

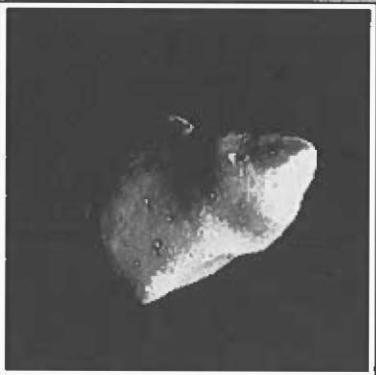
Lunar and Planetary Information

# BULLETIN

FEBRUARY 1992/NUMBER 62 • LUNAR AND PLANETARY INSTITUTE • UNIVERSITIES SPACE RESEARCH ASSOCIATION

## A Brief Encounter Galileo at GASPERA

See article on page 8.



# "Youth and Space: A Science Experience"

## Girl Scouts on Mars!

Fifteen 8th-grade Girl Scouts of the South Texas Girl Scout Council spent a weekend at LPI to take part in "Youth and Space: A Science Experience," a workshop run by LPI staff and scientists. Through a variety of activities during the busy weekend, Scouts were introduced to issues and concepts in the exploration of other planets. Working in teams, they used their new knowledge to construct a model Mars base for presentation to the group and friends and relatives on Sunday.

The weekend began on Friday evening at Camp Wind-a-Mere in Dickinson, Texas, with a Sky Watch supported by members of the JSC Astronomical Society. Although the skies were mostly cloudy, Scouts got good views of the Moon and Saturn. Space artist Pat Rawlings provided a glimpse of things to come with a slide show of his many paintings and drawings.

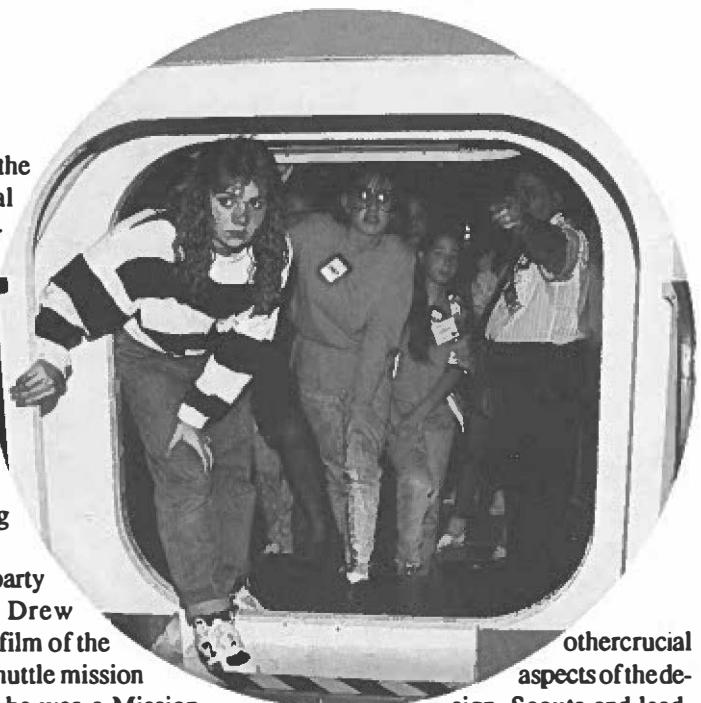
On Saturday morning, LPI Director David Black welcomed the girls, who were soon off on a grand tour of the solar system in slides and pictures. LPI scientists devised interactive outdoor geology labs to demonstrate planetary processes such as cratering, volcanism, and erosion. Indoors, another group of LPI scientists helped Scouts use stereo viewers and globes to familiarize themselves with martian landforms.

After lunch at the JSC cafeteria, the group toured the Space Station mockup and the Curatorial Facility, which houses lunar sample and meteorite collections. Back at LPI, the Scouts were introduced to the problems of building in the space environment

by Michele Caruthers of the Sasakawa International Center for Space Architecture, University of Houston, who used models and slides to illustrate her talk. Steve Clifford, LPI, gave an overview of some of the life sciences issues involved in moving off the Earth by comparing our planet with Mars.

Dinner was a pizza party featuring astronaut Drew Gaffney, who showed a film of the Space Life Sciences-1 shuttle mission in June 1991 on which he was a Mission Specialist. He discussed some of the early results from this first mission dedicated to life sciences experiments. After dinner, the Scouts met in teams to begin design of their Mars bases. Some worked out their ideas with pencil and paper and others used *Moonbase*, a computer program that simulates building a lunar outpost. After a very full day, the girls returned to camp.

On a rainy, blustery Sunday morning, base construction began in earnest in the Institute's Hess Room. Paul Spudis of LPI reviewed some basic concepts and the teams went to work. Some four hours later, the building teams presented their models to the other groups and assembled parents and friends, describing the purpose of their base and how they dealt with energy needs, shielding requirements, food supply, and



other crucial

aspects of the de-sign. Scouts and lead-

ers were presented with a specially designed patch to commemorate their "science experience." Deborah Domingue, the LPI scientist who coordinated the weekend with other scientists and staff, said, "This workshop was a pilot project for the Institute, and we're thrilled with its success. It became a learning experience for everyone involved. The scientists got a chance to see their enthusiasm for science reflected in the interest and excitement the Scouts poured into the weekend's activities. We also got a gentle reminder from the girls on how important a tool imagination can be. This workshop and others like it are needed by today's young people. They are our hope for the future, and these types of workshops are important for building the leaders we will need for tomorrow." ☾



Girl Scouts from the South Texas Council spent the weekend at LPI learning about planetary geology and extraterrestrial environments as they prepared to design and build a model Mars base. Above, processes that shape planetary surfaces were demonstrated in outdoor geology labs; samples of rock types were examined; and astronaut Drew Gaffney explains early results from the SLS-1 mission. Finally, teams of Scouts built and presented their model Mars bases (right).

PHOTOS: D. RUEB, LPI

# NEW IN PRINT

These publications are available from the publisher listed or may be ordered through local bookstores.



LICK OBSERVATORY  
PHOTOGRAPHS

## A REVIEW

### WHAT IS A SHOOTING STAR?

### WHY DO STARS TWINKLE?

### WHY DOES THE MOON CHANGE SHAPE?

### WHY DO WE HAVE DIFFERENT SEASONS?

By Isaac Asimov

Ask Isaac Asimov Reference Series, About Space

Gareth Stevens, Milwaukee, Wisconsin 1991, each 24 pp.

Color illustrations and photographs. Hardcover, each \$11.95

I think these books are very educational. Although meant for the 2nd- and 3rd-grade level, I learned a few things from them myself. For example, I did not know that the atmosphere bends light, or what relation the Moon had to lunar calendars. I wish I had read them as a 2nd or 3rd grader. These books also explain the facts well and are easy to understand. The drawings help to explain, too; for instance, one shows the Moon in different phases around the Earth. The photography is terrific. The books have color photos of outer space, the seasons, the Moon, etc. In the back of each book there is a list of more books to read and places to write for more information.

The description in these books also caught my attention. I could really get a mental image of what the book was saying. I also had some fun reading these books. They are easy-to-read, relaxing books as well as educational.

I think every public and school library should have this series, or at least some of these books. The hardbacks are very sturdy for the library, and each page is about the size of a piece of typewriter paper, so most of the pictures are big and colorful. I would like to read more of the series.

—Abigail Ryder

(Ms. Ryder is a 6th-grade student at P.H. Greene Elementary School in Webster, Texas.)



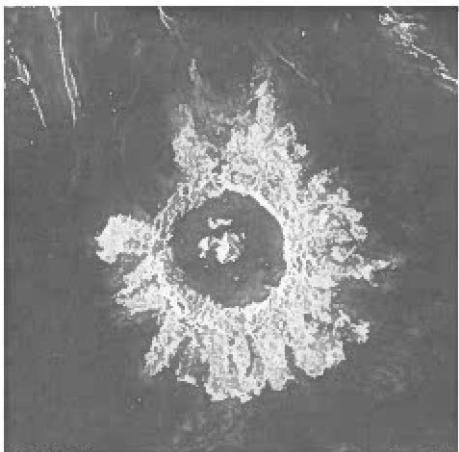
## NEW FROM THE ASTRONOMICAL SOCIETY OF THE PACIFIC

### NEW, EXPANDED CATALOG OF ASTRONOMY MATERIALS

A new and expanded catalog of educational materials on astronomy was recently published by the A.S.P. The 48-page, fully illustrated catalog includes slides and videos, software and laser disks, posters and charts, observing tools, books for all ages, and a variety of other aids for exploring the universe. New items include slides and videos from Magellan at Venus, a videodisk edition of the film *2001* with a wealth of scientific and philosophical background, an audiotape of American Indian star tales, and an astronomy activity book for the whole family. To order a catalog, send your name and address and three first-class stamps to A.S.P., Catalog Request Dept., 390 Ashton Avenue, San Francisco CA 94112.

### MAGELLAN VENUS SLIDE SET

A set of 20 dramatic slides from the Magellan spacecraft's radar survey of Venus is now available. The images—the most detailed views of our cloud-shrouded planetary neighbor ever obtained—include vast troughs and trenches, impact craters, lava flows, huge volcanoes, "pancake domes," and arachnid features—so called because they re-



NASA PHOTO P-36711 MGN 17

semble enormous spiderwebs. A view of Magellan's launch from the space shuttle and a diagram of the way its remarkable radar system maps Venus are included. The package includes a 24-page book of nontechnical captions and a reading list. \$24.95 from A.S.P., Venus Slide Orders Dept., 390 Ashton Avenue, San Francisco CA 94112.

#### PLANET FLYBY VIDEO

A videotape showing dramatic computer-animated sequences made from images from spacecraft exploring the planets has just been released. The 35-minute VHS tape includes three Magellan spacecraft films of the surface of Venus; *Mars: The Movie*, a flyover of the red planet's chasms, volcanoes, and cratered highlands; Galileo films of the Earth-Moon flyby; and *Earth: The Movie*, a supercomputer simulation of the climate and features of a rotating Earth. A booklet of background information and a bibliography of nontechnical books and articles about the planets is included. \$33.95 from A.S.P., Planets Video Orders, 390 Ashton Avenue, San Francisco CA 94112.



NASA PHOTO AS15-82-11145

#### NEW TECHNICAL REPORTS AND A SHORT COURSE FROM LGI

**T**wo new technical reports are available free from the Lunar Geotechnical Institute. "The Investigation of Mechanical Properties of Lunar Soil and its Analogs Under Different Atmospheric Conditions and in a Vacuum Using the Instrument TOR-1," is TR91-04. The 24-page "Bibliography of Lunar Geotechnical Literature" is TR91-02. Order from LGI, P.O. Box 5056, Lakeland FL 33807-5056. Phone: 813-646-1842; FAX: 813-644-5920.

#### A SHORT COURSE

A short course, "Lunar Soil Mechanics and Foundation Engineering," will be given by Dr. David Carrier and Dr. Stewart Johnson in conjunction with the Space 92 Conference in Denver, Colorado, May 31, 1992. Sponsored by the LGI and Space 92, the course is expected to attract 25-40 engineers, scientists, and program managers interested in lunar surface activities. Tuition is \$225.00 with group rates available. Contact LGI, P.O. Box 5056, Lakeland FL 33807-5056. Phone: 813-646-1842; FAX: 813-644-5920.

#### LIBRARY OF CONGRESS EXPANDS NATIONAL TRANSLATIONS CENTER

**T**he National Translations Center (NTC) at the Library of Congress announced the enhancement of its service, which contributes to the international competitiveness of American science and industry. Last year more than half the world's scientific literature appeared in languages other than English. Beginning with letters to 50,000 research centers in the U.S., NTC is asking for cooperation in sharing American translating resources. The center gathers current unpublished English translations of critical research from international technical journals, patents, and conference papers. NTC Director Karl Green said, "For wider distribution, the first magnetic tape of the electronic index including descriptions of more than 11,000 translations has been sent to federal agencies and private vendors such as OCLC, NTIS, and NASA. Furthermore, magnetic tapes of translation descriptions are free to qualifying organizations." Contact K. R. Green, NTC, Library of Congress, Washington DC 20541. Phone: 202-707-0100; FAX: 202-707-6147.



# Conference Information

## CONFERENCE PROGRAM ON LINE

The LPSC Program will be accessible electronically on or about February 7 via the NASA Science Internet (NSI) or by direct dial.

- On NSI/DECNET (SPAN), type SET HOST LPI.
- On NSI/Internet, type TELNET LPI.JSC.NASA.GOV or TELNET 192.101.147.11.
- To dial direct, call 713-244-2090 or 713-244-2091. These are new modem numbers and will connect to 2400, 1200, or 300 baud.

For all three methods of access, respond to USERNAME: LPI. No password is necessary. Choose LPSC Conference Program from the menu.

For the first time, the program also contains abstracts from those authors who chose to submit an abbreviated version of their regular abstract. About 230 were received and placed on line this year.

If you have difficulty in accessing the LPI computer, please contact:  
Kinpong Leung at 713-486-2165;  
(LPI::LEUNG on NSI/DECNET or  
leung@lpiipf.jsc.nasa.gov on NSI/  
Internet);  
or Lorraine Willett at 713-486-2194;  
(LLFISHER on NASAMAIL).

## REGISTRATION/LPI OPEN HOUSE

The 23rd Lunar and Planetary Science Conference will open with a Registration/Open House on Sunday, March 15 from 6:00 to 9:30 p.m. at the new Lunar and Planetary Institute, 3600 Bay Area Boulevard. Registration will continue in the Gilruth Center, JSC, Monday through Thursday between 8:00 a.m. and 5:00

p.m. A shuttle bus will be available to transport participants between the LPI and local hotels Sunday evening from 5:45 p.m. to 10:00 p.m.

## SHUTTLE BUS SERVICE

A shuttle bus service between JSC, LPI, and the various hotels will operate daily from 7:30 a.m. until 9:30 a.m., 11:00 a.m. until 2:00 p.m., and from 5:00 p.m. until 6:30 p.m. Buses will also operate 1/2 hour before and after each official evening function.

During the period of the conference, your conference badge will allow access to the Space Center at all gates, Building 2, the first floor of Building 1, and the Gilruth Center. Please be reminded that this badge does not allow access to those areas or buildings not open to the general public except to those specifically outlined above.

Arrangements may be made in the lobby of Building 2 for a guided tour of the Mission Control Center. For tour information, call 483-4321.

## GUIDE TO SESSIONS

### Monday Morning, 8:30 a.m.

- Magellan at Venus: The Global Perspective Emerges
- Meteorite Parent Bodies
- Mare Basalts, KREEP, and Copernican Ejecta

### Monday Afternoon, 1:30 p.m.

- Venus Geophysics
- Assorted Achondrites
- Origin and Evolution of Planetary Systems

### Monday Evening, 8:00 p.m.

- Harold Masursky Lectures, Public Session, Bldg. 2 Auditorium, Eugene Shoemaker, U.S. Geological Survey, Ellen Stofan, Jet Propulsion Laboratory

### Tuesday Morning, 8:30 a.m.

- Venus: Tectonism and Volcanic Associations
- Reduced Meteorites
- Evolution of the Lunar Crust and Mantle
- Outer Solar Systems/Remote Sensing: Laboratory

### Tuesday Afternoon, 2:30 p.m.

- Venus Volcanism
- Chondrules
- Impact Cratering: Theory and Experimentation

### Tuesday Evening, 7:00-9:00

- Poster Session I, Lunar and Planetary Institute

### Wednesday Morning, 8:30 a.m.

- Dynamics of Impacts and Resurfacing on Venus
- Nebular Processes and CAIs
- A Field Trip to the Moon
- Martian Spectral and Laboratory Data

### Wednesday Afternoon, 2:30 p.m.

- Tectonism and Volcanism: Moon and Mars
- Education: Outreach Opportunities
- Antarctic Micrometeorites and LDEF
- Solar Wind and Cosmic Ray Irradiation

### Wednesday Evening, 7:00-10:00 p.m.

- Annual Barbeque Dinner, Landolt Pavilion

### Thursday Morning, 8:30 a.m.

- Mars Surface and Atmosphere Through Time: Surface Properties and Processes
- Cosmic Dust and Comets
- Planetary Geochemistry

### Thursday Afternoon, 1:30 p.m.

- Mars Surface and Atmosphere Through Time: Atmosphere and Surface-Atmosphere Interactions
- Stardust
- Terrestrial Impacts and the K/T Boundary

### Thursday Evening, 7:00-9:00 p.m.

- Poster Session II, Lunar and Planetary Institute

### Friday Morning, 8:30 a.m.

- Offerings from the Moon
- "Acapulcoites" and Stony-Iron Meteorites: Meteorite Organics
- Galileo Gaspra/Asteroids

# 23rd LPSC Meets March 16-20

## **Proceedings of Lunar and Planetary Science, Volume 22 is Published**

Graham Ryder and Virgil L. Sharpton, eds.  
Lunar and Planetary Institute, Houston 1992 469 pp.  
Black and white illustrations and photographs. Hardcover, \$25.00

*Proceedings of Lunar and Planetary Science, Volume 22* is the last in the series that began with *Proceedings of the Apollo 11 Lunar Science Conference* in 1970. Editors Ryder and Sharpton note that this latest volume demonstrates that our understanding of the characteristics, origins, and evolution of the planets continues to progress despite pressures from funding constraints on research and new missions.

The contents include a review paper on Venus surface mineralogy and a cautionary paper on a possible contamination hazard in the laboratory. The rest of the 38 contributions are grouped by topic: The Surface of Mars; The Cretaceous-Tertiary Boundary and Impact Processes; The Interplanetary Medium Then and Now; Lunar Surface Characterization and Processes; and Basic Magmatic Rocks and Processes. Volume 22 will be distributed to each registrant at the 23rd LPSC. Librarians and others who wish to complete their collection of this series may order it from LPI (see Order Form, this issue).

## **LPSC Proceedings Series Ends**

With the February, 1992, publication of *Proceedings of Lunar and Planetary Science, Volume 22* the venerable series will end after 22 years. In the near future, LPI staff will seek a wide variety of inputs on the needs of our communities for a periodical that could afford more rapid publication of new results and provide a broader scope to reflect the increasingly interdisciplinary nature of today's research. Members of the community can assist in this process by helping to define the changing needs and publication modes of researchers in lunar, planetary and terrestrial studies.

# **Meetings and Special Events**

*As the Conference takes shape in late January, we take the opportunity to list some of the meetings and special events planned for the 23rd LPSC. Some of the details may change and new activities may be added between Bulletin press time and the Conference.*

### **POSTER SESSIONS**

Poster Sessions I and II will be held on Tuesday and Thursday evenings from 7:00 to 9:00 p.m. in the Great Room of the new LPI building. Poster authors will be on hand to discuss their presentations with other attendees and complimentary keg beer and soft drinks will be served during these sessions.

### **DISPLAYS, DEMOS, AND EXHIBITS**

The on-line and remote access capabilities of the interrelated database systems in use at LPI will be displayed throughout the week at the new LPI facility at 3600 Bay Area Boulevard. Shuttle buses will transport attendees to and from the Gilruth Center. Travel time is about 10 minutes. The databases include the Geophysical Data Facility (GDF) developed and maintained by the LPI, as well as the Image Retrieval and Processing System (IRPS) sponsored by Washington University, which includes the Planetary Image

and Cartography System (PICs) created by USGS Flagstaff. The LPI's Computing Center for Planetary Data Analysis (C<sup>2</sup>PDA) will demonstrate the image processing and scientific visualization capabilities of its Stardent Titan graphics supercomputer.

The Combined Publishers Exhibit will be on display at the LPI throughout the week.

Session Chairmen's Breakfast meetings will be held in the Club Room, Gilruth Center, 7:45-8:15 a.m., Monday through Friday.

### **Sunday—March 15**

The Meteoritical Society Council will be held from noon to 10 p.m. in the Director's Conference Room at the LPI.

### **Monday—March 16**

The first of the Hal Masursky Lectures will feature Eugene Shoemaker, USGS, and Ellen Stofan, JPL, speaking in a public session in the Building 2 Auditorium, JSC, at 8:00 p.m.

### **Tuesday—March 17**

Poster Session I will be held in the Great Room, LPI, from 7:00 to 9:00 p.m. Complimentary beer and soft drinks will be served.

### **Wednesday—March 18**

The JSC Astronomy Seminar will present "Terraforming Earth: Interplanetary Engineering Begins at Home" by Jim Oberg at noon in Building 31, Room 129.

A NASA Managers' Meeting organized by Don Bogard will be held from 5:00 to 7:00 p.m. in the Gilruth Gym.

The Annual Barbeque Dinner for all registrants will be held at Landolt Pavilion. Guest tickets will be sold at the registration desk.

### **Thursday—March 19**

Poster Session II ("keg session") will be held in the Great Room, LPI, from 7:00 to 9:00 p.m. ☺

*The Lunar and Planetary Information Bulletin* is published quarterly by the Lunar and Planetary Institute, 3600 Bay Area Boulevard, Houston TX 77058-1113.

Pam Thompson, Editor

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Please send articles or announcements to: Pam Thompson, 3600 Bay Area Boulevard, Houston TX 77058-1113.

Phone: 713-486-2175; Fax: 713-486-2162; E-Mail: SPAN LPI:THOMPSON

# NEWS FROM SPACE

## ICY POLAR CAPS ON MERCURY?

**A**stronomers have reported finding what may be icy polar caps on Mercury, even though much of the planet experiences temperatures hot enough to melt lead. Martin Slade (JPL), Duane Muhleman, Bryan Butler (Caltech), and Raymond Jurgens (JPL) used the Goldstone (California) antenna to transmit and the Very Large Array (New Mexico) to receive radar signals to observe Mercury at inferior conjunction (closest distance to Earth). They compared the signature of circular polarization of the signals reflected from Mercury with similar observations of other solar system objects. For example, transmitting radio energy with right circular polarization onto a rocky surface like the Moon's should produce return signals of mostly left circular polarization. A rough analogy is standing in front of a mirror and raising your right hand; the mirror reflects you raising your left hand. If, however, another mirror reflects the first reflection on its way back to you, you will appear to be raising your right hand. The properties of the target (surface) material determine how much of this multiple scattering of the signal takes place; the surface material also determines how much of the original signal is absorbed rather than reflected back to the observer.

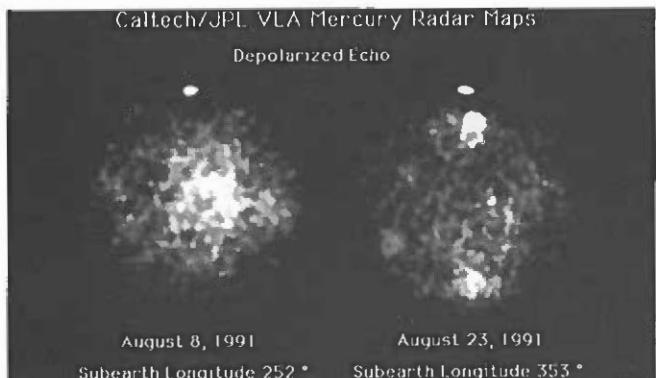
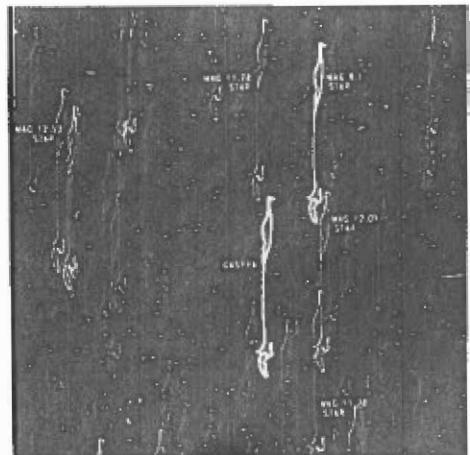


PHOTO-JPL

Planetary surfaces are far more complex than flat mirrors, and it is useful to compare the ratio of "same sense" (the same polarization transmitted) to "opposite sense" (the mirror image) polarization in the total return. For most solar system objects, this ratio is much less than 1, but from the radar-bright patches at the north pole of Mercury (image at left) ratios of 1.3 to 1.4 and greater have been obtained. Ratios like this can be explained by the "coherent backscatter" model, which is not well understood theoretically, but observational experience has shown that in the solar system they are associated with an icy surface of some kind: ratios of 1.3 are seen from the south polar cap of Mars, which is known from other evidence to be CO<sub>2</sub> ice, and the icy Galilean satellites and rings of Saturn also exhibit ratios greater than 1.

