spacecraft will also examine various aspects of Halley and its environment. NASA has already sent the well-instrumented ICE craft through the tail of Comet Giacobini-Zinner, with phenomenally successful results, on its way to measure solar wind and such cometary particles as may be found upstream of Halley.

NASA is considering the possibility of recovering the ICE in 2012 for the National Air and Space Museum!

The Italian Giotto spacecraft is to penetrate the coma at only about 500 km from the sunward side of the nucleus; it carries double shields against the expected impacts. For this close encounter, the position of the comet must be precisely known. The two USSR Vegas will penetrate the sunward coma at a safer distance a week earlier, and will provide positional information for the accurate targeting of Giotto. Two Japanese craft will sample the enormous hydrogen cloud surrounding the coma at much greater sunward distances. None is to penetrate the tail. These rendezvous will occur at about .8 or .9 AU from the Earth.

Of the total of more than 40 experiments, 18 will be plasma studies. Giotto being spin stabilized carries a spin-scan imager.

Brandt presented some of the results of the ICE penetration of the tail of Giacobini-Zinner 8,000 km from the nucleus on 11 September 1985. Seven experiments provided highly successful measurements of an abundant sheath of energetic ions, absence of the expected shock and density discontinuity, but shock-like deceleration of the solar wind, the energetic-ion density and temperature profile through the tail, and high-energy particles upstreaming at 400 km per second. A mass spectrometer confirmed the presence of water, long postulated but never before directly detected in comets. also detected were ions H_2O^+, H_3O^+, and CO^+.

According to Alfvén's 1957 model, interaction with the solar wind will bend magnetic lines into a sheath around the comet with a curent sheet separating the lobes of opposite polarity. Essentially every feature of this model was confirmed. Even the current sheet, which Brandt called "a realy tricky target," hoped, but not fully expected to be seen, was measured to be exactly as predicted. The temperature, density, and speed of electrons were measured. The comet produced the highest plasma-wave intensity ever seen by the instrument in extensive excursions in the interplanetary and near-Earth environment since 1978.

An interesting side effect was seen. Dust particles impacting the spacecraft at 21 km per second produced small puffs of plasma which were counted by the plasma detector, giving a dust-particle impact count.

Brandt summarized the newly updated model, derived from first-time-ever *in-situ* measurements. About 3.5 hours were spent within the main body of the tail, but beams of particles from the comet were measured the day before and two days afterward, indicating an interaction region of millions of km, not just the expected 75,000 km. The bilobal magnetic sheath and current sheet were found. The peculiar "shock wave" differs from expectations, but does exist, and does decelerate the solar wind as expected. The interior of the tail, where about 20 minutes were spent, is cold and dense, Highly energetic particles abound, and plasma-wave activity is very intense.

RH McCracken

OCCULTATION EXPEDITIONS PLANNED

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

UT Date	Time	Place	Vis Mag	Pcnt Sunlit	Cusp Angle	Min Aper
Grazing Lunar: (None in January)						
02-01-86	06:38	Doswell, VA,	7.7	60	14S	15 cm
02-02-86	08:13	Chester, VA	6.8	48	16N	6 cm
Asteroidal:			Star Mag	Delta Mag	Name	
01-15-86	04:44	North Carolina	6.6	7.6	(510) Maybella	5 cm
02-01-86	00:19	E. New England	8.4	0.5	(2) Pallas	15 cm

NCA WELCOMES NEW MEMBERS

Byers, Mr. and Mrs. David M
1611 Sherwood Road
Silver Spring, MD 20902

Cannon, James P.
15510 Barrington Place
Dumfries, VA 22076

Corradino, G. and Family
4928 King Solomon Drive
Annapolis MD 22003

Crump, Mr. and Mrs. F.B. Family
2831 Sutton Oaks Lane
Vienna, VA 22180

Hibbs, Raymond J.
123 Lakeside Drive
Greenbelt, MD 20770

Hoops, Mary Ann
2226 Randolph Street, NE
Washington, DC 20018

Ter-Minassian, Viguen
3307 Mantua Drive
Fairfax, VA 22031

Younker, Myra
4757 Chevy Chase Drive, Apt 305
Chevy Chase, MD 20815

WERNER VON BRAUN MEMORIAL LECTURE IN JANUARY

The annual Werner Von Braun Memorial Lecture, *Looking at Earth: from Satellites to Space Stations,* will be presented by Dr. John H. McElroy on Thursday, January 30 at 8:00 pm in the Langley Theater of the National Air and Space Museum

The lecture is held annually in honor of the late rocket scientist and engineer who led the United States'entry into the era of space exploration.

McElroy, currently with Hughes Aircraft Company, served for 17 years at NASA as a physicist and research director, as deputy director of the NASA Goddard Space Flight Center, and was assistant administrator for environmental satellite data and information services at the National Oceanic and Atmospheric Administration.

EXCERPTS FROM THE IAU CIRCULARS

1. November 7 -- Bregman, Witteborn, Rand, and Wooden detected with the 3-m Shane telescope, an infrared absorption feature at 3.1 microns in the spectrum of Comet Halley. They attribute the feature to water ice.

2. November 16 -- de Pater, Palmer, and Schenewerk observed discrete OH features at 1667 MHz in Comet Halley with the VLA. The peak emission was east and south of the nucleus.

3. Novemmber 23 -- A group of European researchers detected molecular HCN emissions at 88.6 MHz with a 30-m radiotelescope. 1984 July. 4. December -- Ilovaisky and Chevalier reported ultraviolet observations with the 3.6-m reflector at Mauna Kea confirming the variability of AC 211 in M15. A reexamination of the October spectral data indicated that AC 211 probably is the X-ray source in M15. R.N. Bolster

SHARP TO DISCUSS CALENDAR HISTORY AT NASM

By popular request, Planetarium Chief James Sharp will again discuss the history and evolution of the calendar on Saturday, January 4 at 9:30 am in the Albert Einstein Planetarium of the National Air and Space Museum.

Doors open at 9:00 am. Tickets are not required; seating is on a first-come first-served basis.

VOYAGER 2 APPROACHING URANUS, PHOTOGRAPHS WEATHER PATTERNS

Voyager 2 has for the first time photographed weather patterns on Uranus on its way to a 50,000 mile conjunction with the planet on 24 January. Heavy image processing disclosed an ice fog over the sunward south pole.

Launched in 1977, Voyager 2 will be 20 million miles from Uranus and 1.84 billion miles from the Earth on Sunday, 29 December. After conjunction the craft will continue its long trip to rendezvous with Neptune in August 1989.

★ STAR DUST
WASHINGTON, D.C.

Published eleven times yearly by **NATIONAL CAPITAL ASTRONOMERS, INC.**, a non-profit, public-service corporation for promotion of astronomy and related sciences through lectures, expeditions, discussion groups, tours, classes, public programs, and publications. **NCA** is an affiliate of the Washington Academy of Sciences. President, Stanley G. Cawelti. ***Star Dust*** deadline 15th of preceding month. Information: (301) 320-3621. Material for publication: Robert H. McCracken, Editor, 5120 Newport Avenue, Bethesda, MD 20816.

FIRST CLASS MAIL