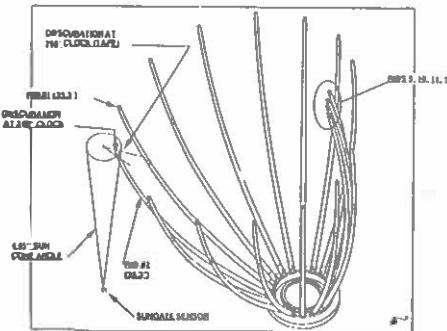
How ice can exist on the innermost planet is under debate, with some workers pointing out that the Sun's tidal lock on the planet prevents its pole from seasonally tilting to and away from solar heating, and that the ice need not rest on the surface of Mercury but could be detected by radar even if covered by a layer of dust or soil. John Harmon (Cornell) and Slade think they may have detected a suggestion of southern polar caps, as well, using the Arecibo (Puerto Rico) radio telescope as both transmitter and receiver and they will make more observations from Arecibo this spring. Confirming the data with the best configuration of the VLA will have to wait until the next inferior conjunction with Mercury in 1993 when the planet's extreme southern latitudes can be seen.



NASA PHOTO P-39343

## GALILEO AT GASPRO: EARLY DATA INTRIGUING

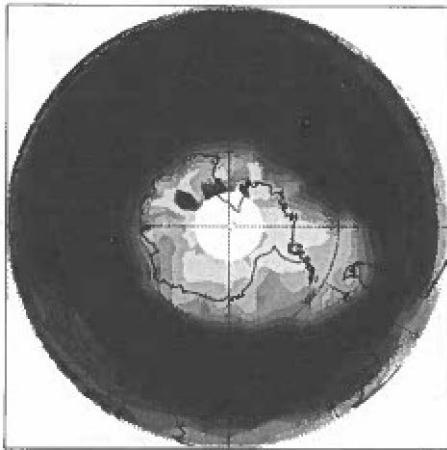
**T**he Galileo spacecraft swept by the asteroid 951 Gaspra in early November, successfully observing the small rocky body with its Solid State Imaging System (SSI) and Near-Infrared Mapping Spectrometer (NIMS)—the first-ever asteroid encounter. Because navigation during the pass was so accurate, finding Gaspra at the bullseye of predicted coverage allowed the spacecraft to transmit a brief portion of the data it gathered to Earth soon after the encounter. The false color image created from views through different filters shows an irregular body with distinct ridges that give it a faceted appearance and suggest that Gaspra is a fragment of a much larger parent dis-



rupted by catastrophic collision. The ridges appear smoothed, however, which might be evidence of regolith development—somewhat surprising for a body with an escape velocity of only  $8 \text{ m/s}^2$ . The 160-m-resolution images reveal many small but relatively few large (1.5-km) craters, which are thought to record Gaspra's history since a last major collision some 500 million years ago.

Spectral data at the resolution analyzed thus far cannot resolve the question of whether Gaspra is a primitive, undifferentiated ordinary chondrite or a thermally evolved stony iron. Spectra are consistent with the body being a shocked ordinary chondrite, but are also consistent with a silicate body with the addition of metallic Fe. NIMS data have not been analyzed yet, and the highest-resolution (40-m) data from the encounter will be played back in April. These observations could help to determine whether this S-type asteroid is of chondritic or stony-iron composition. A flyby of Ida, also an S-type asteroid, in August 1993, will provide an interesting comparison.

Galileo's high-gain antenna remains stuck and engineers will continue to subject it to thermal cycling, pointing the antenna tower sunward, then spaceward, to attempt to free the lodged umbrella pins. Scientists have also made plans to improve the data rate from the low-gain antenna by compressing data, should attempts to free the HGA fail.



NASA PHOTO 91-HC-783

## DATA FROM UARS SHOW LINK BETWEEN CHLORINE, OZONE DEPLETION

**E**arly results from NASA's Upper Atmosphere Research Satellite (UARS) have confirmed the link between the presence of chlorine monoxide and the depletion of ozone in the Earth's upper atmosphere. Chlorine monoxide results from the breakdown of man-made chlorofluorocarbons by the Sun's ultraviolet radiation. The UARS data examined to date show that extremely high amounts of chlorine monoxide (greater than one part per billion) occur only where ozone is severely depleted. These first results from UARS were obtained with the Microwave Limb Sounder (MLS), one of 10 instruments aboard the satellite. MLS detects microwave radiation emitted from chlorine monoxide, ozone, sulfur dioxide, and water vapor in the atmosphere. The radiation is analyzed to produce chemical concentration and temperature data at altitudes throughout the upper atmosphere over almost the entire planet from an orbit 363 miles high. MLS is also detecting the effects of the large eruption of Mount Pinatubo, Philippines, in June 1991. Injection of huge amounts of sulfur dioxide by the volcano has created a band of  $\text{SO}_2$  concentration seen by MLS over the tropics. Aerosols formed in the vicinity of the plume could lead to significant ozone loss in those areas.

Investigators from the Upper Atmosphere Research Satellite mission continue to report excellent performance of the satellite's sensors and instruments. UARS has been in orbit for over 120 days with mostly nominal performance being reported. Some software errors have been noted and have temporarily caused an instrument anomaly. These glitches are being corrected as the software itself is becoming better understood. The science team has reported some excellent early mission results, including one noted by the High Resolution Doppler Imager science team, which discovered large, violent windstorms in the Earth's mesosphere located 43 to 60 miles above the Earth's surface. The biggest such windstorm observed so far stretches from Western Australia across southern Africa and halfway across the Atlantic Ocean.

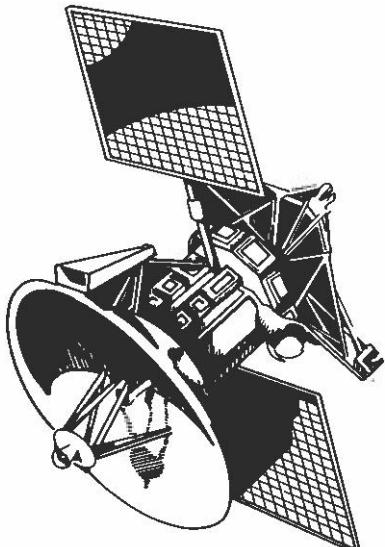
## A MODEST PROPOSAL FOR OZONE REPAIR

Ralph Cicerone and Scott Elliott (University of California, Irvine) and Richard Turco (UCLA) have come up with what Cicerone terms "a concept, not a proposal" to remove chlorine molecules that are destroying ozone over the Antarctic. Their computer modeling suggests that reacting the chlorine with simple hydrocarbons such as ethane would

# NEWS FROM SPACE

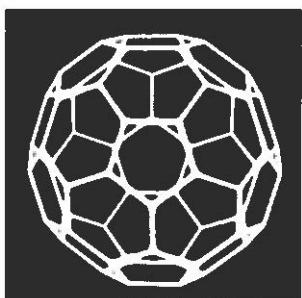
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form hydrogen chloride, thus removing free chlorine from the chain of reactions that now are destroying ozone. One way to achieve this would be to inject 50,000 tons of ethane from hundreds of airplanes flying over the region. "We understand . . . that there could be very unexpected problems arising if you introduce yet another chemical into the system," admits Cicerone. But the researchers hope to spur other scientists to study ways to repair the damage that is already done.



## MAGELLAN'S PRIMARY TRANSMITTER FAILS; BACKUP WILL RESUME MAPPING

**F**light controllers at the Jet Propulsion Laboratory reported on January 6 that the primary high-data-rate transmitter aboard Magellan has apparently failed. The spacecraft was in the process of returning high-resolution radar data on the Saturday afternoon when the failure occurred. JPL activated the backup transmitter to test its functionality. The backup device had not been used in nearly nine months because of intermittent degraded performance once that unit reaches operating temperatures. The backup unit does work, and engineers have decided to use it to resume mapping on January 24. Meanwhile, the spacecraft's batteries are being recharged. The backup unit will operate at a lower data rate (about 42% of the previous rate), but resolution should be just as sharp as with previous mapping cycles. The mission's primary goal was achieved last March when the first complete Venus mapping cycle was accomplished. The second mapping cycle is scheduled to conclude in January, at which time the spacecraft will enter a third phase. Magellan has orbited Venus over 3880 times and provided high-resolution radar imagery of more than 95% of its surface.



## NASA TO STUDY ROCKET FUEL FROM BUCKYBALLS

**A**soccerball-shaped carbon molecule may provide an excellent propellant for a type of spacecraft engine that produces thrust by expelling charged atoms or molecules. Stephanie Leifer (JPL) and Winston Saunders (Caltech) propose to use the molecule  $C_{60}$  as a fuel for ion engines. The engines, which generate thrust by ionizing and accelerating propellants, use less fuel than conventional chemical thrusters. Leifer believes  $C_{60}$  could reduce the energy required to ionize the propellant. "For applications where it is desirable to operate at relatively low to moderate exhaust velocity, ion engines using low-ion-mass propellants become less efficient. A large molecule such as  $C_{60}$  would allow for more efficient operation at low exhaust velocities."

Because the molecule resembles a geodesic dome,  $C_{60}$  is also called buckminsterfullerene in honor of the dome's inventor, the late R. Buckminster Fuller. It was recently declared "Molecule of the Year" by the journal *Science* in recognition of the tremendous variety of new research directions  $C_{60}$  and the family of fullerenes have inspired in many fields of applied science. JPL and Caltech will investigate the basic properties of the molecule important for ion propulsion and will evaluate it as a fuel in a small ion engine testbed. The first practical application of ion engines may be in orbital transfer missions and station-keeping for satellites in GEO. Describing a scenario that has become typical in labs across the country that begin to tinker with "buckyballs," Saunders noted that he and Liefer "cooked up this idea to use  $C_{60}$  and within two weeks we had filed patent disclosures. It's the kind of synergetics Buckminster Fuller advocated."



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## Consortium Finds Evidence of Impact Origin from Samples

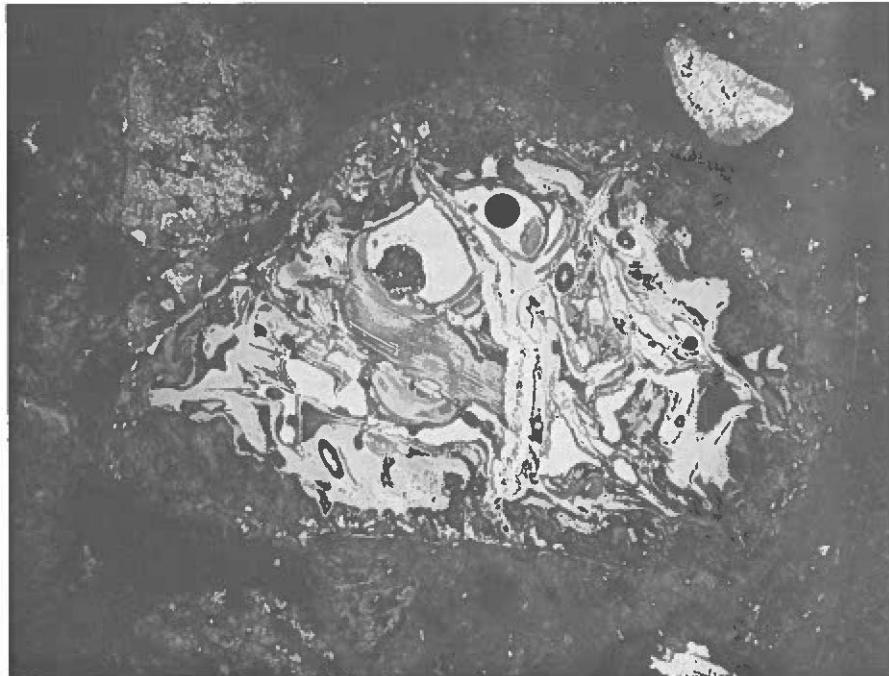
A consortium of researchers including J. M. Quezada Muñeton (Pemex, Mexico), L. E. Marín (Geophysics Institute, UNAM, Mexico), V. L. Sharpton, G. Ryder, and B. Schuraytz (Lunar and Planetary Institute, Houston), and B. G. Dalrymple (U.S.G.S. Menlo Park) has found clear and certain evidence that the Chicxulub structure on the Yucatan coast was created by impact of an asteroid or comet. The group is currently doing a detailed analysis of core samples obtained by Pemex from exploratory wells drilled near the center of the formation.

### Shock Features, Glasses Apparent



Evidence of shock metamorphism that results from the enormous pressures created by impact is abundant in the form

of multiple sets of planar deformation features in quartz and feldspar. A range of shock pressures from 6-10 GPa up to 23 GPa suggests that the breccias analyzed contain a mixture of material from different distances from the center of impact. Some of the clasts in the breccia are roughly andesitic in composition and retain planar shock features; they contain partially digested bits of quartz and feldspar that indicate that these are melt



*Photomicrograph shows a 3.5-mm clast of vesicular glass produced during the Chicxulub impact event. This clast has internal banding suggestive of flow deformation.*

rocks. The samples also contain impact glasses and fragments of basement rock (the layer that underlies the Yucatan platform) that show shock effects. Composition of the glasses and basement clasts is consistent with an impact into continent or continental shelf material. Interestingly, the glasses analyzed so far do not show the high-Ca chemistry reported for a layer of tektites found in Haiti thought to be ejecta from the impact, although this finding doesn't rule out a genetic relationship.

Examination of the basement fragments indicates a target of medium to high grade metamorphic rock, possibly a granitic gneiss containing quartz and alkali feldspars. The grains show signs of considerable deformation and shearing that occurred before the impact; further study should yield a better understanding of the tectonic history of the Yucatan platform.

Iridium, found abundantly at K/T sites around the world, has not been detected in the samples analyzed. It is possible that an impact of this magnitude could gener-

ate pressures and temperatures that would completely vaporize traces of the projectile at ground zero while still distributing Ir globally as fallout.

### Age Not Clearly Determined

Pemex research reports an 80-million-year-old age for the samples based on detailed stratigraphic and paleontological evidence, which would seem to cast doubt on a K/T (65-million-year-old) age for the Chicxulub rocks. In addition, J. M. Quezada Muñeton studied several K/T boundary exposures in Chiapas, Mexico, just 550 km from the center of Chicxulub and found no trace of the breccia deposit that would be expected from an impact so nearby. The consortium of investigators is conducting  $^{40}\text{Ar}$ - $^{39}\text{Ar}$  dating of the Chicxulub samples and hopes to be able to prove or disprove the case for Chicxulub as the K/T extinction trigger. ☐

# CALENDAR 1992

## 1992 is International Space Year

A host of activities, events, and meetings around the world will focus on space science and exploration with a special emphasis on education. The yearlong celebration is coordinated by the national space agencies of 29 countries, the United Nations, 9 international organizations, and many other groups, large and small. Some of the highlights are included in the *LPIB* Calendar. For a more complete list, refer to the special ISY insert in the January/February issues of *Ad Astra* or *Final Frontier* or contact the US-ISY Association, 600 Maryland Avenue NW, Suite 600, Washington DC 20024; phone: 202-863-1734; FAX: 202-863-5240.

### MARCH

**1-5** 4th International Symposium on Experimental Methods for Microgravity Materials Science Research, San Diego, California. Contact: Dr. Robert Schiffman, Symposium Chairman, 1960 Saunders Road, Riverwoods IL 60015. Phone/FAX: 708-940-7417.

**2-6** IAU Symposium 154 Infrared Solar Physics 1 μm to 1 mm, Tucson, Arizona. Contact: Douglas Rabin, National Solar Observatory, P.O. Box 26732, Tucson AZ 85726-6732. Phone: 602-325-9331; FAX: 602-325-9278.  
SPAN: 5355::rabin  
Internet: rabin@noao.edu

**16-20** 23rd Lunar and Planetary Science Conference, Houston, Texas. Contact: Program Services Department, LPI, 3600 Bay Area Boulevard, Houston TX 77058-1113. Phone: 713-486-2166; FAX: 713-486-2160.

**17-20** Recent Advances In High Energy Astronomy, Toulouse, France. Contact: Pierre Mandrou, 9 Av. du Colonel Roche, 31027 Toulouse France. Phone: 33-61.55.66.88; FAX: 33-61.55.67.01; Telex: 531729 UNSPAT Toulouse.  
SPAN: 17449::RAMON

**23** Blueprint for Space Symposium, New York, New York. Contact: NSS Space Frontier Society, Intrepid Sea/Air/Space Museum, W. 46th Street and 12th Avenue, New York NY 10036.

**23-26** Space Commerce 92, Montreux, Switzerland. Contact: (in North America) George Suter, Access Management Corporation, 7 Woodlawn Green, Suite 212, Charlotte NC 28217. Phone: 704-525-7030; FAX: 704-527-3768; Telex: 9102401552 access cha. (outside North America) Norman Neve, Permanent Secretariat, Space Commerce 90, P.O. Box 97, CH-1820 Montreux, Switzerland. Phone: 41 21 963 23 54; FAX: 41 21 963 78 95; Telex: 453 222 mtb ch.

### MARCH (CONTINUED)

**23-27** AGU Chapman Conference on Climate, Volcanism, and Global Change, Hilo, Hawaii. Contact: Stephen Self, Department of Geology and Geophysics, University of Hawaii at Manoa, Honolulu HI 96822; or Richard P. Turco, Department of Atmospheric Sciences, University of California at Los Angeles, Los Angeles CA 90024-1565.

**31** Eighth National Space Symposium, Colorado Springs, Colorado. Contact: United States Space Foundation, 1525 Vapor Trail, Colorado Springs CO 80916. Phone: 719-550-1000; FAX: 791-550-1011.

### APRIL

**6-7** Joint Workshop on New Technologies for Lunar Resource Assessment, Santa Fe, New Mexico. Contact: Program Services Department, LPI, 3600 Bay Area Boulevard, Houston TX 77058-1113. Phone: 713-486-2166; FAX: 713-486-2160.

**6-10** Scientific Instrumentation In Space Programs: International Course In Space Technology, Toulouse, France. Contact: C. Salmon, CNES. Phone: 33-61-27-34-72; FAX: 33-61-28-13-27. C. Tailhades, Europa. Phone: 33-61-32-66-99; FAX: 33-61-32-66-00.

**27** UN/U.S. International Space Year (ISY) Conference on Satellite Remote Sensing, Boulder, Colorado. — May 1 Contact: US-ISY Association, 600 Maryland Avenue SW, Suite 600, Washington DC 20024. Phone: 202-863-1734; FAX: 202-863-5240.

### MAY

**12-15** 1992 Joint Spring Meeting of the American Geophysical Union, Canadian Geophysical Union, and Mineralogical Society of America, Montreal, Canada. Contact: AGU Meetings, 2000 Florida Avenue NW, Washington DC 20009. Phone: 202-462-6903.

## MAY (CONTINUED)

**22-25** National Space Society's 11th Annual International Space Development Conference, Washington, DC. Contact: US-ISY Association, 600 Maryland Avenue SW, Suite 600, Washington DC 20024. Phone: 202-863-1734; FAX: 202-863-5240.

**25-27** Annual Meeting of the Geological Association of Canada and Mineralogical Association of Canada, Wolfville, Nova Scotia. Contact: Aubrey Fricker, Atlantic Geoscience Centre, Bedford Institute of Oceanography, Box 1006, Dartmouth, Nova Scotia, B2Y 4A2. Phone: 902-426-6759.

**26-29** IEEE International Geoscience and Remote Sensing Symposium (IGARSS), Clear Lake, Texas. Contact: US-ISY Association, 600 Maryland Avenue SW, Suite 600, Washington DC 20024. Phone: 202-863-1734; FAX: 202-863-5240.

**30** —June 4 Space 92: International Conference on Engineering, Construction, and Operations In Space, Denver, Colorado. Contact: Marie McGuinness, American Society of Civil Engineers. Phone: 212-705-7494.

## JUNE

**4-5** Evolution of Earth's Surface, Chicago, Illinois. Contact: Carmen Marti, University News and Information, University of Chicago, Room 200, 5801 S. Ellis Avenue, Chicago IL 60637-1473. Phone: 312-702-4195; FAX: 312-702-8324.

**15-19** Getting Comfortable Teaching with Space—Graduate Course, Colorado Springs, Colorado. Contact: U.S. Space Foundation. Phone: 719-550-1000.

**20-25** Universe '92 at 104th Annual Meeting of the Astronomical Society of the Pacific, Madison, Wisconsin. Contact: Meeting Department, A.S.P., 390 Ashton Avenue, San Francisco CA 94112. Phone: 415-337-1100.

**29** —July 1 MSATT Workshop on the Evolution of the Martian Atmosphere, Kona, Hawaii. Contact: Program Services Department, LPI, 3600 Bay Area Boulevard, Houston TX 77058-1113. Phone: 713-486-2166; FAX: 713-486-2160.

**29** —July 1 International Symposium on Small Satellites, Systems, and Services, Arcachon, France. Contact: Chantal Tailhades, Europa Organisation/PSL, 40, boulevard des Recollets-31400 Toulouse, France. Phone: 33-61-32-66-99; FAX: 33-61-32-66-00.

**29** —July 7 Science with the Hubble Space Telescope, Baia Chia, Sardinia, Italy. Contact: Britt Sjoberg, Space Telescope European Coordinating Facility, K-

## JUNE (CONTINUED)

Schwarzschild-Str.2,D-W8046 Garching bei Munchen, Germany. Phone: 49-89-32006-291; FAX: 49-89-32006-480.  
SPAN: ESO::BRITT  
Internet: britt@eso.org

## JULY

**15-18** IAU Colloquium 139 New Perspectives on Stellar Pulsation and Pulsating Variable Stars, Victoria, B.C., Canada. Contact: James Nemec, Washington State University, Pullman WA 99164-3113. Phone: 509-335-3136; FAX: 509-335-3136.

**16-20** International Aerospace Convention, Huntsville, Alabama. Contact: Debbie Roderick, Aviation Space Education Association. Phone: 205-551-2230.

**16-24** Spaceweek 1992, nationwide. Contact: Spaceweek National Headquarters. Phone: 713-333-3627.

**27-31** 55th Meteoritical Society Meeting, Copenhagen, Denmark. Contact: Vagn F. Buchwald, Department of Metallurgy, Building 204, D.T.H., DK-2800 Lyngby, Denmark. Phone: +45-45 93 12 22.

## AUGUST

**2-14** XVII Congress of the International Society for Photogrammetry and Remote Sensing (ISPRS), Washington, DC. Contact: Lawrence W. Fritz, GE Aerospace, P.O. Box 8048-10A26, Philadelphia PA 19101. Phone: 215-531-3205; FAX: 215-962-3698; Telex: 261745.

**8-9** International Symposium on the Exploration of the Sun, Dnepropetrovsk, Ukraine. Contact: US-ISY Association, 600 Maryland Avenue SW, Suite 600, Washington DC 20024. Phone: 202-863-1734; FAX: 202-863-5240.

**10-12** International Colloquium: Magellan at Venus, Pasadena, California. Contact: Program Services Department, LPI, 3600 Bay Area Boulevard, Houston TX 77058-1113. Phone: 713-486-2150; FAX: 713-486-2160.

**19-21** Seventeenth Symposium on Antarctic Meteorites, Tokyo, Japan. Contact: Keizo Yanai, National Institute of Polar Research, 9-10, Kaga 1-Chome, Itabashi-ku, Tokyo, Japan. Phone: 03-3962-4711 ext. 155; FAX: 03-3962-5711.

**24** Experimental Planetology and Cosmic Mineralogy (special symposium at IGC), Kyoto, Japan. Contact: IGC-92 Office, P.O. Box 65, Tsukuba, Ibaraki 305,

# CALENDAR 1992

## AUGUST (CONTINUED)

Japan. Phone: 81-298-54-3627; FAX: 81-298-54-3629;  
Telex: 3652511 GSJ J.

**24** 29th International Geological Congress, Kyoto, Japan. Contact: Secretary General, IGC-92 Office, P.O. Box 65, Tsukuba, Ibaraki 305, Japan. Phone: 81-298-54-3627; FAX: 81-298-54-3629; Telex: 3652511 GSJ J.

**28** World Space Congress—Joint Meeting of the International Astronautical Federation (IAF) and the Committee on Space Research (COSPAR), Washington, D.C. Contact: Mireille Gerard, AIAA, 370 L'Enfant Promenade SW, Washington DC 20024-2518. Phone: 202-646-7450; Information Hotline: 202-646-7451.

**30** Sudbury Impact Structure Meeting, Sudbury, Canada. Contact: Program Services Department, LPI, 3600 Bay Area Boulevard, Houston TX 77058-1113. Phone: 713-486-2150; FAX: 713-486-2160.

**31** Chapman Conference on Tectonics and Topography, Snowbird, Utah. Contact: AGU Meetings, 2000 Florida Avenue NW, Washington DC 20009. Phone: 202-462-6903.

## SEPTEMBER

**10-12** MSATT Workshop on Chemical Weathering on Mars, Cape Canaveral/Orlando, Florida. Contact LPI-MSATT Chemical Weathering Workshop, LPI, 3600 Bay Area Boulevard, Houston TX 77058-1113. Phone: 713-486-2150; FAX: 713-486-2160.

**14-17** 4th International Colloquium on Atomic Spectra and Oscillator Strengths for Astrophysical and Laboratory Plasmas, Gaithersburg, Maryland. Contact: Lori Phillips, National Institute of Standards and Technology, Gaithersburg MD 20899. Phone: 301-975-4513; FAX: 301-926-1630.

**14-19** Chapman Conference on Solar Wind Sources of Magnetospheric Ulf Waves, Williamsburg, Virginia. Contact: AGU Meetings, 2000 Florida Avenue NW, Washington DC 20009. Phone: 202-462-6903.

**15-19** The Impact of Astrometry on Astrophysics and Geodynamics, Shanghai, China. Contact: Ivan I. Mueller, Department of Geodetic Science and Survey-

## SEPTEMBER (CONTINUED)

ing, Ohio State University, Columbus OH 43210-1247. Phone: 614-292-2269; FAX: 614-292-2957.

**21-25** International Symposium on Observational Cosmology, Milano, Italy. Contact: Secretariat, Osservatorio Astronomico, Via Brera 28, 20121 Milano, Italy. Phone: (0)2-72023751; FAX: (0)2-72001600. SPAN: 39216::OBS\_COS Internet: obs\_cos@astmib.infn.it PSI: PSI%23910085::OBS\_COS

**28-30** International Symposium on Mission Technologies and Design of Planetary Mobile Vehicles, Toulouse-Labege, France. Contact: Groupe Europa - 40, boulevard des Recollets, 31400 Toulouse, France. Phone: (33) 61 32 66 99; FAX: (33) 61 32 66 00.

**30** International Symposium on Artificial Intelligence, Robotics, and Automation In Space (I-SAIRAS), — Oct 2 Toulouse-Labege, France. Contact: Groupe Europa - 40, boulevard des Recollets, 31400 Toulouse, France. Phone: (33) 61 32 66 99; FAX: (33) 61 32 66 00.

## OCTOBER

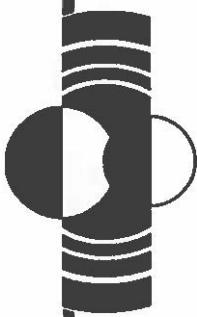
**11-16** 24th Annual Meeting of the Division for Planetary Sciences of the American Astronomical Society, Munich, Germany. Contact: Program Services Department, LPI, 3600 Bay Area Boulevard, Houston TX 77058-1113. Phone: 713-486-2150; FAX: 713-486-2160.

## NOVEMBER

**15-20** Chapman Conference on the Lower Thermosphere and Upper Mesosphere, Asilomar, California. Contact: AGU Meetings, 2000 Florida Avenue NW, Washington DC 20009. Phone: 202-462-6903.

## DECEMBER

**7-11** American Geophysical Union, Fall Meeting, San Francisco, California. Contact: AGU Meetings, 2000 Florida Avenue NW, Washington DC 20009. Phone: 202-462-6903.



## **Twenty-Third Lunar and Planetary Science Conference**

**Preliminary Program  
March 16-20**



**PRELIMINARY CONFERENCE PROGRAM  
23rd Lunar and Planetary Science Conference  
March 16-20, 1992**

\* Designates Speaker

**Monday, March 16, 1992  
MAGELLAN AT VENUS: THE GLOBAL PERSPECTIVE EMERGES  
8:30 a.m. Room A**

**Chairmen:** R. E. Arvidson  
R. S. Saunders

Solomon S. C.\* Smrekar S. E. Bindschadler D. L. Grimm R. E. Kaula W. M. McGill G. E. Phillips R. J.  
Saunders R. S. Schubert G. Squyres S. W. Stofan E. R.  
*Venus Tectonics: An Overview of Magellan Observations*

Suppe J.\* Connors C.  
*Linear Mountain Belts and Related Deformation on Venus*

Schubert G.\*  
*Mantle Dynamics and Tectonics on Venus*

Schaber G. G.\* Moore H. J. Strom R. G. Boyce J. M.  
*The Uniform Distribution but Nonuniform Modification of Impact Craters on Venus*

Phillips R. J.\* Herrick R. R. Grimm R. E. Raubertas R. F. Sarkar I. C. Arvidson R. E. Izenberg N.  
*The Resurfacing History of Venus: Constraints from Impact Crater Distribution*

Head J. W.\* Crumpler L. S. Aubele J. C.  
*Venus Global Volcanism: Characteristics and Distribution of Edifices and Deposits and Implications for Resurfacing Style and Rates*

Arvidson R. E.\* Greeley R. Malin M. Saunders R. S. Izenberg N. Plaut J. J. Stofan E.  
*Surface Modification of Venus as Inferred from Magellan Observations of Plains and Tesserae*

Wood J. A.\*  
*Venus: Surface Chemistry and Modification Processes*

Baker V. R.\* Komatsu G. Gulick V. C. Kargel J. S.  
*Venusian Valleys and Channels*

Saunders R. S.\* Stofan E. R.  
*Science Questions for the Magellan Continuing Mission*

**Monday, March 16, 1992  
METEORITE PARENT BODIES  
8:30 a.m. Room B**

**Chairmen:** A. Graham  
E. Scott

Haack H. \* Taylor G. J. Scott E. R. D. Keil K.  
*Thermal History of Chondrites: Hot Accretion vs. Metamorphic Reheating*

Steele I. M.\*  
*Olivine Zoning as Function of Crystallographic Orientation; Implications for Diffusion in Olivine*

Burkland M. K.\* Swindle T. D.

*Studies of the Diffusion Properties of the I-Xe System in Bjurbole*

Benoit P. H. Sears D. W. G.\*

*The Break-up of the H Chondrite Parent Body and the Delivery of Fragments to Earth*

Fujiwara T. Nakamura N.\*

*Additional Evidence of a Young Impact-Melting Event on the L-Chondrite Parent Body*

Perron C.\* Bourot-Denise M.

*Inclusions in the Metal of Tieschitz and Krymka*

Rubin A. E.\*

*Petrography of Metallic Cu in Ordinary Chondrites*

Brearley A. J. \*

*Phyllosilicates in the Matrix of the Unusual Carbonaceous Chondrite, LEW 85332 and Possible Affinities to CI Chondrites*

Graham A. L.\* Lee M.

*The Matrix Mineralogy of the Vigarano (CV3) Chondrite*

Llorca J.\* Brearley A. J.

*Alteration of Chondrules in ALH 84034, an Unusual CM2 Carbonaceous Chondrite*

Zolensky M. E.\* Weisberg M. K. Buchanan P. C. Prinz M. Reid A. Barrett R. A.

*Mineralogy of Dark Clasts in CR Chondrites, Euclites and Howardites*

Xiao X. Lipschutz M. E. \*

*Carbonaceous Chondrites: Co-Variation of Volatile Element Contents and Siderophile Element Ratios in Petrographic Types 2-6*

Yanai K.\*

*Bulk Composition of Yamato-793575 Classified as Carlisle Lakes-type Chondrite*

Monday, March 16, 1992

MARE BASALTS, KREEP, AND COPERNICAN EJECTA

8:30 a.m. Room C

Chairmen: C. K. Shearer

G. A. Snyder

Marvin U. B.\* Holmberg B. B.

*Highland and Mare Components in the Calcalong Creek Lunar Meteorite*

Boesenborg J. S.\* Delaney J. S.

*Lithic Clasts in Elephant Moraine 87521 Sample Two VLT Fractionation Series*

James O. B.\* McGee J. J.

*Compositional Variations in Mare-Basalt Plagioclase Produced by Differing Crystallization Regimes*

Jerde E. A.\* Snyder G. A. Taylor L. A.

*Apollo 11 High-K Basalts: An Apollo 17 Connection and Evidence for neoKREEP*

Snyder G. A.\* Jerde E. A. Taylor L. A. Lee D.-C. Halliday A. N.

*Isotopic Constraints on the Lunar Upper Mantle: Evidence from High-Ti Basalts*

Misawa K.\* Tatsumoto M. Yanai K.  
*U-Th-Pb, Sm-Nd, and Rb-Sr Isotopic Systematics of Lunar Meteorite Asuka-31*

Shearer C. K.\* Papike J. J.  
*Relationship Between Apollo 12 High-Ti, Red-Picritic Glass and High-Ti Basaltic Magmatism*

Neal C. R.\* Hacker M. D. Taylor L. A. Schmitt R. A. Liu Y.-G.  
*The Petrogenesis of Apollo 12 Mare Basalts, Part 1: The "Lumpers" Versus the "Splitters"*

Wentworth S. J.\* McKay D. S. Bogard D. D.  
*Apollo 12 Ropy Glasses Revisited*

Bogard D. D.\* Garrison D. H. McKay D. S. Wentworth S. J.  
*The Age of Copernicus: New Evidence for 800 $\pm$ 15 Million Years*

Vetter S. K.\* Shervais J. W.  
*Whole Rock Major Element Chemistry of KREEP Basalt Clasts in Lunar Breccia 15205: Implications for the Petrogenesis of Volcanic KREEP Basalts*

Haskin L. A.\* Jolliff B. L. Colson R. O.  
*On Partitioning of REE Between Whitlockite and Apatite in High-ITE Lunar Rocks: Petrologic Consequences*

Monday, March 16, 1992  
VENUS GEOPHYSICS  
1:30 p.m. Room A

Chairmen: C. Johnson  
R. Herrick

Sjogren W. L.\*  
*Venus Gravity: Status and New Data Acquisitions*

Grimm R. E.\* Herrick R. H. Phillips R. J.  
*Highlander III: On the Origin and Evolution of Large Uplands on Venus*

Lenardic A.\* Kaula W. M. Bindschadler D. L.  
*Maxwell and the Andes: Analogous Structures?*

Price E. J.\* Connors C. Dahlen F. A. Suppe J. Williams C. A.  
*Accretionary Wedge Mechanics on Venus: A Brittle/Ductile Critical Taper Model*

Zuber M. T.\* Parmentier E. M.  
*The Contribution of Dynamic Topography Due to Lithosphere Compression to the Structure of Mountain Belts and Ridge Belts on Venus*

Pronin A.\* Kreslavsky M.  
*A Possible Mechanism of Gravity Relaxation on Venus*

Namiki N.\* Solomon S. C.  
*The Gabbro-Eclogite Phase Transition and the Elevation of Mountain Belts on Venus*

Banerdt W. B.\* Sammis C. G.  
*Parallel Fracture Patterns on the Plains of Venus*

Herrick R. R.\* Phillips R. J.  
*Comparison of Magellan Data with the Interior Density Structure of Venus*

Johnson C. L.\* Sandwell D. T.

*Flexure on Venus: Implications for Lithospheric Elastic Thickness and Strength*

Sandwell D. T.\* Schubert G.

*Is the Venusian Lithosphere Subducting?*

Burt J. D.\* Head J. W.

*Thermal Buoyancy on Venus: Underthrusting vs. Subduction*

Davies M. E.\* Colvin T. R. Rogers P. G. Chodas P. W. Sjogren W. L.

*Venus' Rotation Period and Pole Direction*

Monday, March 16, 1992  
ASSORTED ACHONDRITES  
1:30 p.m. Room B

Chairmen: G. A. McKay  
R. N. Clayton

Harvey R. P.\* McSween H. Y. Jr.

*Parental Magmas of the Nakhlites Re-Examined*

Wadhwa M.\* Crozaz G.

*REE in Minerals in Nakhla and Lafayette: A Comparative Study of Trace Element Microdistributions*

McKay G.\* Le L. Wagstaff J.

*REE Partition Coefficients for the Nakhla Parent Melt*

Lindstrom M. M.\* Mittlefehldt D. W. Treiman A. H. Wentworth S. J. Gooding J. L. Morris R. V. Keller L. P. McKay G. A.

*LEW88516: A New Shergottite from Antarctica*

Boynton W. V.\* Hill D. H. Kring D. A.

*The Trace-Element Composition of Lew 88516 and its Relationship to SNC Meteorites*

Treiman A. H.\* Barrett R. A. Gooding J. L.

*The Lafayette Meteorite: Preterrestrial Aqueous Alterations*

Miyamoto M. Takeda H.\*

*Two-Stage Cooling History of the Moore County Eucrite*

Shearer C. K.\* Papike J. J.

*Origin of Olivine Diogenites and Their Relationship to Basaltic Magmatism on the Eucrite Parent Body*

Nyquist L. E.\* Bansal B. Wiesmann H. Shih C.-Y.

*$^{147}\text{Sm}$ - $^{143}\text{Nd}$  Ages and  $^{146}\text{Sm}$ - $^{142}\text{Nd}$  Formation Intervals of Basalt Fragments from the HED Parent Body*

Ireland T. R.\* Saiki K. Takeda H.

*Age and Trace-Element Chemistry of Yamato 791438 Zircon*

Jurewicz A. J. G.\* McKay G. A.

*Chondrite Melting Experiments: Can Angrite LEW 87051 be Produced by Partial Melting of a CV or CM Chondrite?*

Clayton R. N.\* Mayeda T. K. Nagahara H.  
*Oxygen Isotope Relationships Among Primitive Achondrites*

Kring D. A.\* Boynton W. V.  
*The Trace-Element Composition of Eagles Nest and its Relationship to Other Ultramafic Achondrites*

Monday, March 16, 1992  
ORIGIN AND EVOLUTION OF PLANETARY SYSTEMS  
1:30 p.m. Room C

Chairmen: P. Cassen  
J. A. Nuth III

Wolszczan A.\*  
*Discovery of Planets Around a Millisecond Pulsar*

Malhotra R.\* Black D. Eck A. Jackson A.  
*Constraints on the Putative Companions to PSR1257+12*

Sandford S. A.\* Allamandola L. J. Tielens A. G. G. M. Herbst T.  
*The Detection of Methanol and Diamonds in Dense Molecular Clouds*

Kim J. S.\* Marti K.  
*Evidence for Neutron Irradiation in the Early Solar System*

Boss A. P.\*  
*Thermal Structure of the Solar Nebula*

Cassen P.\*  
*Thermal Models of the Primitive Solar Nebula*

Stepinski T. F.\* Levy E. H.  
*On the Generation of Magnetic Fields in the Solar Nebula at the Location of the Present-Day Asteroid Belt*

Stewart G. R.\*  
*Generalized Theory for Planetesimal Dynamics*

Williams D. R.\* Wetherill G. W. Stewart G. R.  
*Growth and Thermal Evolution of Planetesimals*

Wetherill G. W.\*  
*Simultaneous Growth and Orbital Evolution of Terrestrial and Asteroidal Embryos*

Cameron A. G. W.\*  
*The Giant Impact Revisited*

Drobyshevski E. M.\*  
*Mercury's Impact-Induced Self-Destruction and Early Impact History of Inner Planets*

Pepin R. O.\*  
*Evolution of Earth's Noble Gases from Primordial Distributions: Consequences of Assuming Hydrodynamic Loss Driven by Giant Impact*

Monday, March 16, 1992  
PUBLIC SESSION  
HAROLD MASURSKY LECTURES  
8:00 p.m. Bldg. 2 Auditorium

Chairmen: Michael Griffin  
Wesley T. Huntress

Eugene Shoemaker  
U.S. Geological Survey

Ellen Stofan  
Jet Propulsion Laboratory

Tuesday, March 17, 1992  
VENUS: TECTONISM AND VOLCANIC ASSOCIATIONS  
8:30 a.m. Room A

Chairmen: S. E. Smrekar  
D. A. Senske

Ivanov M. A.\* Tormanen T. Head J. W.  
*Global Distribution of Tesserae: Analysis of Magellan Data*

deCharon A. V.\* Stofan E. R.  
*Complex Ridged Terrain at Phoebe Regio, Venus from Magellan Data*

Bilotti F.\* Suppe J.  
*Planetary Distribution and Nature of Compressional Deformation Around Artemis Corona, Venus*

Törmänen T.\* Raitala J.  
*Tectonics of Southwestern Audra Planitia on Venus from Magellan Data: Evidence of Underthrusting*

Hansen V. L.\*  
*Regional Non-Coaxial Deformation on Venus: Evidence from Western Itzpalalotl Tessera*

Pohn H. A.\* Schaber G. G.  
*Indenter Type Deformation on Venus as Evidence for Large-Scale Tectonic Slip, and Multiple Strike-Slip Events as a Mechanism for Producing Tesselated Terrain*

Baer G.\* Schubert G. Bindschadler D. L. Stofan E. R.  
*Spatial and Temporal Relations Between Coronae and Extensional Belts, Northern Lada Terra*

Senske D. A.\* Head J. W.  
*Zones of Extension and Rifting on Venus: Characteristics and Distribution*

Roberts K. M.\* Head J. W. Lancaster M. G. Guest J. E.  
*Volcanism and Rifting Along the Northern Edge of Lada Terra, Venus*

Parker T. J.\* Komatsu G. Baker V. R.  
*Longitudinal Topographic Profiles of Very Long Channels in Venusian Plains Regions*

Pavri B.\* Head J. W. Wilson L. Klose B.  
*Steep-sided Domes on Venus: Distribution, Associations, and Implications for Petrologic Models*

Guest J. E.\* Bulmer M. H. Beretan K. Michaels G. Saunders S.  
*Gravitational Collapse of the Margins of Volcanic Domes on Venus*

Head J. W.\* Crumpler L. S. Aubele J. C.  
*A Major Global-Scale Concentration of Volcanic Activity in the Beta-Atla-Themis Region of Venus*

Tuesday, March 17, 1992  
REDUCED METEORITES  
8:30 a.m. Room B

Chairmen: M. K. Weisberg  
A. H. Spitz

Chang Y.\* Benoit P. H. Sears D. W. G.  
*Bulk Compositional Confirmation of the First EL3 Chondrite and Some Implications*

Weisberg M. K.\* Fogel R. A. Prinz M.  
*FeO-rich Silicates and Reduction Processes in the Unequilibrated Enstatite Chondrites*

El Goresy A.\* Wadhwa M. Nagel H.-J. Zinner E. K. Janicke J. Crozaz G.  
*<sup>53</sup>Cr-<sup>53</sup>Mn Systematics of Mn-Bearing Sulfides in Four Enstatite Chondrites*

Lodders K.\* Fegley B. Jr.  
*Lanthanide and Actinide Condensation into Oldhamite Under Reducing Conditions*

Dickinson T. L.\* Lofgren G. E.  
*Melting Relations for Indarch (EH4) Under Reducing Conditions*

Gaffey M. J. Reed K. L. Kelley M. S.\*  
*E-Type Apollo Asteroid (3103) 1982BB: A Hungaria-Derived Near-Earth Source Body for the Aubrites*

Treiman A. H.\* Berkley J. L.  
*A New Ureilite: Preliminary Data on Nuevo Mercurio (B)*

Spitz A. H.\*  
*ICP-MS Trace Element Analysis of Ureilites: Evidence for Mixing of Distinct Components*

Goodrich C. A.\* Lugmair G. W.  
*Addition of LREE-Enriched Material to a Ureilite at 4.23 Ga: Evidence for Episodic Metasomatism?*

Scott E. R. D.\* Keil K. Taylor G. J.  
*Origin of Ureilites by Partial Melting and Explosive Volcanism on Carbon-rich Asteroids*

Warren P. H.\* Kallemeyn G. W.  
*Ureilites: The Graphite f(O<sub>2</sub>) Buffer, Explosive Volcanism, and the Gross Dissipation of Basalt from the Parent Asteroid(s)*

Olsen E.\* Davis A. M. Moore C. B. Clayton R. N. Mayeda T. K. Steele I. M.  
*Puenta Del Zacate: First Occurrence of a Silicate Inclusion in a Type III Iron (But What Is It?)*

Petaev M. I.\* Ariskin A. A.  
*Thermodynamic Modelling of the Origin of the Divnoe Achondrite*

**Tuesday, March 17, 1992**  
**EVOLUTION OF THE LUNAR CRUST AND MANTLE**  
**8:30 a.m. Room C**

**Chairmen:**    **R. L. Korotev**  
                    **G. Ryder**

**Basu A.\* Wentworth S. J. McKay D. S.**

*Preliminary Results of a Petrographic Investigation of Apollo 16 Core 60014*

**Korotev R. L.\***

*Compositional Differences Between Feldspathic Fragmental Breccias and Ancient Regolith Breccias from Apollo 16*

**Shih C.-Y.\* Wiesmann H. Nyquist L. E.**

*K-Ca Age of Lunar Granites*

**Premo W. R.\* Tatsumoto M.**

*U-Pb Isotopes in Dunite 72415*

**Takeda H.\* Miyamoto M. Mori H.**

*Mineralogy and Cooling Histories of Lunar Granulites and Related Lunar Meteorites*

**Phinney W. C.\***

*D's for Cr, Mn, and Ti as Tests of Igneous vs. Subsolidus Equilibration of Mafic Minerals in Lunar Rocks*

**Jolliff B. L.\***

*Mafic, Ferroan Lithologies from North Ray Crater, Apollo 16: Implications for Crustal Abundance*

**Ryder G.\***

*Lunar Highlands Totality from Bits and Pieces: A Whole-Rock-Chemistry-Free Characterization of an Evolved Hypabyssal Igneous Gabbro Schlieren from the Apollo 17 Landing Site*

**Longhi J.\* Fram M. S. Vander Auwera J. Montieth J.**

*Pressure Effects in Anorthositic and Related Magmas*

**Nyquist L. E.\* Shih C.-Y.**

*Nd Isotopic Evidence for Lunar Crust/Mantle Mixing - Possibly During a Basin-Forming Impact*

**Hess P. C.\***

*Dissolution of Plagioclase and the Origin of Mg-Suite Parent Magmas*

**Solomatov V. S.\* Stevenson D. J.**

*Comparison of Lunar and Terrestrial Magma Oceans*

**Tuesday, March 17, 1992**  
**OUTER SOLAR SYSTEM/REMOTE SENSING: LABORATORY**  
**8:30 a.m. Room D**

**Chairmen:**    **D. Domingue**  
                    **L. Lebofsky**

**Colwell J. E.\* Esposito L. W.**

*Formation of Narrow Planetary Rings by Satellite Disruption*

**Kuramoto K.\* Matsui T.**

*Loss of Ice from Accreting Giant-Icy-Satellites by the Escape of Hot Proto-Atmospheres*

Malcuit R. J.\* Mehringer D. M. Winters R. R.

*Numerical Simulation of Retrograde Tidal Capture of a Triton-like Planetoid by a Neptune-like Planet: Two-Dimensional Limits of a Stable Capture Zone*

Nash D. B.\* VanHecke G. R.

*Chemical Working Fluid Mechanism for Recycling and Exothermic Heating of Io's Surface*

Rudnyk M.\* Pieri D.

*Lineament Types as Evolutionary Stages for Development of Ridges/Scars on Europa*

Pappalardo R.\* Greeley R.

*Single-Plate Rifting Model for Ridge and Trough Terrain on Icy Satellites*

Henderson B. G.\* Jakosky B. M. Randall C. E.

*Multiple Scattering and Polarization of Thermal Emission from Particulate Planetary Surfaces*

Hapke B.\* Nelson R. Smythe W. Gharakhanian V. Hom L. Lane A.

*Opposition Effect and Negative Polarization: Laboratory Studies*

Oehler A.\* Neukum G.

*First Results from the DLR Goniospectrophotometer*

Wald A. E.\* Salisbury J. W.

*Angular Dependence of Spectral Emissivity of Quartz and Basalt*

Dilley J.\*

*The Coefficient of Restitution for Collisions of Icy Spheres*

Kane K. Y. Cremer D. A.\*

*Remote Elemental Analysis of Planetary Surfaces Using Laser-Induced Breakdown Spectroscopy*

Tuesday, March 17, 1992

Session Dedicated to William Quaide on the Event of his Retirement

VENUS VOLCANISM

1:15 p.m. Room A

Chairmen: J. J. Plaut  
K. M. Roberts

Burnett D.

*Introduction*

Holloway J. R.\*

*Volcanic Degassing Under Thick Atmospheres: Consequences for Magmatic Volatiles on Venus*

Sakimoto S. E. H.\* Zuber M. T. Marsh B. D.

*Cooling of Ascending Magma on Venus and Earth*

Wilson L.\* Head J. W.

*Magma Reservoirs and Neutral Buoyancy Zones on Venus: Implications for the Formation and Evolution of Volcanic Landforms*

Parmentier E. M.\* Hess P. C.

*Chemical Differentiation of a Convecting Planetary Interior: Consequences for One-Plate Planets such as Venus*

Kargel J. S.\* Komatsu G.  
*The Composition of Venus and the Petrogenesis of Venusian Silicate Lavas*

Klose K. B.\* Zolotov M. Yu.  
*Chemical Weathering of Evolved Igneous Rocks on Venus*

Basilevsky A. T.\* Weitz C. M.  
*Venera 9, 10 and 13 Landing Sites as seen by Magellan*

Gregg T. K. P.\* Greeley R.  
*Formation Constraints on Venusian "Canali"*

Robinson C. A.\* Wood J. A.  
*Recent Volcanic Activity on Venus: Evidence from Emissivity Measurements*

Keddie S. T.\* Head J. W.  
*Sapas Mons Venus: Sequence of Events in a Large Shield Volcano*

Lancaster M. G.\* Guest J. E. Roberts K. M. Head J. W.  
*"Great" Lava Fields on Venus*

Campbell B. A.\*  
*Comparison of Magellan Measurements of Surface Roughness on Venus to Topographic Profiles of Terrestrial Basaltic Lava Flows*

Plaut J. J.\*  
*Multiple Views of Venus: Geological Significance of Scattering Law Anomalies*

Tuesday, March 17, 1992  
CHONDRULES  
1:30 p.m. Room B

Chairmen: J. M. Dehart  
D. W. G. Sears

Simon S. B.\* Grossman L.  
*Petrography, Composition and Origin of Chromian Spinel Crystals Separated from the Murchison Meteorite*

Wasson J. T.\* Krot A.  
*Oxidizing Conditions in the Solar Nebula and the Origin of Chromite Chondrules*

Lu J.\* Sears D. W. G. Benoit P. H. Prinz M. Weisberg M. K.  
*The Four Primitive Chondrule Groups and the Formation of Chondrules*

Jones R. H.\*  
*Petrology of FeO-poor, Porphyritic Pyroxene Chondrules in the Semarkona Ordinary Chondrite*

DeHart J. M.\* Lofgren G. E.  
*Annealing Studies of Type A Chondrule Analogs*

Lofgren G. E.\* DeHart J. M.  
*Dynamic Crystallization Studies of Enstatite Chondrite Chondrules: Cathodoluminescence Properties of Enstatite*

Connolly H. C. Jr.\* Hewins R. H.  
*Chondrule Modifications as a Possible Indicator of Rim-Forming Mechanisms*

Kennedy A. K.\* Lofgren G. E. Wasserburg G. J.

*A Study of Trace Element Partitioning Between Olivine, Orthopyroxene and Melt in Chondrules: Equilibrium Values and Kinetic Effects*

Lofgren G. E.\* Dehart J. M. Dickinson T. L.

*Relict Enstatite and Olivine in Porphyritic Chondrules from Enstatite Chondrites Formed by Partial Melting of Precursor Material*

Palme H.\* B. Spettel Kurat G. Zinner E.

*Origin of Allende Chondrules*

Hervig R. L.\* Steele I. M.

*Oxygen Isotopic Analysis of Allende Olivine by Ion Microprobe and Implications for Chondrule Origin*

Kurat G.\* Brandstätter F. Zinner E. Palme H. Spettel B.

*A SIMS Study of Some Allende Chondrules: Support for the New Chondrule Model*

Sahagian D. L. Hewins R. H.\*

*The Size of Chondrule-Forming Events*

Tuesday, March 17, 1992

**IMPACT CRATERING: THEORY AND EXPERIMENTATION**

1:30 p.m. Room C

Chairmen: D. A. Crawford

C. L. Smither

Crawford D. A.\* Schultz P. H.

*The Production and Evolution of Magnetic Fields During Hypervelocity Impacts*

Schmidt R. M.\*

*Experiments to Investigate Atmospheric Effects on Crater Size*

Barnouin O.\* Schultz P. H.

*A Continuum Model for Atmospheric Response to an Advancing Ejecta Curtain*

Housen K. R.\*

*Crater Ejecta Velocities for Impacts on Rocky Bodies*

Asphaug E.\* Melosh H. J. Ryan E.

*Theoretical Predictions for Fragment Size Distributions*

Ryan E. V.\* Asphaug E. Melosh H. J.

*Hydrocode Simulation of Explosive Disruption: External Pressure and Gravity*

Smither C. L.\* Ahrens T. J.

*Energy Partitioning and Ejecta Escape for Normal and Oblique Impacts on Self Gravitating Planetary Systems*

Yang W.\* Ahrens T. J.

*Silicate Jet Ejecta Mass and Geometry upon Oblique Impact*

Brackett R. A.\* McKinnon W. B.

*Pressure Attenuation in Impacts Determined Using a Finite Shell Model: Implications for Melt and Vapor Scaling*

O'Keefe J. D.\* Ahrens T. J.

*Melting and Shock Weakening Effects on Impact Crater Morphology*

Mittlefehldt D. W.\* See T. H. Hörr F.

*Projectile Dissemination in Impact Melts from Meteor Crater, Arizona*

Graup G.\* Palme H. Spettel B.

*Trace Element Stratification in the Stevens Klinton Cretaceous/Tertiary Boundary Layers*

Ahrens T. J. Rowan L. Yang W. Becker R. H.\* Pepin R. O.

*Impact Release of Noble Gases from the Murchison Meteorite*

Tuesday, March 17, 1992  
POSTER SESSION I  
7:00 - 9:00 P.M. LPI

#### VENUS GEOMORPHOLOGY

Clark J. Alexander D. Andres P. Stanley C.

*Image Processing Data Products for the Magellan Mission*

Finn V. J. Baker V. R.

*Venus and Earth: Morphostructural Comparison and Endogenetic Implications*

Gulick V. C. Baker V. R. Komatsu G.

*Channel and Valley Morphology on Venus: An Updated Classification*

Kucinskas A. B. Turcotte D. L. Huang J. Ford P. G.

*A Spectral Study of Venus Topography in Two Selected Equatorial Regions*

Landheim R. Geringer M. A. Greeley R. Barker J.

*Radar-Visible Wind Streaks on Venus Compared with Terrestrial Analogs*

Stofan E. R. Plaut J. J. Greeley R. Arvidson R. A. Elachi C. Geringer M. A. Saunders R. S. Schubert G. Wall S.D. Weitz C. M.

*Geologic Settings of Aeolian Features on Venus*

Weitz C. M. Elachi C. Blom R. Greeley R.

*Two Possible Dune Fields on Venus*

Törmänen T.

*Geomorphic/Geologic Map of Audra Planitia Region on Venus Based on Magellan Radar Image Mosaic CI-MIDR.60N070;1*

#### VENUS TECTONICS

Wieczorek M. A. Tatsumura M. J. Leyva I. A. Desmarais K. Johnson J. Koopowitz L. Landheim R. Bindschadler D. L.

*Morphologic Mapping of the Region from Northern Owda Regio to Southern Tellus Regio, Venus*

Bindschadler D. L. Tatsumura M. J.

*Tellus Regio, Venus: Preliminary Magellan Observations of a Region of Complex Ridged Terrain*

Grosfils E. B. Head J. W.

*Venusian Stress Directions from Radial Fractures*

Ghail R. Wilson L.

*Subduction at Artemis Chasma*

Michaels G. A. Saunders R. S. Stofan E. R.  
*Morphology of Regional Fracture Systems on Venus*

Parfitt E. A. Head J. W.  
*A Survey of Radial Fracture Systems on Venus*

Sankrekar S. E. Solomon S. C.  
*Tectonic Implications of Gravitational Spreading Models for Ishtar Terra, Venus*

## VENUS IMPACT CRATERS

Chadwick D. J. Schaber G. G. Moore H. J. Strom R. G.  
*Bright Crater Outflows on Venus*

Duval D. M. Wood C. A.  
*Impact Crater Flows on Venus: Morphological Evidence for Complex Ejection Dynamics*

Edmunds M. S. Sharpton V. L.  
*Characterization of Ejecta Facies Around Large Venusian Craters: Implications for the Origin of Flow-like Ejecta*

Garvin J. B. Schaber G. G.  
*Morphometry of Large Impact Craters on Venus: Comparisons with Terrestrial and Lunar Examples*

Grieve R. A. F. Cintala M. J.  
*Venusian Impact Craters: Effects of Differential Scaling*

Ivanov B. A. Provalov A. A. Rybakov V. A.  
*The Possible Radiative Heat Damage of the Venusian Surface*

Leff C. Morrison A. D.  
*The Small Craters of Venus - an Inspection Using Magellan Data*

Moore H. J. Weitz C. M. Schaber G. G.  
*Cochran and Other Venusian Impact Craters*

Schenk P. Sharpton V. L.  
*The Simple-to-Complex Crater Transition on Venus*

Schultz P. H.  
*Wake-Blast Effects in Laboratory Experiments and on Venus*

Weitz C. M. Moore H. J. Schaber G. G.  
*Low-Emissivity Impact Craters on Venus*

Nikolaeva O. V. Klose K. B.  
*The Giant Impact: A New Paradigm for the Origin of the Global Crustal Dichotomies of the Terrestrial Planets*

## PLANETARY VOLCANISM

Crumpler L. S. Head J. W. Aubele J. C. Guest J. Saunders R. S.  
*Venus Volcanism: Global Distribution and Classification from Magellan Data*

Aubele J. C. Head J. W. Crumpler L. S. Guest J. E. Saunders R. S.  
*Fields of Small Volcanoes on Venus (Shield Fields): Characteristics and Implications*

Wiles C. R. Forshaw M. R. B.  
*Automated Detection and Measurements of Small Volcanoes on Venus*

**Head J. W. Crumpler L. S. Aubele J. C.**

*Large Shield Volcanoes on Venus: Distribution and Classification*

**Bulmer M. H. Guest J. E. Stofan E. R.**

*Calderas on Venus*

**Moore H. J. Schenk P. M. Plaut J. J. Weitz C. M.**

*An Explosive Eruption on Venus*

**Wenrich M. L. Greeley R.**

*Investigation of Venusian Pyroclastic Volcanism*

**Schenk P. Moore H. J.**

*An Unusual Thick Lava Flow in Ovda Regio, Venus*

**Komatsu G. Baker V. R.**

*Formation of Venusian Channels and Valleys, and Styles of Volcanism*

**Straub D. W. Burns R. G.**

*A Kinetic Study of the Conversion of Hematite to Magnetite with Applications to the Metastability of Hematite on Venus*

**Zimbelman J. R. Edgett K. S.**

*Volcanic and Modified Landforms on the Tharsis Montes, Mars*

**Bertka C. M.**

*Martian vs. Terrestrial Volcanism: Are Partial Melt Properties Influential?*

**Lopes-Gautier R. M. C. Kilburn C. R. J.**

*The Growth of a and Blocky Lavas and Implications for Magmatic Feeding Systems*

**Austin R. T. England A. W.**

*Multi-Scale Roughness Spectra of Volcanic Debris Flows*

## IMPACT CRATERING: THEORETICAL ASPECTS

**Zenchenko E. V. Tsvetkov V. M.**

*The Effect of Target Properties on Cratering Mechanism*

**Crawford D. A. Schultz P. H.**

*Experimental Investigations of Impact-Generated Magnetic Fields*

**Ivliev A. I. Kashkarov L. L. Baryshnikova G. V. Badjukov D. D.**

*Thermoluminescence of Oligoclase as Indicator of Shock Metamorphic Processes*

**Gratz A. J. Nellis W. J. Hinsey N.**

*Laboratory Simulations of Explosive Volcanism and Implications for the K/T Boundary*

**Gratz A. J. Nellis W. J. Hinsey N.**

*Shock Deformation and Transformation in the SiO<sub>2</sub> System*

**Oberbeck V. R. Aggarwal H.**

*Impact Crater Deposit Production on Earth*

McHone J. F. Dietz R. S.  
*Earth's Multiple Impact Craters and Astroblemes*

Oberbeck V. R. Marshall J. R.  
*Impacts, Flood Basalts, and Continental Breakup*

## TEKTITES

Izett G. A. Obradovich J. D.  
*Laser-Fusion  $^{40}\text{Ar}/^{39}\text{Ar}$  Ages of Australasian Tektites*

## OUTER SOLAR SYSTEM

Boyce J. M. Rogers P. G.  
*The Canteloupe Terrain of Triton*

Croft S. K.  
*Aspects of Tectonics on Icy Satellites*

McEwen A. S. Isbell N. R. Pearl J. C.  
*Io Thermophysics: New Models with Voyager 1 Thermal IR Spectra*

Schenk P.  
*Volcanism on Triton*

## LABORATORY REMOTE SENSING

Hudgins D. M. Sandford S. A. Allamandola L. J. Tielens A. G. G. M.  
*The Measurement of Optical Constants from Interstellar and Solar System Ice Analogs Using Transmission Infrared Spectroscopy*

Salisbury J. W. Wald A. E.  
*The Role of Volume Scattering in Reducing Spectral Contrast of Reststrahlen Bands in Spectra of Powdered Minerals*

Shepard M. K. Arvidson R. E. Guinness E. A. Deering D. W.  
*Volume and Surface Scattering Properties of Lunar Lake Playa, Nevada*

## SOLAR SYSTEM FORMATION

Hood L. L. Horanyi M.  
*Gas Dynamic Heating of Chondrule Precursor Grains: Mechanisms for Generation of Nebular Shock Waves*

Nuth J. A. Berg O. Faris J. Wasilewski P.  
*Laboratory Studies of Very Small Iron Grains: Magnetically Enhanced Coagulation*

Peak D. Kusiak S. J. Donn B.  
*Laboratory Study of Analogs of Early Solar Nebula Condensed Objects*

Tonks W. B. Melosh H. J.  
*Magma Ocean Formation due to Giant Impacts: The Effect of the Planet's Thermal State Before the Collision*

Verronen M. Vanhala H.\*  
*Collisional Model for Turbulent and Molecular Processes in Preplanetary Disk*

Weidenschilling S. J. Davis D. R.  
*Multizone Simulations of Planetary Accretion: Effects of Distant Perturbations*

## ACHONDrites AND IRONS

Treiman A. H.

*The Parent Magma of the Nakhla (SNC) Meteorite: Constraints from Magmatic Inclusions in Olivine*

Longhi J.

*Volatiles in SNC Petrogenesis: A Sr Signal?*

Pun A. Keil K. Taylor G. J. Wieler R. King E. A.

*Clasts in Kapoeta: Implications for the Regolith Evolution of the HED Parent Body*

Buchanan P. C. Reid A. M.

*Matrix Pyroxenes in Howardites and Polymict Eucrites*

Saiki K. Yamaguchi A. Takeda H.

*New Chemical Mapping Technique for Analysis of Pyroxenes in Polymict Breccias and Application to Some Eucrites*

Golden D. C. Ming D. W. Zolensky M. E.

*Chemistry and Mineralogy of Oxidation Products from a Nickel-rich Ataxite*

Hall T. M. Burns R. G.\*

*Fusion Crusts of Achondrites: Changes of Mineralogy of Iron in Outermost Surfaces of Meteorites*

Ntaflos Th. Koeberl C.

*Petrological Studies and Bulk Chemical Analyses of Eight Antarctic Aubrites*

Takeda H. Baba T. Mori H. Saito J.

*Mineralogy of a New Orthopyroxene-Bearing Ureilite LEW88201 and the Relationship Between Magnesian Ureilites and Lodranites*

Petaev M. I. Barsukova L. D. Shumskaya T. V. Romashova T. V. Galuzinskaya A. K. Smolian M. I.

*The Divnoe Achondrite - VI. New Data on Bulk Chemistry*

## CHONDRULES AND INCLUSIONS

Russell S. S. Pillinger C. T.

*Modelling Nitrogen Degassing in Chondrite Diamonds*

Fisenko A. V. Russell S. S. Ash R. D. Semjenova L. F. Verchovsky A. B. Pillinger C. T.

*Isotopic Composition of Carbon and Nitrogen in the Diamonds from the Unequilibrated Ordinary Chondrite Krymka LL3.0*

Krot A. Ivanova M. A.

*Cr-rich Chondrules and Inclusions in Ordinary Chondrites*

Keller L. P.

*Petrography and Mineral Chemistry of Calcium- and Aluminum-rich Inclusions in the Maralinga CK4 Chondrite*

Jones R. H.

*Classification of Porphyritic, Pyroxene-rich Chondrules in the Semarkona Ordinary Chondrite*

Ruzicka A. Boynton W. V.

*Microfaulting of CAI Rim Layers and Relationships to the Fabric of the Leoville (CV3) Chondrite*

## CHONDRITES AND METEORITE RECOVERY

Bischoff A. Sears D. W. G. Benoit P. H. Geiger T. Stöffler D.

*New Type 3 Ordinary Chondrites from the Sahara Desert*

Kallemeyn G. W.

*Three Ungrouped Carbonaceous Chondrites from MacAlpine Hills, Antarctica*

Prinz M. Weisberg M. K.

*Acyer 182/207: A New ALH85085-Type Chondrite and its Implications*

Lipschutz M. E. Wolf S. F. Gartenhaus S. Lindstrom M. M. Mittlefehldt D. W. Zolensky M. E. Wacker J. F.

Benoit P. H. Sears D. W. G. Dodd R. T.

*Noblesville Meteorite Breccia: Recovery and Initial Characterization*

McCoy T. J. Keil K. Bogard D. Casanova I. Lindstrom M. M.

*Ilafegh 009: A New Sample of the Diverse Suite of Enstatite Impact Melt Rocks*

Reid A. M. Jakeš P. Zolensky M. E. Miller R.

*Three New Chondrites from Western Namibia*

Mardon A. A. Williams J. S.

*Potential Meteorite Recovery Locales Within Russian Antarctic Logistical Capability*

## THE MOON COMES TO YOU!

Kadel S. D. Greeley R.

*Mare Basalts in the Orientale Basin: Galileo Multispectral Observations*

Mustard J. F. Head J. W. Murchie S. M. Pieters C. M. Belton M. S. McEwen A. S.

*Schickard Cryptomare: Interaction Between Orientale Ejecta and Pre-Basin Mare from Spectral Mixture Analysis of Galileo SSI Data*

McEwen A. S. Gaddis L. R. Neukum G. Hoffmann H. Pieters C. M. Head J. W. III

*Lunar Craters and Soils: Ages, Colors, and Regolith Thicknesses*

Tompkins S. Pieters C. M. Mustard J. F. Pinet P.

*Distribution of Materials Excavated by the Lunar Crater Bullialdus: A Spectral Mixing Analysis*

Sprague A. L. Witteborn F. C. Kozlowski R. W. H. Cruikshank D. P. Bartholomew M. J. Graps A. L.

*The Moon: Mid-Infrared (7.5-11.4 μm) Spectroscopy of Five Selected Regions*

Wilson T. L.

*The Moon as a Scientific Laboratory*

Coombs C. R. Hawke B. R. Robinson M. S.

*Pyroclastic Deposits on the Northwestern Limb of the Moon*

Clark P. Joerg S.

*Using Geochemical Profiles of Recent Impact Features in Northeastern Tranquillitatis to Characterize Mare/Highland Interfaces*

Pinet P. C. Chevrel S. Shevchenko V. V.

*High Resolution UV-Visible-Near Infrared Spectro-Imaging Data of Reiner Gamma Formation*

Sears W. D.

*Tidal Dissipation and the Giant Impact Origin for the Moon*

**Jaumann R. Gröbner C. Dummel A. Rebban H. Neukum G.**

*Dependence of Color Ratios on the Observation Geometry*

**Haines E. L. Metzger A. E. Drake D. M.**

*Water Detection at the Moon and Mars with a Combined Neutron-Gamma Ray Instrument*

**Stacy N. J. S. Campbell D. B. Ford P. G.**

*High Resolution Lunar Radar Studies - Preliminary Results*

**Mardon A. A.**

*Space Gophers: Robotic Mining Systems in Inner Solar System Exploration*

**Melendrez D. E. Larson S. M. Singer R. B. Johnson J. R.**

*High Spatial Resolution Mapping of Lunar Mare Titanium Abundances*

**Taylor L. A. McKay D. S.**

*An Ilmenite Feedstock on the Moon: Beneficiation of Rocks Versus Soil*

**Stern S. A.**

*Imaging Detection of Atmospheric Sodium over the Lunar Terminator*

**Swindle T. D. Burkland M. K. Johnson J. R. Larson S. M. Morris R. V. Rizk B. Singer R. B.**

*Systematic Variations in Solar Wind Fluence with Lunar Location: Implications for Abundances of Solar-Wind-Implanted Volatiles*

**Premo W. R. Tatsumoto M.**

*Acid Leaching of Apatite: Implications for U-Th-Pb Systematics of Lunar Highland Plutonic Rocks*

**Neal C. R. Taylor L. A. Schmitt R. A. Liu Y.-G.**

*The Recognition of Monomict and Polymict Clasts from Apollo 17 Breccias*

**Schwarz C.**

*Preliminary Description of 60013, Bottom Half of Double Drive Tube 60014/60013*

**Housley R. M.**

*XPS Studies of the Surface Chemistry of Lunar Highlands Regolith*

**Finnila A. B. Hess P. C. Rutherford M. J.**

*Dissolution of Anorthite in Lunar Maria Basalts: Preliminary Experiments and Petrologic Significance*

**Pearce T. H. Timms C.**

*Interference Imaging of Plagioclase in Lunar Materials*

**Jull A. J. T. Donahue D. J.**

*<sup>14</sup>C Terrestrial Ages of Two Lunar Meteorites, ALHA 81005 and EET 87521*

## INSTRUMENTS AND FUTURE PLANETARY EXPLORATION

**Kieffer H. H. Wildey R. L.**

*Spectrophotometry of the Moon for Calibration of Space-Borne Imaging Instruments*

**Blake D. F. Bryson C. Freund F.**

*Design of an X-Ray Diffraction/X-Ray Fluorescence Instrument for Planetary Applications*

**Mancinelli R. L. Banin A. White M. R.**

*DTA/GC: Limits of Detectability and Identification of Minerals*

Elphic R. C. Funsten H. O. III Barracough B. L. McComas D. J. Vaniman D. T.  
*Can Secondary Ion Mass Spectrometry Resolve Variations in Lunar Surface Composition?*

Brückner J. Fabian U. Patnaik A. Wänke H. Cloth P. Dagge G. Drüke V. Filges D. Englert P. A. J. Drake D. M. Reedy R. C. Parlier B.

*Simulation Experiments for Planetary Gamma-Ray Spectroscopy by Means of Thick Target High-Energy Proton Irradiations*

Shelfer T. D. Pimperl M. M. Wills E. L. Agresti D. G. Morris R. V.

*Development of a Backscatter Mössbauer Spectrometer (BaMS) for Planetary Applications*

Klingelhöfer G. Foh J. Held P. Jäger H. Kankeleit E. Teucher R. Evlanov E. N. Khromov V. N. Mukhin L. M. Prilutski O. F. Zubkov B. Knudsen J. M. Madsen M. Smirnov G. V. Juchniewicz J. d'Uston C.

*Mössbauer Spectrometer for Mineralogical Analysis of the Mars Surface for the Mars-96 Mission*

Metzger A. E. Haines E. L.

*Seasonal Cap Measurements at Mars via Gamma Ray Spectroscopy*

Drake D. M. Drosig M. Byrd R. C. Reedy R. C. Clark D. A. Englert P. A. J. Bobias S. G. Dempsey J. F. Harris L.  
*Experimental Simulations of Martian Neutron Spectra*

Costard F. M. Achache J. Bibring J. P. Blanc M. Coutin-Faye S. Langevin Y. Lognonne P. Masson P. Moura D. Rocard F.

*Mars Rover Mission: The French Views*

Vorder Bruegge R. W.

*Science Rationale for a Discovery Program Venus Atmospheric Probe Mission*

Allton J. H. Lyons D. M.

*Computer Games Geologists Play: A Tool for Determining Appropriate Rover Autonomy*

Crowell L. B.

*Spacetime Geodesy by Neural Networks*

Gooding J. L. Allton J. H. Byers T. B. Dunn R. P. Gibbons F. L. Pate D. B.  
*Thermal Analyzer for Planetary Soils (TAPS) Experiment, 2: Water Sensors*

Wednesday, March 18, 1992  
DYNAMICS OF IMPACT AND RESURFACING ON VENUS  
8:30 a.m. Room A

Chairmen: B. A. Ivanov  
N. R. Izenberg

Schultz P. H.\*

*Impactor Signatures on Venus*

Johnson J. R.\* Komatsu G. Baker V. R.

*Elliptical Impact Craters on Venus*

Soderblom L. A.\* Chadwick D. J. Schaber G. G.  
*Surface Effects of Impacts into Venus' Atmosphere*

Takata T.\* Ahrens T. J. Phillips R. J.

*Atmospheric Effect on Cratering on Venus*

Provalov A. A. Ivanov B. A.\*

*Near Surface Soil-Gas Flow Due to Impact on Venus*

Zahnle K. J.\*

*Airburst Origin of Dark Shadows on Venus*

Campbell D. B.\* Stacy N. J. S. Newman W. Arvidson R. E.

*Magellan Observations of Extended Impact Crater Related Deposits on the Surface of Venus*

Bills B. G.\*

*Venus: Satellite Orbital Decay and Consequent Crater Production*

Bullock M. A.\* Grinspoon D. H. Head J. W.

*Modeling the Volcanic Resurfacing of Venus*

Strom R. G.\* Schaber G. G. Arkani-Hamed J. Toksöz M. N.

*Global Resurfacing of Venus*

Izenberg N. R.\* Arvidson R. E. Phillips R. J.

*Resurfacing Processes on Venus: Approaching a Global View*

Simpson R. A.\* Tyler G. L. Maurer M. J. Holmann E.

*Scattering Properties of Venus' Surface*

Greeley R.\* Geringer M. A. Arvidson R. E. Elachi C. Plaut J. J. Saunders R. S. Stofan E. R. Wall S. D.

Weitz C. M. Schubert G. Thouvenot E. J. P.

*Wind-Related Features on Venus Observed via Magellan*

Wednesday, March 18, 1992

**NEBULAR PROCESSES AND CAIS**

8:30 a.m. Room B

Chairmen: **J. T. Armstrong**  
**G. W. Lugmair**

Harper C. L. Jr.\* Wiesmann H.

*High Precision Investigations of the  $^{53}\text{Mn}$ - $^{53}\text{Cr}$  Systematics. I. Bulk Carbonaceous Chondrites, Planetary Reservoirs and the Moon*

Lugmair G. W.\* MacIsaac C. Shukolyukov A.

*The  $^{53}\text{Mn}$ - $^{53}\text{Cr}$  Isotope System and Early Planetary Evolution*

Shukolyukov A.\* Lugmair G. W.

*First Evidence for Live  $^{60}\text{Fe}$  in the Early Solar System*

Jessberger E. K.\* Jordan J. L. Shukolyukov Yu. A. Meshik A. P. D. V. Minh

*Widespread Alien Xe and its Formation*

Ash R. D.\* Pillinger C. T.

*Carbon and Nitrogen Isotopes in CR Chondrites; Evidence for a Single Parent Body?*

Thiemens M. H.\*

*Mass Independent Isotope Effects: Recent Advances and Application to the Pre-Solar Nebula and Stratosphere*

Chen J. H.\* Wasserburg G. J. Papanastassiou D. A.

*Th and U in Some Chondrites*

Jurewicz S. R.\* Jones J. H.

*Experimental Partitioning of Zirconium, Titanium, and Niobium Between Silicate Liquid and Platinum Metal*

**Chamberlin L.\* Beckett J. R. Stolper E. M.**  
*Experimental Determination of Oxide Activities in Synthetic CAI and POI Melts*

**Zanda B.\***  
*Inclusions in the Metal of ALH85085: New Clues to a Condensation Origin?*

**Armstrong J. T.\***  
*Evidence for Ni-Pt-Ge-Te-rich 'Opaque Assemblages' in CV3 CAI Being True Fremdlinge and Not Low Temperature Alteration*

**Davis A. M.\* Simon S. B. Grossman L.**  
*Melilite Composition Trends during Crystallization of Allende Type BI Refractory Inclusion Melts*

**Sylvester P. J.\* Simon S. B. Grossman L.**  
*Chemical Compositions of Fremdlinge from a Type A Allende Inclusion*

**Wednesday, March 18, 1992**  
**A FIELD TRIP TO THE MOON**  
**8:30 a.m. Room C**

**Chairmen:**      **B. R. Hawke**  
                        **A. S. McEwen**

**Head J. W.\***  
*Problems in Lunar Science: Galileo Results and the Promise of Future Exploration*

**Pieters C. M.\* Belton M. Fischer E. Greeley R. Jaumann R. Head J. W. Hoffmann H. McEwen A. Murchie S. Neukum G. Sunshine J.**  
*Compositional Implications of SSI Multispectral Images of the Unexplored Lunar Farside*

**Hawke B. R.\* Lucey P. G. Taylor G. J. Peterson C. A. Spudis P. D.**  
*The Distribution and Modes of Occurrence of Lunar Anorthosite*

**Spudis P. D.\* Hawke B. R. Lucey P. G. Taylor G. J. Peterson C.**  
*Geology and Deposits of the Humorum Basin*

**Murchie S. L.\* Head J. W. McEwen A. S. Mustard J. F. Pieters C. M. Belton M. S.**  
*Spectral Properties of Orientale Basin Materials from Galileo Images*

**Sunshine J. M.\* Pieters C. M. Head J. W. McEwen A. S. Greeley R.**  
*Oceanus Procellarum as Viewed by Galileo: Evidence for Compositional Diversity in the Mare Deposits and at the Marius Hills Plateau*

**Williams D. A.\* Greeley R.**  
*Lunar Farside Mare Deposits: Latest Galileo Imaging Results*

**Hiesinger H.\* Hoffmann H. Jaumann R. Rebhan R. Neukum G.**  
*Earth-Based Multispectral Observations of Mare Humorum and Western Oceanus Procellarum: Geological and Geochemical Implications*

**Hawke B. R. Peterson C. A.\* Lucey P. G. Taylor G. J. Blewett D. T. Spudis P. D.**  
*Spectral Reflectance Studies of the Grimaldi Region of the Moon*

**Blewett D. T.\* Hawke B. R. Lucey P. G. Bell J. F. III Bell J. F. Taylor G. J. Peterson C. A. Spudis P. D.**  
*A Near-IR Spectral Investigation of the Schiller-Schickard Region of the Moon*

Fischer E. M.\* Pieters C. M. McEwen A. S. Head J. W. Belton M. J. S.  
*Lunar Highland Soil Heterogeneity: Al/Si Estimated for the Limb and Farside from Galileo SSI and Apollo X-Ray Spectrometer Data*

Pinet P. C.\* Chevrel S. Martin P.  
*Detailed Spectro-Mixing Analysis of Copernicus Crater from High Resolution Visible-Near Infrared Imaging Data*

Robinson M. S.\* Lucey P. G. Hawke B. R. Smith G. A.  
*Mariner 10 Color Images of the Eastern Limb and Farside of the Moon*

**Wednesday, March 18, 1992**  
**MARTIAN SPECTRAL AND LABORATORY DATA**  
**8:30 a.m. Room D**

**Chairmen:**      **P. E. Geissler**  
                        **I. P. Wright**

Mustard J. F.\* Erard S. Bibring J.-P. Langevin Y. Head J. W. Pieters C. M.  
*Pyroxene Chemistry of the Syrtis Major Volcanic Plateau*

Geissler P. E.\* Singer R. B.  
*Spectrophotometric Mapping of Coprates Quadrangle, Mars*

Robinson M. S.\* Zimbelman J. R.  
*Viking IRTM Analysis of Apollinaris Patera, Mars*

Roush T. L.\* Witteborn F. C. Bregman J. Rank D. Graps A. Pollack J. B.  
*Thermal Infrared Spectra (5.5-9.2  $\mu$ m) of Mars Obtained from the Kuiper Airborne Observatory*

Edgett K. S.\* Christensen P. R.  
*The Windblown Sands of Mars: Estimation of the Amount of Sand in Dark Intracrater Deposits*

Bishop J. L. \* Pieters C. M.  
*Strength of IR Hydration Bands: Application to the Martian Surface*

Blaney D. L.\*  
*Does Adsorbed Carbon Dioxide Contribute to the Infrared Spectrum of Mars?*

Zent A. P.\* Roush T. L.  
*The Spectra of Chemisorbed CO<sub>2</sub> on Mars Analog Materials*

Madsen M. B.\* Olsen M. Knudsen J. M. Petersen D. Vistisen L.  
*The Ferrimagnetic Phase in Nakhla and Zagami - Implications for the Martian Fines*

Wright I. P.\* Pillinger C. T. Grady M. M.  
*An Investigation of the Carbon in Different Lithologies of Zagami*

Jull A. J. T.\* Donahue D. J. Swindle T. D. Burkland M. K. Herzog G. F. Albrecht A. Klein J. Middleton R.  
*Isotopic Studies Relevant to the Origin of the "White Druse" Carbonates on EETA 79001*

Spargur C. S. Gooding J. L.\*  
*Calorimetric "Weatherometer" for Stony Meteorites*

Plumb R. C.\* Scala A. A. Tantayanon R.  
*False-Positive Responses in "Getter" Simulations of Viking LR Results: Invalidation of that Evidence for Acidic Clay Minerals on Mars*

**Wednesday, March 18, 1992**  
**TECTONISM AND VOLCANISM: MOON AND MARS**  
**1:30 p.m. Room A**

**Chairmen:**      **N. T. Bridges**  
                        **R. W. Wichman**

**Kiefer W. S.\***

*Convective Uplift and the Formation of the Tharsis and Elysium Regions of Mars*

**Golombek M. P.\* Banerdt W. B. Franklin B. J.**

*Limits on the Expansion and Contraction of the Moon*

**Watters T. R.\***

*A Globally Distributed Compressional Ridge System on Mars?*

**Schultz R. A.\* Zuber M. T.**

*Why are Strike-Slip Faults that are "Predicted" by Lithospheric Deformation Models Rarely Observed on Planetary Surfaces?*

**McGovern P. J.\* Solomon S. C.**

*State of Stress and Tectonics of Large Volcanoes on Mars and Earth*

**Wichman R. W.\* Schultz P. H.**

*Distribution of Lithospheric Failure and Volcanism in the Lunar Crisium Basin: Additional Signatures of an Oblique Multi-Ring Impact Structure*

**Cooper B. L.\***

*Apollo 17 Lunar Sounder: Evidence for Graben Structure in the Procellarum Basin?*

**Bridges N. T.\* Fink J. H.**

*Aspect Ratios of Lava Domes on the Earth, Moon and Venus*

**Bruno B. C.\* Taylor G. J. Rowland S. K. Lucey P. G. Self S.**

*Fractal Analysis: A New Remote Sensing Tool for Lava Flows*

**Balogh S. M.\* Taylor G. J. Bruno B. C.**

*The Character of Lava Flow Margins*

**Crisp J.\* Baloga S.**

*The Influence of Crystallization and Entrainment on the Emplacement of Lava Flows*

**Mouginis-Mark P. J.\***

*Emplacement of Long Lava Flows at Elysium Mons, Mars*

**Zimbelman J. R.\***

*Late-Stage Effusion and Mass-Wasting on Ascraeus Mons Volcano, Mars*

**Wednesday, March 18, 1992**  
**EDUCATIONAL OUTREACH AND CAREER OPPORTUNITIES**  
**1:30 p.m. Room B**

**Chairmen:**      **N. G. Barlow**  
                        **L. A. Lebosky**

**Invited 15 Minute Presentations:**

**Schultz P. H.\***  
*The Subliminal Side of Science*

**Lebofsky L. A.\* Lebofsky N. R.**  
*Teaching Planetary Science in Elementary Schools*

**Strom R. G.\* Greenberg R. J. Magisos M. Kovoord R. E. Croft S.**  
*Image Processing for Teaching and the Center for Image Processing in Education*

**Lockwood J.\* Strom R. G. Greenberg R. J. Magisos M. Kolvoord R. E. Croft S.**  
*Image Processing for Teaching: a High School Teacher's Perspective:*

**Mouginis-Mark P. J.\* Taylor G. J. Hawke B. R.**  
*Exciting the Community about Planetary Sciences - Experiences of the Hawaii Space Grant College Program*

**Dasch E. J.\***  
*Rocks and Stars; the 77% Solution*

**Barlow N. G.\***  
*Dispelling the Reservations many Young Women have about Science*

**Barnes C.\***  
*Academic Opportunities for Planetary Scientists*

**Wednesday, March 18, 1992**  
**ANTARCTIC MICROMETEORITES AND LDEF**  
**1:30 p.m. Room C**

**Chairmen:**      **D. E. Brownlee**  
                        **H. A. Zook**

**Maurette M. Immel G. Perreau M. Pourchet M. Vincent C. Kurat G.\***  
*The 1991 Euromet Collection of Micrometeorites at Cap-Prudhomme, Antarctica: Discussion of Possible Collection Biases*

**Maurette M. Brownlee D. E.\* Joswiak D. J. Sutton S. R.**  
*Antarctic Micrometeorites Smaller than 50 µm*

**Koeberl C.\* Kurat G. Presper T. Brandstätter F. Maurette M.**  
*Bulk Major and Trace Element Analyses of Unmelted Micrometeorites from Cap Prudhomme, Antarctica*

**Sutton S. R.\* Prinz M. Maurette M. Nehru C. E. Weisberg M. K. Bajt S.**  
*Antarctic Micrometeorites: Trace Element Contents and Textures of 50 to 100 µm Particles*

**Alexander C. M. O'D.\* Maurette M. Swan P. Walker R. M.**  
*Studies of Antarctic Micrometeorites*

Nishijizumi K. Arnold J. R.\* Klein J. Middleton R. Brownlee D. E. Hagen E. H. Faure G.  
*<sup>10</sup>Be and <sup>26</sup>Al in Individual Cosmic Spherules from Antarctica*

Klöck W.\* Beckerling W. Spettel B. Flynn G. Sutton S.  
*Bulk Composition and Mineralogy of Antarctic Micrometeorites*

See T. H.\* Mack K. S. Warren J. L. Zolensky M. E.  
*Continued Investigation of the Impact Flux on the Long Duration Exposure Facility by the Meteoroid and Debris Special Investigation Group*

McDonnell J. A. M.\*  
*LDEF's Space Exposure Yields Hypervelocity Impact Penetration Relationships*

Coombs C. R. Atkinson D. R.\* Wagner J. D. Crowell L. B. Allbrooks M. Watts A. J.  
*Environment Modelling in Near-Earth Space: Preliminary LDEF Results*

Bernhard R.\* Hötz F.  
*Compositional Variety of Particles Encountered by LDEF's Trailing Edge*

Amari S. Foote J. Simon C. Swan P. Walker R. M. Zinner E.\* Jessberger E. K. Lange G. Stadermann F.  
*SIMS Chemical Analysis of Extended Impacts on the Leading and Trailing Edges of LDEF Experiment A0187-2*

Stephan T.\* Stadermann F. J. Cramer H.-G. Zehnpfenning J.  
*TOF-SIMS Analysis of LDEF Impact Residues*

Wednesday, March 18, 1992  
SOLAR WIND AND COSMIC RAY IRRADIATION  
1:30 p.m. Room D

Chairmen: K. Marti  
L. Schultz

Wieler R.\* Bauer H. Signer P.  
*Krypton and Xenon from Solar Energetic Particles in a Lunar Ilmenite*

Pedroni A.\* Begemann F. Weber H. W.  
*Solar Noble Gases in Mineral Separates of ACFER 111*

Rider P. E.\* Becker R. H. Pepin R. O.  
*Measurement of Solar Wind Noble Gas Composition in Lunar Soils by In Vacuo Acid Etching*

Kim Y. Kim J. S. Marti K. Kerridge J. F.\*  
*On the Isotopic Signature of Recent Solar-Wind Nitrogen*

Reedy R. C.\*  
*Solar-Proton Production of Neon and Argon*

Sisterson J. M.\* Koehler A. M. Jull A. J. T. Donahue D. J. McHargue L. Reedy R. C. Englert P. A. J.  
*Cross Section Measurements for the Production of Carbon-14 and Beryllium-10: Improved Estimates for Cosmogenic Nuclide Production Rates*

Fink D. Klein J.\* Dezouy-Arjomandy B. Middleton R. Herzog G. F. Albrecht A.  
*<sup>41</sup>Ca in the Norton County Aubrite*

Michlovich E.\* Lipschutz M. Shortreed M. Vogt S. Elmore D.  
*Cosmogenic Nuclide Depth Profiles in the Iron Meteorite, Canyon Diablo*

Vogt S.\* Herzog G. F. Fink D. Klein J. Middleton R.  
*Cosmogenic Nuclides in the H3 Chondrite Dhajala*

Traub-Metlay S. G.\* Benoit P. H.  
*The Natural Thermoluminescence of Meteorites with High  $^{26}\text{Al}$  Contents: Unusual Orbital Histories in Ordinary Chondrites?*

Eugster O.\* Michel Th. Niedermann S. Wang D. Yi W.  
*History of 27 Chinese and 10 Other Chondrites Derived from Solar, Cosmic-Ray Produced, Radiogenic and Fissiogenic Noble Gases*

Nishiizumi K. Arnold J. R. Caffee M. W.\* Finkel R. C. Sounon J.  
*Exposure History of Separated Phases from the Kapoeta Meteorite*

Schultz L.\* Weber H. W.  
*Noble Gases in Metal and Silicates of the IIE Iron Meteorite Watson*

**Thursday, March 19, 1992**  
**MARS SURFACE AND ATMOSPHERE THROUGH TIME:**  
**SURFACE PROPERTIES AND PROCESSES**  
8:30 a.m. Room A

**Chairmen:** R. G. Burns  
R. B. Singer

Singer R. B.\* McSween H. Y. Jr.  
*Composition of the Martian Crust: Evidence from Spectroscopy and SNC Meteorites*

Murchie S.\* Erard S. Bishop J. Mustard J. Bibring J.-P. Langevin Y. Head J. Pieters C.  
*The Forms and Evolution of Water in Martian Soil: Evidence from ISM Imaging Spectroscopy*

Banin A.\*  
*Analog Studies of Nanophase Iron Oxides in Mars Soil*

Bell J. F. III\* Morris R. V. Adams J. B.  
*Relative Abundances of Poorly- and Well-Crystalline Ferric Oxides in the Martian Soil and Dust from Telescopic Data and Terrestrial Spectral Analog Studies*

Burns R. G.\*  
*Chemical Weathering on Mars: Rates of Dissolution and Oxidation of Ferromagnesian Silicate Minerals*

Carr M. H.\*  
*Post-Noachian Erosion Rates: Implications for Mars Climate Change*

Frey H.\*  
*Thermal History and Climatic Implications of Early Hesperian Ages for Presumed Noachian Age Volcanic Flows on Mars*

Rotto S. L.\* Tanaka K. L.  
*Chryse Planitia Region, Mars: A Summary of Geologic/Geomorphologic Mapping Results*

De Hon R. A.\* Pani E. A.  
*Duration and Rates of Discharge Through a Martian Outflow System: Maja Valles*

Mellan M. T.\* Jakosky B. M.  
*Stability and Diffusion Time Scales of Water Ice in the Martian Regolith*

Cave J. A.\*

*Martian Volcanoes and Ground-Ice: Evidence for the Localised Enrichment of Sub-Surface Ice by Juvenile Volatiles*

Gulick V. C.\* Baker V. R.

*Martian Hydrothermal Systems: Some Physical Considerations*

Thursday, March 19, 1992  
COSMIC DUST AND COMETS  
8:30 a.m. Room B

Chairmen: **J. P. Bradley**  
**L. P. Keller**

Flynn G. J.\* Sutton S. R.

*Element Abundances in Stratospheric Cosmic Dust: Indications for a New Chemical Type of Chondritic Material*

Lindstrom D. J.\*

*Scandium/Iron and Cobalt/Iron Ratios as Indicators of the Sources of Stratospheric Dust Particles*

Fomenkova M.\* Chang S. Mukhin L.

*Classification of Carbonaceous Component in Comet Halley "CHON" Particles*

Thomas K. L.\* Keller L. P. Blanford G. Klöck W. McKay D. S.

*Carbon in Anhydrous Interplanetary Dust Particles: Correlations with Silicate Mineralogy and Sources of Anhydrous IDPs*

Bradley J. P.\* Humecki H. J. Germani M. S.

*Interplanetary Dust Analogues for Infrared Silicate Emission from Comets*

Keller L. P.\* Thomas K. L. McKay D. S.

*Thermal Processing of Cosmic Dust: Atmospheric Heating and Parent Body Metamorphism*

Flynn G. J.\* Sutton S. R. Thomas K. L. Keller L. P. Klöck W.

*Zinc Depletions and Atmospheric Entry Heating in Stratospheric Cosmic Dust Particles*

Nier A. O.\* Schlutter D. J.

*Helium Release from Interplanetary Dust Particles in Laboratory Studies Simulating the Heat Pulse Experienced by Particles During Atmospheric Entry*

Herzog G. F.\* Hall G. S. Brownlee D. E.

*Mass Fractionation of Nickel Isotopes in Metallic Cosmic Spherules Collected from Deep-Sea Sediments*

Blake D. F. Fleming R. H.\*

*Sequential Analyses of IDPs by LVSEM, TOF-SIMS, SIMS, and AEM*

Rietmeijer F. J. M.\*

*Interplanetary Dust Particle L200ST12 Directly Linked to Type CM Chondrite Petrogenesis*

Thiel K.\* Grün E. Gebhard J. Kölzer G.

*Artificial "Regolith" of an Ice-Dust Body Under Space Conditions: Dust Mantle Dynamics and Phenomenology During KOSI 9*

Kochan H.\* Grün E. Gebhard J. Benkhoff J. Kührt E. Lämmerzahl P. Lorenz E. Möhlmann D. Roessler K. Seidensticker K. J. Thomas H.

*Bistable Activity of a Cometary Analogous Ice-/Mineral Mixture During Insolation*

**Thursday, March 19, 1992**  
**PLANETARY GEOCHEMISTRY**  
**8:30 a.m. Room C**

**Chairmen:**    **C. J. Capobianco**  
                    **H. E. Newsom**

Grove T. L.\* Ehlers K. E. Jercinovic M. J. Zervas D. A.

*Effect of Oxygen Fugacity on Partitioning of Ni and Co Between Olivine and Silicate Melt: Implications for Eucrite Parent Body Evolution*

Amelin A. A. Capobianco C. J.\*

*The Partitioning of Co and Ni in a Simple Metal/Silicate System as a Function of Oxygen Fugacity and Temperature*

McFarlane E. A.\* Drake M. J. Rubie D. C. Gasparik T.  
*Manite Mineral/Silicate Melt Partition Coefficients*

Matsuda J. Sudo M. Ozima M.\*

*Noble Gas Partition Between Metal and Silicate Under High Pressure*

Jakeš P.\* Sen S. Matsuishi K. Reid A. M. King E. A. Casanova I.

*Silicate Melts at Super Liquidus Temperatures: Reduction and Volatilization*

Hillgren V. J.\* Capobianco C. J. Drake M. J.

*Metal-Silicate Partitioning Behavior of Moderately Siderophile Elements in Ni-Rich Systems*

Newsom H. E.\* Noll P. D. Jr. Slane F. A. Beserra T. B.  
*Siderophile Element Abundances and Behavior*

Borisov A.\* Palme H. Holzheid A. Spettel B. Dingwell D. B. O'Neill H. St. C.

*The Origin of Highly Siderophile Elements in the Upper Mantle of the Earth: An Experimental Approach*

Dickinson T. L. Lofgren G. E. Casanova I.\*

*High Temperature Reduction of Silicon in Enstatite Meteorites: Evidence from the Experimental Studies of Indarch*

Shaffer E. E.\* Burnett D. S.

*Minor Element Variations in Plagioclase*

Smyth J. R.\* McCormick T. C.

*Hydrous Silicates in the Upper Mantles of Terrestrial Planets*

Ross D. K.\* Elthon D.

*Variable Size of the Crystallizing Boundary Layer During Formation of the Stillwater Layered Complex, Montana*

Tatsumoto M.\* Nakamura Y. Premo W. R. Boyd F. R.

*Elemental Distribution of U, Th, and Pb in Peridotite Xenoliths: Implications for the Pb Isotopic Evolution of the Moon*

**Thursday, March 19, 1992**  
**MARS SURFACE AND ATMOSPHERE THROUGH TIME:**  
**ATMOSPHERE AND SURFACE - ATMOSPHERE INTERACTIONS**  
**1:30 p.m. Room A**

**Chairmen:**    **G. J. Flynn**  
                    **A. P. Zent**

Jakosky B. M.\*

*Out on a Limb: Mars Atmospheric Opacity During the Last Hundred Years*

**Martin T. Z.\* Richardson M. I.**  
*Global Behavior of Martian Atmospheric Dust During the Viking Era*

**Flynn G. J.\***  
*The Contribution of Meteoritic Material to the Dust and Aerosols in the Atmosphere of Mars*

**Moroz V. I.\***  
*Hazes and Clouds on Mars: Some of the Phobos Mission Results*

**Lee P.\* Dollfus A.**  
*Polarimetric Survey of Crystal Clouds on Mars*

**Zent A. P.\* Haberle R. M. Houben H. Jakosky B. M.**  
*Coupled Subsurface Atmosphere Boundary Layer Model of H<sub>2</sub>O on Mars: Sensitivity Studies*

**Wänke H.\* Dreibus G. Jagoutz E. Mukhin L. M.**  
*Volatiles on Mars: The Role of SO<sub>2</sub>*

**Dollfus A.\* Zimbelman J.**  
*Martian Surface Texture and Wind Effect Implications*

**Maxwell T. A.\* Craddock R. A.**  
*Geologic Effects of Atmosphere Loss on Mars: Evidence from Highland Erosion*

**Barlow N. G.\***  
*Quantifying Crater Degradation in Maja Valles and Memnonia, Mars*

**Craddock R. A.\* Maxwell T. A.**  
*Morphologic Variations of Degraded Impact Craters in the Martian Highlands*

**Howard A. D.\***  
*Simulated Erosion of Martian Heavily Cratered Terrain*

**Thursday, March 19, 1992**  
**STARDUST**  
**1:30 p.m. Room B**

**Chairmen:**      **G. R. Huss**  
                        **U. Ott**

**Huss G. R.\* Hutcheon I. D. Wasserburg G. J. Stone J.**  
*Presolar (?) Corundum in the Orgueil Meteorite*

**Newton J.\* Arden J. W. Pillinger C. T.**  
*Carbon and Nitrogen Isotope Studies of a Suite of Type CO3 Carbonaceous Chondrites*

**Russell S. S. Arden J. W.\* Pillinger C. T.**  
*Adrar 003: An Unequilibrated Ordinary Chondrite Rich in Pristine Interstellar Grains*

**Hoppe P.\* Amari S. Zinner E. Lewis R. S.**  
*Just How Many Types of Interstellar Carbon?*

**Amari S.\* Hoppe P. Zinner E. Lewis R. S.**  
*Interstellar SiC with Unusual Isotopic Compositions*

Verchovsky A. B.\* Ott U. Russell S. S. Pillinger C. T. Fisenko A. V. Shukolyukov Yu. A.  
*Carbon, Nitrogen and Noble Gases in Diamond-rich Residues of the Efremovka CV3 Chondrite*

Lewis R. S.\* Amari S.

*Interstellar Murchison Graphite: How Many Noble Gas Components?*

Nichols R. H. Jr.\* Hohenberg C. M. Hoppe P. Amari S. Lewis R. S.

*<sup>22</sup>Ne-E(H) and <sup>4</sup>He in Single SiC and <sup>22</sup>Ne-E(L) in Single Ca Known C- Isotopic Compositions*

Richter S. Ott U.\* Begemann F.

*S-process Isotope Anomalies: Neodymium, Samarium, and a Bit More of Strontium*

Prombo C. A.\* Podosek F. A. Amari S. Lewis R. S.

*S-Process Sr and Ba in SiC from Murchison Series KJ*

Alexander C. M. O'D. Swan P. D. Walker R. M.\*

*Continued In Situ Studies of Interstellar Grains in Primitive Meteorites*

Bernatowicz T. J. \* Amari S. Lewis R. S.

*TEM Studies of a Circumstellar Rock*

Clayton D. D.\* Brown L. E.

*New Ideas for SiC: Mg Burning in AGB Shell Flashes*

Thursday, March 19, 1992

#### TERRESTRIAL IMPACTS AND THE K/T BOUNDARY

1:30 p.m. Room C

Chairmen: A. R. Hildebrand  
E. M. Shoemaker

Shoemaker E. M.\* Izett G. A.

*Stratigraphic Evidence from Western North America for Multiple Impacts at the K/T Boundary*

Hartung J. \* Kracher A. Anderson R. Plocher O.

*Manson Impact Structure Rocks: Evidence for an Exotic Component*

Anderson R. R.\* Hartung J. B. Reagan M. K. Bell M. S. Plocher O.

*First Results from the Manson Impact Structure Core-Drilling Project: Preliminary Observations and Interpretations from the M-1 Core*

Schultz P. H.\* Grant J. Collins W. Lopez J. P. Toselli A. J. Castellanos T. G.

*Rio Cuarto Crater Field*

Bunch T. E.\* Schultz P. H.

*A Study of the Rio Cuarto Loess Impactites and Chondritic Impactor*

Pevzner L. A. Kirjakov A. F. Vorontsov A. K. Masaitis V. L. Mashchak M. S. Ivanov B. A.\*

*Vorotilovskaya Drillhole: First Deep Drilling in the Central Uplift of Large Terrestrial Impact Crater*

Quezada Muñton J. M. Marín L. E. Sharpton V. L.\* Ryder G. Schuraytz B. C.

*The Chicxulub Impact Structure: Shock Deformation and Target Composition*

Brett R.\*

*Anhydrite: A Lethal Target Rock at the Chicxulub Impact Site*

Vickery A. M.\* Kring D. A. Melosh H. J.  
*Ejecta Associated with Large Terrestrial Impacts: Implications for the Chicxulub Impact and K/T Boundary Stratigraphy*

Hildebrand A. R.\* Stansberry J. A.  
*K/T Boundary Ejecta Distribution Predicts Size and Location of Chicxulub Crater*

Bohor B. F.\* Betterton W. J.  
*Ejection and Dispersal Mechanisms of the K/T Impact*

Glass B. P.\* Wu J.  
*Impact Ejecta Associated with the Australasian and North America Microtektite Layers*

Thursday, March 19, 1992  
POSTER SESSION II  
7:00 - 9:00 p.m. LPI

#### EXOBIOLOGY

Ivanov M. V. Lein A. Yu. Mukhin L. M.  
*Geochemical Evidences of Methane-Producing Bacteria's Activity in Rocks of Mars*

#### MARS SPECTRA: OBSERVATIONAL DATA/LABORATORY ANALYSIS

Reyes D. P.  
*Significance of Komatiite: Thermal Emission Spectroscopy of Komatiite for Remote Sensing of Planetary Surfaces*

Ramsey M. S. Christensen P. R.  
*The Linear "Un-Mixing" of Laboratory Thermal Infrared Spectra: Implications for the Thermal Emission Spectrometer (TES) Experiment, Mars Observer*

Bishop J. L. Pieters C. M. Burns R. G.  
*Ferrihydrite Found in Fe-rich Montmorillonite and its Relationship to the Reflectance Spectra of Mars*

Vaniman D. T. Heiken G. Wohletz K. Blacic J.  
*Palagonites and Martian Soil Simulants*

Head J. N. Singer R. B. Geissler P. E.  
*Multispectral Study of Cerberus Dark Materials*

DeBraal J. D. Reed M. H. Plumlee G. S.  
*Preliminary Results of Computer Modeled Near 0°C Water-Rock Interactions at the Martian Surface*

Merenyi E. Miller J. S. Singer R. B.  
*Compositional Variations on the Surface of Mars: Mixing Model Analysis from a Telescopic Spectral Image*

Vempati R. K. Morris R. V. Lauer H. V. Jr.  
*Spectral Properties of Cr Substituted Goethites and Hematites*

Roush T. L. Martin T. Z. Pollack J. B.  
*Analysis of Mariner 7 Thermal Infrared Spectra of Mars and Comparison to Recent Airborne Observations*

Edgett K. S. Geissler P. E. Herkenhoff K. E.  
*Mars: The Composition of Dunes and Other Dark Surficial Material*

Tejfel V. G. Sinyaeva N. V. Aksenov A. N. Kharitonova G. A.  
*The Experience of the Mars Normal Albedo and Limb Darkening Coefficients Mapping from the Observations During 1990 Opposition*

Miller J. S. Singer R. B. Wells W. K. Weller L.  
*Radiance Factor Calibration of 1988 Visible and Near-IR Spectral Images of Mars*

McEwen A. S.  
*Temporal Variability of the Surface and Atmosphere of Mars: Viking Orbiter Color Observations*

Erard S. Drossart P. Bibring J.-P. Langevin Y. Pinet P. Chevrel S.  
*Aerosol Contribution to the Reflectance Spectra of Mars*

Roush T. L. Singer R. B.  
*Analysis of Mars 1986 Seasonal South Polar Cap Spectrum*

#### GEOLOGY/GEOPHYSICS: MARS/MERCURY

Kozak R. C. Batson R. M. Isbell N. K.  
*Digital Geologic Maps of the Planets*

Harmon J. K. Slade M. A.  
*Radar Mapping of Mercury*

Butler B. Muhleman D. Slade M.  
*A Comparison of the Radar Returns from the Icy Poles and Other Regions of Mars and Mercury*

Thompson T. W. O'Brien T. C. Jurgens R. F. Slade M. A. Moore H. J.  
*Mars Quasi-Specular Echoes: Preliminary Results at 3.5-cm Wavelength*

Price K. H.  
*Geologic Mapping of Part of Harmakhis Vallis Region, Mars: Evidence of Multiple Drainage Events*

Craddock R. A. Crumpler L. S. Aubele J. C.  
*Central Chryse Planitia, Mars: Geologic Unit Interpretation from 1:500,000-Scale Mapping*

Chapman M. G.  
*Geologic Mapping of the Granicus Valles, Mars*

McBride K.  
*Geologic Mapping of the Elysium Region of Mars*

Parker T. J. Gorsline D. S.  
*Preliminary Geologic Mapping of the MTM -55036 and -55043 Quadrangles, Southern Argyre Planitia, Mars*

Reidy A.-M. Sandford C. A. Frey H. Schultz R. A.  
*A Search for Large Impact Basins in the Southern Hemisphere of Mars II: South Polar B?*

Strickland E. L. III  
*Physical Properties of Deucalionis, Eos, and Xanthe-type Units in the Central Equatorial Region of Mars*

Murchie S. L. Erard S. Mustard J. F. Bibring J.-F. Langevin Y. Head J. W. Pieters C. M.  
*The Geology of the Interior Deposits of Valles Marineris from Viking Images and ISM Imaging Spectroscopy*

Lucchitta B. K. Isbell N. K.  
*Valles Marineris Volumes*

Thornhill G. D. Murray J. B. Rothery D. A. Day T. Cook A. C. Iliffe J. C. Muller J.-P.  
*Comparison of Automatically Generated DEM of Tithonium Chasma with USGS Interpolated Contour DEM*

Sotin C. Smrekar S. Rosenqvist Y. Bibring J.-P.

*Topography of Tharsis Mons (Mars) Deduced from the ISM Experiment: Comparison with Radar Profiles*

Marchenkov K. I. Koshlyakov E. M. Zharkov V. N. Nikishin A. M.

*Investigation of Stresses in the Lithosphere of Mars: New Tectonic Interpretation*

Jöns H.-P.

*Large-Scale Tectonic Features, Volcanoes, and Suspected Intrusions of the Ancient Uplands of Mars*

Frey H.

*New Mars Global Gravity Field: Correlation with Topography, Physiography and Large Impact Basins*

Murray J. B. Rothery D. A. Thornhill G. Muller J.-P. Cook T. Day T. Iliffe J. C.

*The Origin of Grooves and Crater Chains on Phobos*

Blumberg D. G. Greeley R.

*Influence of Surface Roughness on Windblown Sand: Earth, Mars, and Venus*

## TERRESTRIAL CRATERING: FIELD STUDIES

Feldman V. I. Sazonova L. V. Korotaeva N. N. Guseva L. B. Budkov G. K.

*Diaplectic Transformation of Minerals in Vorotilov Core, Puchezh-Katunk Astrobleme, Russia (Preliminary Data)*

Ivanov B. A. Petaev M. I.

*Mass and Impact Velocity of the Meteorite Formed the Sterlitamak Crater in 1990*

Reimold W. U. Koeberl C.

*Pretoria Saltpan Impact Crater: Impact Glasses and Sulphide Spherules*

Koeberl C. Schultz P. H.

*Chemical Composition of Meteoritic and Impactite Samples from the Rio Cuarto Craters, Argentina*

Perry E. C. Winter D. J. Sagar B. Wu B.

*The Chicxulub Structure: Surface Manifestation and Possible Sulfur Isotope Signature*

Grant J. A. Schultz P. H.

*Gradation of the Rio Cuarto Crater Field, Argentina*

Marín L. E. Quezada-Muñeton J. M. Sharpton V. L. Ryder G. Schuraytz B. C. Dalrymple G. B.

*Age Constraints on the Chicxulub Impact Structure: K/T or Not?*

Pope K. O. Ocampo A. C.

*Biospheric Effects of the Proposed Chicxulub K/T Bolide*

Halvorson K. McHone J. F.

*Vredefort Coesite Confirmed with Raman Spectroscopy*

Pilkington M. Grieve R. A. F.

*The Geophysical Signature of Terrestrial Impact Craters*

## MARS: AVALANCHES

Sullivan R.

*Three-Dimensional Stability Back-Analysis of Small Martian Avalanche Chutes*

Lucchitta B. K. Ferguson H. M.

*A Martian Landslide Caught in the Act?*

## MARS: ATMOSPHERE

Nemchinov I. V. Shuvalov V. V.

*The Explosion in the Atmosphere of Mars Caused by a High-Speed Impact of Cosmic Bodies*

Musselwhite D. S. Drake M. J. Swindle T. D.

*Production of the Martian Atmosphere by 2-Stage Outgassing of an Early Magma Ocean*

Zakharov A. V.

*Erosion of the Martian Atmosphere on Plasma Measurements*

## PLANETARY CRATERING

Sugita S. Matsui T.

*Topographic Evolution of the Moon by Impacts During Heavy Bombardment*

Hartmann W. K.

*The "Voyager Paradigm" of Planetary Cratering: Further Unabashed Revisionism*

Hartmann W. K. Gaskell R. W.

*Crater Saturation Equilibrium in Ancient Uplands: Preliminary Results of New Modelling*

## IMPACTS AND BOUNDARY PROBLEMS

Liu Y.-G. Schmitt R. A.

*Permian/Triassic Boundary, Carnic Alps Austria, Revisited; Correlations with Ce Anomalies,  $\delta^{13}C$ , and Siberian Trap Flood Basalts, 1*

Liu Y.-G. Schmitt R. A.

*Permian/Triassic Boundary, Carnic Alps Austria, Revisited; Correlations with Ce Anomalies,  $\delta^{13}C$ , and Siberian Trap Flood Basalts, 2*

Gilmour I. Russell S. S. Pillinger C. T. Lee M. Arden J. W.

*Origin of Microdiamonds in KT Boundary Clays*

Byerly G. R. Lowe D. R.

*Exotic Nickel-Chromites in Impact Spherules from the Archean Barberton Greenstone Belt*

Lowe D. R. Byerly G. R.

*Depositional Mechanics of Impact-Produced Debris in the Archean Barberton Greenstone Belt, South Africa*

## MARS: GLACIATION

Lockwood J. F. Kargel J. S. Strom R. B.

*Thumbprint Terrain on the Northern Plains: A Glacial Hypothesis*

Kargel J. Strom R. Lockwood J. Shaw J.

*Subglacial and Glaciomarine Processes in the Martian Northern Plains*

Metzger S. M.

*The Eskers of New York State: Formation Process Implications and Esker-like Features on the Planet Mars*

Jöns H.-P.

*Fossil Glaciations in the Environs of the South Pole, Mars?*

## MARS: CHANNELS/OCEANS

Rotto S. L. Tanaka K. L.

*Channels and Basin Materials of Chryse and Acidalia Planitiae, Mars*

Grin E. A. Cabrol N. A.

*Modeling Martian Channels by Bifurcation Theory and Differential Topology: Arguments for Drainage of Subsurface Aquifer*

Cabrol N. A. Grin E. A.

*Recurrent Rules in Martian Channel Organization: Implication for Their Formation*

Sahuaro High School Astronomical Research Classes of 1991 Lockwood J. F.

*Oceans on Mars: A Crater/Frequency Analysis by Elevation of the Northern Plains*

Parker T. J. Gorsline D. S.

*"Sourceless" Outflow Channels and Stem Valleys on Mars*

Scott D. H. Dohm J. M.

*Mars Highland Channels: An Age Reassessment*

Goldspiel J. M. Squyres S. W. Slade M. A. Jurgens R. F. Zisk S. H.

*New Radar-Derived Topography of Ancient Aqueous Sedimentation Basins on Mars*

## CHONDRITE STUDIES

Fisher D. S. Burns R. G.

*The Noblesville Meteorite: Mechanism of Oxidation of Iron in Ordinary Chondrites Induced by Aerated Icewater*

DeHart J. M. Keller L. Prothroe W. Lofgren G. E.

*TEM and Cathodoluminescence Spectroscopic Studies of Type A Chondrule Mesostases*

Fisher D. S. Burns R. G.

*Mössbauer Spectra of H-5 Chondrites from Antarctica*

Brearley A. J.

*Mineralogy of Fine-Grained Matrix in the Ivuna CI Carbonaceous Chondrite*

Bourcier W. L. Zolensky M. E.

*Computer Modeling of Aqueous Alteration on Carbonaceous Chondrite Parent Bodies*

Wolf S. F. Lipschutz M. E.

*Compositional Differences Among Antarctic Populations: Discriminant Analysis of H Chondrites from Victoria Land and Queen Maud Land*

Garrison D. H. Bogard D. D.

*<sup>39</sup>Ar-<sup>40</sup>Ar Dating of Shock-Melted Phases of the Chico Chondrite and Implications for K-Ar Dating of Impact Melts*

Benoit P. H. Sears D. W. G.

*Metallographic Cooling Rate Differences Between Antarctic and Non-Antarctic H5 Chondrites and Some Implications*

McSween H. Y. Jr. Labotka T. C.

*Changes in Redox State During Ordinary Chondrite Metamorphism*

Ming D. W. Yang S. V. Golden D. C. Thomas K. L. Keller L. P. Krivian K. Barrett R. A. Zolensky M. E.

*Method for the Stabilization and Characterization of Phyllosilicates in Carbonaceous Chondrites*

Sutton S. R. Spanne P. Rivers M. L. Jones K. W.

*Computed Microtomography (CMT) of Extraterrestrial Objects Using a Linear Photodiode Array Detector*

Traub-Metlay S. Benoit P. Cassidy W.

*Establishment of a Thermoluminescence Facility at the University of Pittsburgh*

Delaney J. S. Sutton S. R. Bajt S. Smith J. V.

*In Situ MicroXANES Determination of Ferrous/Ferric Ratio in Terrestrial and Extraterrestrial Plagioclase: First Reconnaissance*

## SOLAR WIND/COSMIC RAY IRRADIATION

Futagami T. Ozima M. Nagai S. Aoki T.

*Thermal Behavior of Noble Gases Implanted into Minerals*

Mathew K. J. Michel R. Rao M. N.

*Xenon Production Cross-Sections by High Energy Protons on Barium Targets*

Masarik J. Chochula P. Povinec P.

*Production of Cosmogenic Nuclides in Extraterrestrial Objects*

Albrecht A. Vogt S. Herzog G. F. Middleton R. Dezfouly-Arjomandy B. Fink D. Klein J.  
 $^{26}\text{Al}$ ,  $^{10}\text{Be}$ , and  $^{41}\text{Ca}$  in Mesosiderites

Jull A. J. T. Donahue D. J. Reedy R. C.

$^{14}\text{C}$  Depth Profile in Lunar Rock 68815

Nichols R. H. Jr. Hohenberg C. M. Goswami J. N.

*Spallation-Produced  $^{21}\text{Ne}$  in Individual Orgueil Olivines*

Benoit P. H. Sears D. W. G. McKeever S. W. S.

*Natural Thermoluminescence and Terrestrial Ages of Meteorites: Age Clustering in the Saharan Collection*

## COSMIC DUST

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B. Fegley Jr.

Hood L. L.\*  
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Keller L. P. McKay D. S.\*  
*Impact Glasses and Vapor Condensates in Apollo 11 Soil 10084*

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*C-O-S-Cl Volatiles in Primitive Lunar Glasses: FTIR and EM Analyses of Apollo 15 Green Glasses*

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Theriault A. M.\* Hörz F. Cintala M. J. Cardenas F. Haynes G. L.  
*Fractionation Trends During Impact Communition of Modally Controlled Regoliths*

Allen C. C. Hines J. A. Altemir D. A.\* McKay D. S.  
*Sintering of Lunar Simulant Basalt*

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"ACAPULCOITES" AND STONY-IRON METEORITES; METEORITE ORGANICS  
8:30 a.m. Room B

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J. W. Morgan

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*244Pu Content of Phosphates and Cooling History of Acapulco Meteorite*

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*Search for N and Xe Carriers in the Acapulco Meteorite*

McCoy T. J.\* Keil K. Mayeda T. K. Clayton R. N.  
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Chairmen: C. R. Chapman  
F. Vilas

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 Cassidy W.

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**Stardust**, Thu. p.m., Rm. B  
**Antarctic Micrometeorites and LDEF**, Wed. p.m., Rm. C  
**Cosmic Dust and Comets**, Thu. a.m., Rm. B  
**Instruments and Future ... Explor. Posters**, Tue. p.m., LPI  
**Tecton. and Volc.: Moon and Mars**, Wed. p.m., Rm. A  
**Instruments and Future ... Explor. Posters**, Tue. p.m., LPI  
**Achondrites and Irons Posters**, Tue. p.m., LPI  
**Meteorite Parent Bodies**, Mon. a.m., Rm. B  
**Terres. Cratering and Field Studies Posters**, Thu. p.m., LPI  
**Dynamics of Impacts ... Venus**, Wed. a.m., Rm. A  
**Planetary Volcanism Posters**, Tue. p.m., LPI  
**Venus: Tecton. and Volc. Assoc.**, Tue. a.m., Rm. A  
**Terrestrial Impacts and K/T Boundary**, Thu. p.m., Rm. C  
**Martian Spectral ... Data**, Wed. a.m., Rm. D  
**Meteorite Parent Bodies**, Mon. a.m., Rm. B  
**Moon Comes to You Posters**, Tue. p.m., LPI  
**Planetary Geochemistry**, Thu. a.m., Rm. C  
**Achondrites and Irons Posters**, Tue. p.m., LPI  
**Chondrite Studies Posters**, Thu. p.m., LPI  
**Mars Spectra: Obs. Data/Lab Posters**, Thu. p.m., LPI  
**Mars ... Surface Properties and Processes**, Thu. a.m., Rm. A  
**Planetary Volcanism Posters**, Tue. p.m., LPI  
**Venus Geophysics**, Mon. p.m., Rm. A  
**Geol./Geophysics: Mars/Mercury Posters**, Thu. p.m., LPI  
**Impacts and Boundary Prob. Posters**, Thu. p.m., LPI  
**Instruments and Future ... Explor. Posters**, Tue. p.m., LPI  
**Instruments and Future ... Explor. Posters**, Tue. p.m., LPI  
**Mars: Channels and Oceans Posters**, Thu. p.m., LPI  
**Solar Wind/Cosmic Ray Irradiation**, Wed. p.m., Rm. D  
**Origin and Evol. of Planetary Sys.**, Mon. p.m., Rm. C  
**Venus Volcanism**, Tue. p.m., Rm. A  
**Dynamics of Impacts ... Venus**, Wed. a.m., Rm. A  
**Moon Comes to You Posters**, Tue. p.m., LPI  
**Planetary Geochemistry**, Thu. a.m., Rm. C  
**Galileo: Gaspra Encounter/Asteroids**, Fri. a.m., Rm. C  
**Offerings from the Moon**, Fri. a.m., Rm. A  
**Asteroids and Comets Posters**, Thu. p.m., LPI  
**Mars ... Surface Properties and Processes**, Thu. a.m., Rm. A  
**Chondrites and Meteorite ... Posters**, Tue. p.m., LPI  
**Planetary Geochemistry Posters**, Thu. p.m., LPI  
**Planetary Geochemistry**, Thu. a.m., Rm. C  
**Origin and Evol. of Planetary Sys.**, Mon. p.m., Rm. C  
**Chondrite Studies Posters**, Thu. p.m., LPI

- Castellanos T. G.  
 Cave J. A. \*  
 Chadwick D. J.  
 Chadwick D. J.  
 Chamberlin L. \*  
 Chang S.  
 Chang Y. \*  
 Chapman C. R. \*  
 Chapman M. G.  
 Chen J. H. \*  
 Cheng R. K.  
 Chevreli S.  
 Chevreli S.  
 Chevreli S.  
 Chochula P.  
 Chodas P. W.  
 Christensen P. R.  
 Christensen P. R.  
 Cintala M. J.  
 Cintala M. J.  
 Clark B. E.  
 Clark D. A.  
 Clark J.  
 Clark P.  
 Clarke R. S. Jr.  
 Clayton D. D. \*  
 Clayton R. N.  
 Clayton R. N. \*  
 Clayton R. N.  
 Clemett S. J. \*  
 Cloth P.  
 Collins W.  
 Colson R. O.  
 Colvin T. R.  
 Colwell J. E. \*  
 Connolly H. C. Jr. \*  
 Connors C.  
 Connors C.  
 Cook A. C.  
 Cook T.  
 Coombs C. R.  
 Coombs C. R.  
 Coombs C. R.  
 Cooper B. L. \*

Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
 Mars ... Surface Properties and Processes, Thu. a.m., Rm. A  
 Dynamics of Impacts ... Venus, Wed. a.m., Rm. A  
 Venus Impact Crater Posters, Tue. p.m., LPI  
 Nebular Processes and CAIs, Wed. a.m., Rm. B  
 Cosmic Dust and Comets, Thu. a.m., Rm. B  
 Reduced Meteorites, Tue. a.m., Rm. B  
 Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Nebular Processes and CAIs, Wed. a.m., Rm. B  
 Asteroids and Comet Posters, Thu. p.m., LPI  
 Field Trip to the Moon, Wed. a.m., Rm. C  
 Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
 Venus Geophysics, Mon. p.m., Rm. A  
 Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
 Martian Spectral ... Data, Wed. a.m., Rm. D  
 Offerings from the Moon, Fri. a.m., Rm. A  
 Venus Impact Crater Posters, Tue. p.m., LPI  
 Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
 Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
 Venus Geomorphology Posters, Tue. p.m., LPI  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
 Stardust, Thu. p.m., Rm. B  
 Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
 Assorted Achondrites, Mon. p.m., Rm. B  
 Reduced Meteorites, Tue. a.m., Rm. B  
 Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
 Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
 Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
 Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
 Venus Geophysics, Mon. p.m., Rm. A  
 Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
 Chondrules, Tue. p.m., Rm. B  
 Magellan at Venus, Mon. a.m., Rm. A  
 Venus Geophysics, Mon. p.m., Rm. A  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
 Dust Env. in Earth Orbit Posters, Thu. p.m., LPI  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A

- Costard F. M.  
Coutin-Faye S.  
Craddock R. A.  
Craddock R. A. \*  
Cramer H.-G.  
Crawford D. A. \*  
Crawford D. A.  
Creaser R. A. \*  
Cremers D. A. \*  
Crisp J. \*  
Croft S. K.  
Crowell L. B.  
Crowell L. B.  
Crowell L. B.  
Crozaz G.  
Crozaz G.  
Crozaz G.  
Cruikshank D. P.  
Crumpler L. S.  
Crumpler L. S.  
Crumpler L. S.  
Crumpler L. S.  
d'Uston C.  
D. V. Minh  
Dagge G.  
Dahlen F. A.  
Dalrymple G. B.  
Davies M. E.  
Davies M. E. \*  
Davis A. M. \*  
Davis A. M.  
Davis D. R.  
Davis D. R.  
Davis D. R.  
Day T.  
De Hon R. A. \*  
DeBraal J. D.  
deCharon A. V. \*  
Deering D. W.  
DeHart J. M.  
DeHart J. M. \*  
Delaney J. S.  
Delaney J. S.  
Dempsey J. F.
- Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
Mars ... Atmosphere and Surface, Thu. p.m., Rm. A  
Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
Impact Cratering: Theory and Exper., Tue. p.m., Rm. C  
Impact Cratering ... Posters, Tue. p.m., LPI  
Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A  
Outer Solar System Posters, Tue. p.m., LPI  
Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
Dust Env. in Earth Orbit Posters, Thu. p.m., LPI  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Assorted Achondrites, Mon. p.m., Rm. B  
Planetary Geochemistry Posters, Thu. p.m., LPI  
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Moon Comes to You Posters, Tue. p.m., LPI  
Geol./Geophysics: Mara/Mercury Posters, Thu. p.m., LPI  
Magellan at Venus, Mon. a.m., Rm. A  
Planetary Volcanism Posters, Tue. p.m., LPI  
Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Nebular Processes and CAIs, Wed. a.m., Rm. B  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Venus Geophysics, Mon. p.m., Rm. A  
Terres. Cratering and Field Studies Posters, Thu. p.m., LPI  
Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
Venus Geophysics, Mon. p.m., Rm. A  
Nebular Processes and CAIs, Wed. a.m., Rm. B  
Reduced Meteorites, Tue. a.m., Rm. B  
Asteroids and Comets Posters, Thu. p.m., LPI  
Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
Solar System Formation Posters, Tue. p.m., LPI  
Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
Mars ... Surface Properties and Processes, Thu. a.m., Rm. A  
Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A  
Lab. Remote Sensing Posters, Tue. p.m., LPI  
Chondrite Studies Posters, Thu. p.m., LPI  
Chondrules, Tue. p.m., Rm. B  
Chondrite Studies Posters, Thu. p.m., LPI  
Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI
- Desmarais K.  
Dezfouly-Arjomandy B.  
Dezfouly-Arjomandy B.  
Dickinson T. L.  
Dickinson T. L.  
Dickinson T. L. \*  
Dietz R. S.  
Dilley J. \*  
Dingwell D. B.  
Dodd R. T.  
Dohm J. M.  
Dollfus A. \*  
Donahue D. J.  
Donahue D. J.  
Donahue D. J.  
Donahue D. J.  
Donn B.  
Drake D. M.  
Drake D. M.  
Drake M. J.  
Drake M. J.  
Dreibus G.  
Drobyshevski E. M. \*  
Drosig M.  
Drossart P.  
Drücke V.  
Dummel A.  
Dunn R. P.  
Duval D. M.  
Duxbury N. S.  
Eck A.  
Edgett K. S.  
Edgett K. S. \*  
Edgett K. S.  
Edmunds M. S.  
Ehlers K. E.  
El Goresy A. \*  
Elachi C.  
Elachi C.  
Elmore D.  
Elphic R. C.  
Elthon D.  
England A. W.  
Englert P. A. J.
- Venus Tectonics Posters, Tue. p.m., LPI  
Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
Chondrules, Tue. p.m., Rm. B  
Planetary Geochemistry, Thu. a.m., Rm. C  
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Impact Cratering ... Posters, Tue. p.m., LPI  
Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
Planetary Geochemistry, Thu. a.m., Rm. C  
Chondrites and Meteorite ... Posters, Tue. p.m., LPI  
Mars: Channels and Oceans Posters, Thu. p.m., LPI  
Mars ... Atmosphere and Surface, Thu. p.m., Rm. A  
Martian Spectral ... Data, Wed. a.m., Rm. D  
Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
Moon Comes to You Posters, Tue. p.m., LPI  
Solar System Formation Posters, Tue. p.m., LPI  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Moon Comes to You Posters, Tue. p.m., LPI  
Mars: Atmosphere Posters, Thu. p.m., LPI  
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Mars ... Atmosphere and Surface, Thu. p.m., Rm. A  
Origin and Evol. of Planetary Sys., Mon. p.m., Rm. C  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Moon Comes to You Posters, Tue. p.m., LPI  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Venus Impact Crater Posters, Tue. p.m., LPI  
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Origin and Evol. of Planetary Sys., Mon. p.m., Rm. C  
Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
Martian Spectral ... Data, Wed. a.m., Rm. D  
Planetary Volcanism Posters, Tue. p.m., LPI  
Venus Impact Crater Posters, Tue. p.m., LPI  
Planetary Geochemistry, Thu. a.m., Rm. C  
Reduced Meteorites, Tue. a.m., Rm. B  
Dynamics of Impacts ... Venus, Wed. a.m., Rm. A  
Venus Geomorphology Posters, Tue. p.m., LPI  
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Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Planetary Geochemistry, Thu. a.m., Rm. C  
Planetary Volcanism Posters, Tue. p.m., LPI  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI

- Englert P. A. J.  
Erard S.  
Erard S.  
Erard S.  
Erard S.  
Erard S.  
Erat T. M. \*  
Esposito L. W.  
Eugster O. \*  
Evlanov E. N.  
Fabian U.  
Fanale F. P. \*  
Farinella P.  
Faris J.  
Faure G.  
Fegley B. Jr.  
Fegley B. Jr. \*  
Feldman V. I.  
Ferguson H. M.  
Fiéni C.  
Filges D.  
Fink D.  
Fink D.  
Fink J. H.  
Finkel R. C.  
Finn V. J.  
Finnila A. B.  
Fischer E. M. \*  
Fisenko A. V.  
Fisenko A. V.  
Fisher D. S.  
Fleming R. H. \*  
Fleming R. H.  
Flynn G. J. \*  
Flynn G. J.  
Flynn G. J. \*  
Flynn G. J.  
Fogel R. A. \*  
Fogel R. A.  
Foh J.  
Fomenkova M. \*  
Fomenkova M.  
Foote J.  
Ford P. G.  
Ford P. G.
- Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
Geol./Geophysics: Mara/Mercury Posters, Thu. p.m., LPI  
Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
Mars ... Surface Properties and Processes, Thu. a.m., Rm. A  
Martian Spectral ... Data, Wed. a.m., Rm. D  
Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
Asteroids and Comets Posters, Thu. p.m., LPI  
Solar System Formation Posters, Tue. p.m., LPI  
Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
Reduced Meteorites, Tue. a.m., Rm. B  
Offerings from the Moon, Fri. a.m., Rm. A  
Terres. Cratering and Field Studies Posters, Thu. p.m., LPI  
Mars: Avalanches Posters, Thu. p.m., LPI  
Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A  
Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
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Moon Comes to You Posters, Tue. p.m., LPI  
Field Trip to the Moon, Wed. a.m., Rm. C  
Chondrules and Inclusions Posters, Tue. p.m., LPI  
Stardust, Thu. p.m., Rm. B  
Chondrite Studies Posters, Thu. p.m., LPI  
Cosmic Dust and Comets, Thu. a.m., Rm. B  
Cosmic Dust Posters, Thu. p.m., LPI  
Cosmic Dust and Comets, Thu. a.m., Rm. B  
Cosmic Dust Posters, Thu. p.m., LPI  
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Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
Offerings from the Moon, Fri. a.m., Rm. A  
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Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Cosmic Dust and Comets, Thu. a.m., Rm. B  
Cosmic Dust Posters, Thu. p.m., LPI  
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Moon Comes to You Posters, Tue. p.m., LPI  
Venus Geomorphology Posters, Tue. p.m., LPI
- Forshaw M. R. B.  
Fram M. S.  
Franklin B. J.  
Freund F.  
Frey H.  
Frey H. \*  
Friedlander A. L.  
Fujiwara T.  
Funsten H. O. III  
Futagami T.  
Gaddis L. R.  
Gaffey M. J. \*  
Gaffey M. J.  
Gaffey M. J.  
Galileo Imaging Team  
Galuzinakya A. K.  
Garrison D. H.  
Garrison D. H.  
Gartenhaus S.  
Garvin J. B.  
Gaskell R. W.  
Gasparik T.  
Gebhard J.  
Geiger T.  
Geissler P. E.  
Geissler P. E. \*  
Geringer M. A.  
Geringer M. A.  
Germani M. S.  
GhaiR.  
Gharakonian V.  
Gibbons F. L.  
Gibson E. K.  
Gilichinsky D. A.  
Gilmour I.  
Glass B. P. \*  
Goguen J. D.  
Golden D. C.  
Golden D. C.  
Goldspiel J. M.  
Golombek M. P. \*  
Gooding J. L.  
Gooding J. L.  
Gooding J. L. \*
- Planetary Volcanism Posters, Tue. p.m., LPI  
Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
Mars ... Surface Properties and Processes, Thu. a.m., Rm. A  
Asteroids and Comets Posters, Thu. p.m., LPI  
Meteorite Parent Bodies, Mon. a.m., Rm. B  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
Moon Comes to You Posters, Tue. p.m., LPI  
Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
Reduced Meteorites, Tue. a.m., Rm. B  
Asteroids and Comets Posters, Thu. p.m., LPI  
Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
Achondrites and Irons Posters, Tue. p.m., LPI  
Chondrite Studies Posters, Thu. p.m., LPI  
Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
Chondrites and Meteorite ... Posters, Tue. p.m., LPI  
Venus Impact Crater Posters, Tue. p.m., LPI  
Planetary Cratering Posters, Thu. p.m., LPI  
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Chondrites and Meteorite ... Posters, Tue. p.m., LPI  
Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
Martian Spectral ... Data, Wed. a.m., Rm. D  
Dynamics of Impacts ... Venus, Wed. a.m., Rm. A  
Venus Geomorphology Posters, Tue. p.m., LPI  
Cosmic Dust and Comets, Thu. a.m., Rm. B  
Venus Tectonics Posters, Tue. p.m., LPI  
Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Planetary Geochemistry Posters, Thu. p.m., LPI  
Exobiology Posters, Thu. p.m., LPI  
Impacts and Boundary Prob. Posters, Thu. p.m., LPI  
Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
Asteroids and Comets Posters, Thu. p.m., LPI  
Achondrites and Irons Posters, Tue. p.m., LPI  
Chondrite Studies Posters, Thu. p.m., LPI  
Mars: Channels and Oceans Posters, Thu. p.m., LPI  
Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A  
Assorted Achondrites, Mon. p.m., Rm. B  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Martian Spectral ... Data, Wed. a.m., Rm. D

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| Goodrich C. A. * | Reduced Meteorites, Tue. a.m., Rm. B                         | Gulick V. C.       | Magellan at Venus, Mon. a.m., Rm. A                         |
| Gorsline D. S.   | Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI       | Gulick V. C. *     | Mars ... Surface Properties and Processes, Thu. a.m., Rm. A |
| Gorsline D. S.   | Mars: Channels and Oceans Posters, Thu. p.m., LPI            | Gulick V. C.       | Venus Geomorphology Posters, Tue. p.m., LPI                 |
| Goswami J. N.    | Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI         | Gurley J. G.       | Asteroids and Comets Posters, Thu. p.m., LPI                |
| Grady M. M.      | Martian Spectral ... Data, Wed. a.m., Rm. D                  | Guseva L. B.       | Terres. Cratering and Field Studies Posters, Thu. p.m., LPI |
| Graf J.          | Offerings from the Moon, Fri. a.m., Rm. A                    | Haack H.           | Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C       |
| Graf Th.         | Asteroids and Comets Posters, Thu. p.m., LPI                 | Haack H. *         | Meteorite Parent Bodies, Mon. a.m., Rm. B                   |
| Graham A. L. *   | Meteorite Parent Bodies, Mon. a.m., Rm. B                    | Haberle R. M.      | Mars ... Atmosphere and Surface, Thu. p.m., Rm. A           |
| Granahan J. C. * | Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C        | Hacker M. D.       | Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C       |
| Grant J. A.      | Terres. Cratering and Field Studies Posters, Thu. p.m., LPI  | Hagen E. H.        | Antarctic Micromet. and LDEF, Wed. p.m., Rm. C              |
| Grant J. A.      | Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C       | Haines E. L.       | Instruments and Future ... Explor. Posters, Tue. p.m., LPI  |
| Graps A. L.      | Moon Comes to You Posters, Tue. p.m., LPI                    | Haines E. L.       | Moon Comes to You Posters, Tue. p.m., LPI                   |
| Graps A. L.      | Martian Spectral ... Data, Wed. a.m., Rm. D                  | Hall G. S.         | Cosmic Dust and Comets, Thu. a.m., Rm. B                    |
| Gratz A. J.      | Impact Cratering ... Posters, Tue. p.m., LPI                 | Hall T. M.         | Achondrites and Irons Posters, Tue. p.m., LPI               |
| Graup G. *       | Impact Cratering: Theory and Exper., Tue. p.m., Rm. C        | Halliday A. N.     | Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C       |
| Greeley R.       | Field Trip to the Moon, Wed. a.m., Rm. C                     | Halvorson K.       | Terres. Cratering and Field Studies Posters, Thu. p.m., LPI |
| Greeley R. *     | Dynamics of Impacts ... Venus, Wed. a.m., Rm. A              | Hansen V. L. *     | Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A           |
| Greeley R.       | Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C        | Hapke B. *         | Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D       |
| Greeley R.       | Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI       | Harmon J. K.       | Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI      |
| Greeley R.       | Magellan at Venus, Mon. a.m., Rm. A                          | Harper C. L. Jr. * | Nebular Processes and CAIs, Wed. a.m., Rm. B                |
| Greeley R.       | Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D        | Harper C. L. Jr.   | Planetary Geochemistry Posters, Thu. p.m., LPI              |
| Greeley R.       | Planetary Volcanism Posters, Tue. p.m., LPI                  | Harris L.          | Instruments and Future ... Explor. Posters, Tue. p.m., LPI  |
| Greeley R.       | Moon Comes to You Posters, Tue. p.m., LPI                    | Hartmann W. K.     | Planetary Cratering Posters, Thu. p.m., LPI                 |
| Greeley R.       | Venus Geomorphology Posters, Tue. p.m., LPI                  | Hartung J. B. *    | Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C      |
| Greeley R.       | Venus Volcanism, Tue. p.m., Rm. A                            | Harvey R. P. *     | Assorted Achondrites, Mon. p.m., Rm. B                      |
| Greeley R.       | Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C        | Haskin L. A. *     | Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C       |
| Greeley R.       | Venus Volcanism, Tue. p.m., Rm. A                            | Hawke B. R. *      | Field Trip to the Moon, Wed. a.m., Rm. C                    |
| Grieve R. A. F.  | Terres. Cratering and Field Studies Posters, Thu. p.m., LPI  | Hawke B. R.        | Moon Comes to You Posters, Tue. p.m., LPI                   |
| Grieve R. A. F.  | Venus Impact Crater Posters, Tue. p.m., LPI                  | Haynes G. L.       | Offerings from the Moon, Fri. a.m., Rm. A                   |
| Grieve R. A. F.  | Magellan at Venus, Mon. a.m., Rm. A                          | Head J. N.         | Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI         |
| Grimm R. E.      | Venus Geophysics, Mon. p.m., Rm. A                           | Head J. W. III     | Moon Comes to You Posters, Tue. p.m., LPI                   |
| Grimm R. E. *    | Mars: Channels and Oceans Posters, Thu. p.m., LPI            | Head J. W. III *   | Field Trip to the Moon, Wed. a.m., Rm. C                    |
| Grin E. A.       | Dynamics of Impacts ... Venus, Wed. a.m., Rm. A              | Head J. W. III     | Dynamics of Impacts ... Venus, Wed. a.m., Rm. A             |
| Grinspoon D. H.  | Moon Comes to You Posters, Tue. p.m., LPI                    | Head J. W. III     | Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C       |
| Gröbner C.       | Venus Tectonics Posters, Tue. p.m., LPI                      | Head J. W. III     | Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI      |
| Grosfils E. B.   | Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B | Head J. W. III *   | Magellan at Venus, Mon. a.m., Rm. A                         |
| Grossman J. N.   | Chondrules, Tue. p.m., Rm. B                                 | Head J. W. III     | Martian Spectral ... Data, Wed. a.m., Rm. D                 |
| Grossman L.      | Nebular Processes and CAIs, Wed. a.m., Rm. B                 | Head J. W. III     | Planetary Volcanism Posters, Tue. p.m., LPI                 |
| Grossman L.      | Planetary Geochemistry, Thu. a.m., Rm. C *                   | Head J. W. III     | Moon Comes to You Posters, Tue. p.m., LPI                   |
| Grove T. L. *    | Cosmic Dust and Comets, Thu. a.m., Rm. B                     | Head J. W. III     | Venus Geophysics, Mon. p.m., Rm. A                          |
| Grün E.          | Planetary Volcanism Posters, Tue. p.m., LPI                  | Head J. W. III     | Venus Tectonics Posters, Tue. p.m., LPI                     |
| Guest J. E.      | Venus Volcanism, Tue. p.m., Rm. A                            | Head J. W. III     | Venus Volcanism, Tue. p.m., Rm. A                           |
| Guest J. E. *    | Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A            | Head J. W. III *   | Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A           |
| Guest J. E. *    | Lab. Remote Sensing Posters, Tue. p.m., LPI                  | Head J. W. III     | Mars ... Surface Properties and Processes, Thu. a.m., Rm. A |

- Heiken G.  
Held P.  
Helfenstein P. \*  
Hemley R. J.  
Henderson B. G. \*  
Herbst T.  
Herkenhoff K. E.  
Herrick R. R. \*  
Herrick R. R.  
Hervig R. L. \*  
Herzog G. F. \*  
Herzog G. F.  
Herzog G. F.  
Hess P. C. \*  
Hess P. C.  
Hess P. C.  
Hewins R. H. \*  
Heymann D. \*  
Hiesinger H. \*  
Hildebrand A. R. \*  
Hill D. H.  
Hillgren V. J. \*  
Hines J. A.  
Hinsey N.  
Hiroi T. \*  
Hoffmann H.  
Hoffmann H.  
Hohenberg C. M.  
Hohenberg C. M.  
Holloway J. R. \*  
Holmann E.  
Holmberg B. B.  
Holsapple K. A.  
Holzheid A.  
Hood L. L. \*  
Hood L. L.  
Hoppe P. \*  
Horan M. F.  
Horanyi M.  
Horn L.  
Hörz F.  
Hörz F.  
Hörz F.
- Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
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Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
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Origin and Evol. of Planetary Sys., Mon. p.m., Rm. C  
Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
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Martian Spectral ... Data, Wed. a.m., Rm. D  
Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
Moon Comes to You Posters, Tue. p.m., LPI  
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Chondrules, Tue. p.m., Rm. B  
Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
Field Trip to the Moon, Wed. a.m., Rm. C  
Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
Assorted Achondrites, Mon. p.m., Rm. B  
Planetary Geochemistry, Thu. a.m., Rm. C  
Offerings from the Moon, Fri. a.m., Rm. A  
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Field Trip to the Moon, Wed. a.m., Rm. C  
Moon Comes to You Posters, Tue. p.m., LPI  
Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
Stardust, Thu. p.m., Rm. B  
Venus Volcanism, Tue. p.m., Rm. A  
Dynamics of Impacts ... Venus, Wed. a.m., Rm. A  
Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
Asteroids and Comets Posters, Thu. p.m., LPI  
Planetary Geochemistry, Thu. a.m., Rm. C  
Offerings from the Moon, Fri. a.m., Rm. A  
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Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
Solar System Formation Posters, Tue. p.m., LPI  
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Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
Impact Cratering: Theory and Exper., Tue. p.m., Rm. C  
Offerings from the Moon, Fri. a.m., Rm. A
- Houben H.  
Housen K. R. \*  
Housley R. M.  
Howard A. D. \*  
Huang J.  
Hudgins D. M.  
Hurneck H. J.  
Huss G. R. \*  
Hutcheon I. D. \*  
Hutcheon I. D.  
Iliffe J. C.  
Immel G.  
Ingersoll A. P.  
Ireland T. R. \*  
Isbell N. K.  
Isbell N. R.  
Ivanov B. A.  
Ivanov B. A. \*  
Ivanov B. A.  
Ivanov M. A. \*  
Ivanov M. V.  
Ivanova M. A.  
Ivliev A. I.  
Izenberg N. R. \*  
Izenberg N. R.  
Izett G. A.  
Izett G. A.  
Jackson A. A.  
Jackson A. A.  
Jacobsen S. B.  
Jäger H.  
Jagoutz E.  
Jákiš P.  
Jákiš P.  
Jákiš P. \*  
Jakovsky B. M. \*  
Jakovsky B. M.  
Jakovsky B. M.  
James O. B. \*  
Janicke J.  
Jaumann R.  
Jaumann R.  
Jercinovic M. J.  
Jerde E. A. \*
- Mars ... Atmosphere and Surface, Thu. p.m., Rm. A  
Impact Cratering: Theory and Exper., Tue. p.m., Rm. C  
Moon Comes to You Posters, Tue. p.m., LPI  
Mars ... Atmosphere and Surface, Thu. p.m., Rm. A  
Venus Geomorphology Posters, Tue. p.m., LPI  
Lab. Remote Sensing Posters, Tue. p.m., LPI  
Cosmic Dust and Comets, Thu. a.m., Rm. B  
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Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
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Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
Outer Solar System Posters, Tue. p.m., LPI  
Terres. Cratering and Field Studies Posters, Thu. p.m., LPI  
Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
Venus Impact Crater Posters, Tue. p.m., LPI  
Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A  
Exobiology Posters, Thu. p.m., LPI  
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Impact Cratering ... Posters, Tue. p.m., LPI  
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Tektites Posters, Tue. p.m., LPI  
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Dust Env. in Earth Orbit Posters, Thu. p.m., LPI  
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Planetary Geochemistry Posters, Thu. p.m., LPI  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
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Chondrites and Meteorite ... Posters, Tue. p.m., LPI  
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Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
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Moon Comes to You Posters, Tue. p.m., LPI  
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Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C

- Jerde E. A.  
Jerde E. A.  
Jessberger E. K.  
Jessberger E. K. \*  
Jochum K. P.  
Joerg S.  
Johnson C. L. \*  
Johnson J. R. \*  
Johnson J. R.  
Johnson J.  
Johnson T. V.  
Jolliff B. L. \*  
Jolliff B. L.  
Jonea J. H.  
Jones J. H.  
Jonea K. W.  
Jonea R. H.  
Jonea R. H. \*  
Jonea T.  
Jöns H.-P.  
Jöns H.-P.  
Jordan J. L.  
Joswiak D. J.  
Juchniewicz J.  
Jull A. J. T. \*  
Jull A. J. T.  
Jull A. J. T.  
Jull A. J. T.  
Jurewicz A. J. G. \*  
Jurewicz S. R. \*  
Jurgens R. F.  
Jurgens R. F.  
Kadel S. D.  
Kallmeyn G. W.  
Kane K. Y.  
Kankeleit E.  
Kargel J. S.  
Kargel J. S.  
Kargel J. S.  
Kargel J. S. \*  
Kashkarov L. L.  
Kaula W. M.  
Kaula W. M.  
Keddie S. T. \*
- Planetary Geochemistry Posters, Thu. p.m., LPI  
Offerings from the Moon, Fri. a.m., Rm. A  
Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
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Planetary Geochemistry Posters, Thu. p.m., LPI  
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Moon Comes to You Posters, Tue. p.m., LPI  
Venus Tectonics Posters, Tue. p.m., LPI  
Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
Mare Bassa ... and Copern. Ejecta, Mon. a.m., Rm. C  
Planetary Geochemistry Posters, Thu. p.m., LPI  
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Chondrite Studies Posters, Thu. p.m., LPI  
Chondrules and Inclusions Posters, Tue. p.m., LPI  
Chondrulea, Tue. p.m., Rm. B  
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Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
Mars: Glaciation Posters, Thu. p.m., LPI  
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Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
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Martian Spectral ... Data, Wed. a.m., Rm. D  
Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
Moon Comes to You Posters, Tue. p.m., LPI  
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Mars: Channels and Oceans Posters, Thu. p.m., LPI  
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Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Magellan at Venus, Mon. a.m., Rm. A  
Mars: Glaciation Posters, Thu. p.m., LPI  
Planetary Geochemistry Posters, Thu. p.m., LPI  
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Venus Volcanism, Tue. p.m., Rm. A
- Keil K.  
Keil K.  
Keil K.  
Keil K.  
Keil K.  
Kelleymen G. W.  
Keller L. P.  
Kelley M. S. \*  
Kennedy A. K. \*  
Kennedy A. K. \*  
Kerridge J. F. \*  
Kerridge J. F.  
Kharitonova G. A.  
Khromov V. N.  
Kiefer W. S. \*  
Kieffer H. H.  
Kilburn C. R. J.  
Kim J. S.  
Kim J. S. \*  
Kim J. S.  
Kim Y.  
Kim Y.  
King E. A.  
King E. A.  
Kirjakov A. F.  
Klaasen K. P.  
Klein J.  
Klein J.  
Klein J. \*  
Klein J.  
Klingelhöfer G.  
Klöck W. \*  
Klöck W.  
Klose K. B.  
Klose K. B.  
Klose K. B. \*  
Knudsen J. M.  
Knudsen J. M.  
Kochan H. \*
- Acapulcoitea and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
Achondritea and Irons Posters, Tue. p.m., LPI  
Chondrites and Meteorite ... Posters, Tue. p.m., LPI  
Meteorite Parent Bodies, Mon. a.m., Rm. B  
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Reduced Meteorites, Tue. a.m., Rm. B  
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Cosmic Dust Posters, Thu. p.m., LPI  
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Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
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Origin and Evol. of Planetary Sys., Mon. p.m., Rm. C  
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Acapulcoitea and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
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Cosmic Dust and Cometa, Thu. a.m., Rm. B

- Koeberl C.  
 Koeberl C. \*  
 Koeberl C.  
 Koeberl C.  
 Koehler A. M.  
 Kolesnichenko A. V.  
 Kölzer G.  
 Komatsu G.  
 Komatsu G.  
 Komatsu G.  
 Komatsu G.  
 Komatsu G.  
 Komatsu G.  
 Komarovitz L.  
 Korotaeva N. N.  
 Korotev R. L. \*  
 Koshlyakov E. M.  
 Kozak R. C.  
 Kozłowski R. W. H.  
 Kracher A.  
 Krešlaváky M.  
 Kring D. A. \*  
 Kring D. A.  
 Krivian K.  
 Krot A.  
 Krot A.  
 Kucinskas A. B.  
 Küprt E.  
 Kuramoto K. \*  
 Kurat G. \*  
 Kurat G. \*  
 Kurat G.  
 Kusiak S. J.  
 Labotka T. C.  
 Lämmerzahl P.  
 Lancaster M. G. \*
- Lancaster M. G.  
 Landheim R.  
 Lane A.  
 Lange G.  
 Langevin Y.  
 Langevin Y.  
 Langevin Y.  
 Langevin Y.
- Achondrites and Irons Posters, Tue. p.m., LPI  
 Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
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 Terres. Cratering and Field Studies Posters, Thu. p.m., LPI  
 Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
 Cosmic Dust Posters, Thu. p.m., LPI  
 Cosmic Dust and Comets, Thu. a.m., Rm. B  
 Dynamics of Impacts ... Venus, Wed. a.m., Rm. A  
 Magellan at Venus, Mon. a.m., Rm. A  
 Planetary Volcanism Posters, Tue. p.m., LPI  
 Venus Geomorphology Posters, Tue. p.m., LPI  
 Venus Volcanism, Tue. p.m., Rm. A  
 Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A  
 Venus Tectonics Posters, Tue. p.m., LPI  
 Terres. Cratering and Field Studies Posters, Thu. p.m., LPI  
 Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
 Venus Geophysics, Mon. p.m., Rm. A  
 Assorted Achondrites, Mon. p.m., Rm. B  
 Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
 Chondrite Studies Posters, Thu. p.m., LPI  
 Chondrules and Inclusions Posters, Tue. p.m., LPI  
 Chondrules, Tue. p.m., Rm. B  
 Venus Geomorphology Posters, Tue. p.m., LPI  
 Cosmic Dust and Comets, Thu. a.m., Rm. B  
 Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
 Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
 Chondrules, Tue. p.m., Rm. B  
 Cosmic Dust Posters, Thu. p.m., LPI  
 Solar System Formation Posters, Tue. p.m., LPI  
 Chondrite Studies Posters, Thu. p.m., LPI  
 Cosmic Dust and Comets, Thu. a.m., Rm. B  
 Venus Volcanism, Tue. p.m., Rm. A  
 Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A  
 Venus Geomorphology Posters, Tue. p.m., LPI  
 Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
 Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
 Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
 Mars ... Surface Properties and Processes, Thu. a.m., Rm. A
- Langevin Y.  
 Larson S. M.  
 Lauer H. V. Jr.  
 Le L.  
 Lebofsky L. A.  
 Lee D.-C.  
 Lee M.  
 Lee M.  
 Lee P. \*  
 Leff C.  
 Lein A. Yu.  
 Lenardic A. \*  
 Levy E. H.  
 Lewis R. S. \*  
 Leyva I. A.  
 Lindstrom D. J. \*  
 Lindstrom M. M. \*  
 Lindstrom M. M.  
 Lipaszczuk M. E.  
 Lipschutz M. E. \*  
 Lipschutz M. E.  
 Liu Y.-G.  
 Liu Y.-G.  
 Liu Y.-G.  
 Lockwood J. F.  
 Lockwood J. F.  
 Lodders K. \*  
 Lofgren G. E.  
 Lofgren G. E. \*  
 Lofgren G. E.  
 Lofgren G. E.  
 Lognonne P.  
 Longhi J.  
 Longhi J. \*  
 Lopes-Gautier R. M. C.  
 Lopez J. P.  
 Lorenz E.  
 Lowe D. R.  
 Lu J. \*  
 Lucchitta B. K.  
 Lucchitta B. K.  
 Lucey P. G.  
 Lucey P. G.
- Martian Spectral ... Data, Wed. a.m., Rm. D  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Mara Spectra: Oba. Data/Lab Posters, Thu. p.m., LPI  
 Assorted Achondrites, Mon. p.m., Rm. B  
 Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
 Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
 Impacts and Boundary Prob. Posters, Thu. p.m., LPI  
 Meteorite Parent Bodies, Mon. a.m., Rm. B  
 Mara ... Atmosphere and Surface, Thu. p.m., Rm. A  
 Venus Impact Crater Posters, Tue. p.m., LPI  
 Exobiology Posters, Thu. p.m., LPI  
 Venus Geophysics, Mon. p.m., Rm. A  
 Origin and Evol. of Planetary Sys., Mon. p.m., Rm. C  
 Stardust, Thu. p.m., Rm. B  
 Venus Tectonics Posters, Tue. p.m., LPI  
 Cosmic Dust and Comets, Thu. a.m., Rm. B  
 Assorted Achondrites, Mon. p.m., Rm. B  
 Chondrites and Meteorite ... Posters, Tue. p.m., LPI  
 Chondrite Studies Posters, Thu. p.m., LPI  
 Meteorite Parent Bodies, Mon. a.m., Rm. B  
 Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
 Impacts and Boundary Prob. Posters, Thu. p.m., LPI  
 Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Meteorite Parent Bodies, Mon. a.m., Rm. B  
 Mara: Channels and Oceans Posters, Thu. p.m., LPI  
 Mars: Glaciation Posters, Thu. p.m., LPI  
 Reduced Meteorites, Tue. a.m., Rm. B  
 Chondrite Studies Posters, Thu. p.m., LPI  
 Chondrules, Tue. p.m., Rm. B  
 Planetary Geochemistry, Thu. a.m., Rm. C  
 Reduced Meteorites, Tue. a.m., Rm. B  
 Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
 Achondrites and Irons Posters, Tue. p.m., LPI  
 Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
 Planetary Volcanism Posters, Tue. p.m., LPI  
 Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
 Cosmic Dust and Comets, Thu. a.m., Rm. B  
 Impacts and Boundary Prob. Posters, Thu. p.m., LPI  
 Chondrules, Tue. p.m., Rm. B  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Mars: Avalanches Posters, Thu. p.m., LPI  
 Field Trip to the Moon, Wed. a.m., Rm. C  
 Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A

- Lugmair G. W. \*  
Lugmair G. W.  
Lyons D. M.  
Maag C. R.  
MacIsaac C.  
Mack K. S.  
Madsen M. B. \*Madsen M. B.  
Maechling C. R.  
Malcuit R. J. \*  
Malhotra R. \*  
Malin M.  
Mancinelli R. L.  
Mao H.  
Marchenkov K. I.  
Mardon A. A.  
Mardon A. A.  
Marín L. E.  
Marín L. E.  
Marov M. Ya.  
Marsh B. D.  
Marshall J. R.  
Marti K. \*  
Marti K.  
Marti K.  
Marti K.  
Marti K.  
Martin P.  
Martin T. Z.  
Martin T. Z. \*  
Marvin U. B. \*Massaitis V. L.  
Masarik J.  
Mashchak M. S.  
Masson P.  
Mathew K. J.  
Matsuda J.  
Matsuji T.  
Matsuji T.  
Matsumi K.  
Maurer M. J.  
Maurette M.  
Maurette M.  
Maxwell T. A. \*Nebular Processes and CAIs, Wed. a.m., Rm. B  
Reduced Meteorites, Tue. a.m., Rm. B  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Dust Env. in Earth Orbit Posters, Thu. p.m., LPI  
Nebular Processes and CAIs, Wed. a.m., Rm. B  
Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
Martian Spectral ... Data, Wed. a.m., Rm. D  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
Origin and Evol. of Planetary Sys., Mon. p.m., Rm. C  
Magellan at Venus, Mon. a.m., Rm. A  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Planetary Geochemistry Posters, Thu. p.m., LPI  
Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
Chondrites and Meteorite ... Posters, Tue. p.m., LPI  
Moon Comes to You Posters, Tue. p.m., LPI  
Terres. Cratering and Field Studies Posters, Thu. p.m., LPI  
Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
Cosmic Dust Posters, Thu. p.m., LPI  
Venus Volcanism, Tue. p.m., Rm. A  
Impact Cratering ... Posters, Tue. p.m., LPI  
Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
Asteroide and Cometa Posters, Thu. p.m., LPI  
Cosmic Dust Posters, Thu. p.m., LPI  
Origin and Evol. of Planetary Sys., Mon. p.m., Rm. C  
Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
Field Trip to the Moon, Wed. a.m., Rm. C  
Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
Mars ... Atmosphere and Surface, Thu. p.m., Rm. A  
Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
Planetary Geochemistry, Thu. a.m., Rm. C  
Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
Planetary Cratering Posters, Thu. p.m., LPI  
Planetary Geochemistry, Thu. a.m., Rm. C  
Dynamics of Impacts ... Venus, Wed. a.m., Rm. A  
Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
Cosmic Dust Posters, Thu. p.m., LPI  
Mars ... Atmosphere and Surface, Thu. p.m., Rm. A  
Mayeda T. K.  
Mayeda T. K.  
Mayeda T. K.  
McAdams J. V.  
McBride K.  
McComas D. J.  
McCormick T. C.  
McCoy T. J. \*  
McCoy T. J.  
McDonald R. A.  
McDonnell J. A. M. \*  
McEwen A. S.  
McFadden L.  
McFarlane E. A. \*  
McGee J. J.  
McGill G. E.  
McGovern P. J. \*  
McHargue L.  
McHone J. F.  
McHone J. F.  
McKay D. S.  
McKay D. S.  
McKay D. S.  
McKay D. S.  
McKay D. S. \*  
McKay D. S.  
McKay G. A. \*  
McKeever S. W. S.  
McKinnon W. B.  
McSween H. Y. Jr.  
McSween H. Y. Jr.  
McSween H. Y. Jr.  
Mehringer D. M.  
Melendrez D. E.  
Mellon M. T. \*  
Meloah H. J.  
Meloah H. J.  
Meloah H. J.  
Mércenyi E.  
Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
Assorted Achondrites, Mon. p.m., Rm. B  
Reduced Meteorites, Tue. a.m., Rm. B  
Asteroids and Comets Posters, Thu. p.m., LPI  
Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Planetary Geochemistry, Thu. a.m., Rm. C  
Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
Chondrites and Meteorite ... Posters, Tue. p.m., LPI  
Dust Env. in Earth Orbit Posters, Thu. p.m., LPI  
Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
Field Trip to the Moon, Wed. a.m., Rm. C  
Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
Outer Solar System Posters, Tue. p.m., LPI  
Moon Comes to You Posters, Tue. p.m., LPI  
Cosmic Dust Posters, Thu. p.m., LPI  
Planetary Geochemistry, Thu. a.m., Rm. C  
Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
Magellan at Venus, Mon. a.m., Rm. A  
Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A  
Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
Impact Cratering ... Posters, Tue. p.m., LPI  
Terres. Cratering and Field Studies Posters, Thu. p.m., LPI  
Cosmic Dust and Cometa, Thu. a.m., Rm. B  
Cosmic Dust Posters, Thu. p.m., LPI  
Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
Offerings from the Moon, Fri. a.m., Rm. A  
Moon Comes to You Posters, Tue. p.m., LPI  
Assorted Achondrites, Mon. p.m., Rm. B  
Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
Impact Cratering: Theory and Exper., Tue. p.m., Rm. C  
Assorted Achondrites, Mon. p.m., Rm. B  
Chondrite Studies Posters, Thu. p.m., LPI  
Mars ... Surface Properties and Processes, Thu. a.m., Rm. A  
Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
Moon Comes to You Posters, Tue. p.m., LPI  
Mars ... Surface Properties and Processes, Thu. a.m., Rm. A  
Impact Cratering: Theory and Exper., Tue. p.m., Rm. C  
Solar System Formation Posters, Tue. p.m., LPI  
Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI

- Meekik A. P.  
 Metzger A. E.  
 Metzger A. E.  
 Metzger S. M.  
 Michaels G. A.  
 Michaels G. A.  
 Michel R.  
 Michel Th.  
 Michlovich E. \*  
 Middleton R.  
 Middleton R.  
 Middleton R.  
 Middleton R.  
 Miller J. S.  
 Miller R.  
 Ming D. W.  
 Ming D. W.  
 Misawa K. \*  
 Mittlefehldt D. W.  
 Mittlefehldt D. W.  
 Mittlefehldt D. W. \*  
 Miyamoto M.  
 Miyamoto M.  
 Möhlmann D.  
 Montieth J.  
 Moore C. B.  
 Moore H. J.  
 Moore H. J.  
 Moore H. J.  
 Moore H. J.  
 Morgan J. W.  
 Mori H.  
 Mori H.  
 Moroz V. I. \*  
 Morris R. V.  
 Morrison A. D.  
 Morrison D.  
 Mouginis-Mark P. J. \*  
 Moura D.
- Nebular Processes and CAIs, Wed. a.m., Rm. B  
 Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Mars: Glaciation Posters, Thu. p.m., LPI  
 Venus Tectonics Posters, Tue. p.m., LPI  
 Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A  
 Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
 Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
 Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
 Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
 Martian Spectral ... Data, Wed. a.m., Rm. D  
 Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
 Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
 Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
 Chondrites and Meteorite ... Posters, Tue. p.m., LPI  
 Achondrites and Irons Posters, Tue. p.m., LPI  
 Chondrite Studies Posters, Thu. p.m., LPI  
 Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
 Assorted Achondrites, Mon. p.m., Rm. B  
 Chondrites and Meteorite ... Posters, Tue. p.m., LPI  
 Impact Cratering: Theory and Exper., Tue. p.m., Rm. C  
 Assorted Achondrites, Mon. p.m., Rm. B  
 Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
 Cosmic Dust and Comets, Thu. a.m., Rm. B  
 Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
 Reduced Meteorites, Tue. a.m., Rm. B  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Magellan at Venus, Mon. a.m., Rm. A  
 Planetary Volcanism Posters, Tue. p.m., LPI  
 Venus Impact Crater Posters, Tue. p.m., LPI  
 Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
 Achondrites and Irons Posters, Tue. p.m., LPI  
 Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
 Mars ... Atmosphere and Surface, Thu. p.m., Rm. A  
 Assorted Achondrites, Mon. p.m., Rm. B  
 Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
 Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
 Mars ... Surface Properties and Processes, Thu. a.m., Rm. A  
 Offerings from the Moon, Fri. a.m., Rm. A  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Venus Impact Crater Posters, Tue. p.m., LPI  
 Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
 Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A  
 Instruments and Future ... Explor. Posters, Tue. p.m., LPI
- Muhleman D.  
 Mukhin L. M.  
 Mukhin L. M.  
 Mukhin L. M.  
 Mukhin L. M.  
 Muller J.-P.  
 Murchie S. L. \*  
 Murchie S. L.  
 Murchie S. L.  
 Murchie S. L.  
 Murchie S. L.  
 Murray J. B.  
 Murrell M. T.  
 Musselwhite D. S.  
 Mustard J. F.  
 Mustard J. F.  
 Mustard J. F. \*  
 Mustard J. F.  
 Mustard J. F.  
 Nagahara H.  
 Nagai S.  
 Nagel H.-J.  
 Nakamura N. \*  
 Nakamura Y.  
 Namihi N. \*  
 Nash D. B. \*  
 Neal C. R. \*  
 Neal C. R.  
 Nehru C. E.  
 Nellis W. J.  
 Nelson R.  
 Nemchinov I. V.  
 Neukum G.  
 Neukum G.  
 Neukum G.  
 Neukum G.  
 Newman W.  
 Newsom H. E. \*  
 Newton J. \*  
 Nichols R. H. Jr.  
 Nichols R. H. Jr. \*  
 Niedermann S.  
 Nier A. O. \*  
 Nikishin A. M.
- Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Exobiology Posters, Thu. p.m., LPI  
 Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
 Mars ... Atmosphere and Surface, Thu. p.m., Rm. A  
 Cosmic Dust and Comets, Thu. a.m., Rm. B  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Field Trip to the Moon, Wed. a.m., Rm. C  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
 Mars ... Surface Properties and Processes, Thu. a.m., Rm. A  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Asteroids and Comets Posters, Thu. p.m., LPI  
 Mars: Atmosphere Posters, Thu. p.m., LPI  
 Field Trip to the Moon, Wed. a.m., Rm. C  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
 Martian Spectral ... Data, Wed. a.m., Rm. D  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Mars ... Surface Properties and Processes, Thu. a.m., Rm. A  
 Assorted Achondrites, Mon. p.m., Rm. B  
 Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
 Reduced Meteorites, Tue. a.m., Rm. B  
 Meteorite Parent Bodies, Mon. a.m., Rm. B  
 Planetary Geochemistry, Thu. a.m., Rm. C  
 Venus Geophysics, Mon. p.m., Rm. A  
 Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
 Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
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 Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
 Mars: Atmosphere Posters, Thu. p.m., LPI  
 Field Trip to the Moon, Wed. a.m., Rm. C  
 Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
 Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Dynamics of Impacts ... Venus, Wed. a.m., Rm. A  
 Planetary Geochemistry, Thu. a.m., Rm. C  
 Stardust, Thu. p.m., Rm. B  
 Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI  
 Stardust, Thu. p.m., Rm. B  
 Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
 Cosmic Dust and Comets, Thu. a.m., Rm. B  
 Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI

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|------------------------|---|-----------------------|---|
| Plaut J. J.            | Magellan at Venus, Mon. a.m., Rm. A                         | Rebhan R.             | Field Trip to the Moon, Wed. a.m., Rm. C                    |
| Plaut J. J.            | Planetary Volcanism Posters, Tue. p.m., LPI                 | Roed K. L.            | Reduced Meteorites, Tue. a.m., Rm. B                        |
| Plaut J. J.            | Venus Geomorphology Posters, Tue. p.m., LPI                 | Reed K. L.            | Asteroids and Comets Posters, Thu. p.m., LPI                |
| Plaut J. J. *          | Venus Volcanism, Tue. p.m., Rm. A                           | Reed M. H.            | Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI         |
| Plocher O.             | Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C      | Reedy R. C.           | Instruments and Future ... Explor. Posters, Tue. p.m., LPI  |
| Plumb R. C. *          | Martian Spectral ... Data, Wed. a.m., Rm. D                 | Reedy R. C. *         | Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D         |
| Plumlee G. S.          | Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI         | Reedy R. C.           | Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI        |
| Podosek F. A.          | Stardust, Thu. p.m., Rm. B                                  | Reid A. M.            | Achondrites and Irons Posters, Tue. p.m., LPI               |
| Pohn H. A. *           | Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A           | Reid A. M.            | Chondrites and Meteorite ... Posters, Tue. p.m., LPI        |
| Pollack J. B.          | Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI         | Reid A. M.            | Planetary Geochemistry, Thu. a.m., Rm. C                    |
| Pollack J. B.          | Martian Spectral ... Data, Wed. a.m., Rm. D                 | Reid A. M.            | Planetary Geochemistry Posters, Thu. p.m., LPI              |
| Pope K. O.             | Terres. Cratering and Field Studies Posters, Thu. p.m., LPI | Reidy A.-M.           | Meteorite Parent Bodies, Mon. a.m., Rm. B                   |
| Pourchet M.            | Antarctic Micromet. and LDEF, Wed. p.m., Rm. C              | Reimold W. U.         | Geol./Geophysics: Mar/Mercury Posters, Thu. p.m., LPI       |
| Povinec P.             | Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI        | Reyes D. P.           | Terres. Cratering and Field Studies Posters, Thu. p.m., LPI |
| Premo W. R. *          | Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C       | Richardson M. I.      | Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI         |
| Premo W. R.            | Planetary Geochemistry, Thu. a.m., Rm. C                    | Richter S.            | Mars ... Atmosphere and Surface, Thu. p.m., Rm. A           |
| Premo W. R.            | Moon Comes to You Posters, Tue. p.m., LPI                   | Rider P. E. *         | Stardust, Thu. p.m., Rm. B                                  |
| Presper T.             | Antarctic Micromet. and LDEF, Wed. p.m., Rm. C              | Rietmeijer F. J. M. * | Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D         |
| Presper T.             | Cosmic Dust Posters, Thu. p.m., LPI                         | Rivers M. L.          | Cosmic Dust and Comets, Thu. a.m., Rm. B                    |
| Price E. J. *          | Venus Geophysics, Mon. p.m., Rm. A                          | Rizk B.               | Chondrite Studies Posters, Thu. p.m., LPI                   |
| Price K. H.            | Geol./Geophysics: Mar/Mercury Posters, Thu. p.m., LPI       | Roberts K. M.         | Moon Comes to You Posters, Tue. p.m., LPI                   |
| Prilutski O. F.        | Instruments and Future ... Explor. Posters, Tue. p.m., LPI  | Roberts K. M. *       | Venus Volcanism, Tue. p.m., Rm. A                           |
| Prinz M.               | Antarctic Micromet. and LDEF, Wed. p.m., Rm. C              | Robinson C. A. *      | Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A           |
| Prinz M.               | Chondrites and Meteorite ... Posters, Tue. p.m., LPI        | Robinson M. S. *      | Venus Volcanism, Tue. p.m., Rm. A                           |
| Prinz M.               | Chondrules, Tue. p.m., Rm. B                                | Robinson M. S. *      | Field Trip to the Moon, Wed. a.m., Rm. C                    |
| Prinz M.               | Meteorite Parent Bodies, Mon. a.m., Rm. B                   | Robinson M. S.        | Martian Spectral ... Data, Wed. a.m., Rm. D                 |
| Prinz M.               | Reduced Meteorites, Tue. a.m., Rm. B                        | Rocard F.             | Moon Comes to You Posters, Tue. p.m., LPI                   |
| Pronbo C. A. *         | Stardust, Thu. p.m., Rm. B                                  | Roessler K.           | Instruments and Future ... Explor. Posters, Tue. p.m., LPI  |
| Pronin A. *            | Venus Geophysics, Mon. p.m., Rm. A                          | Rogers P. G.          | Cosmic Dust and Comets, Thu. a.m., Rm. B                    |
| Prothroe W.            | Chondrite Studies Posters, Thu. p.m., LPI                   | Rogers P. G.          | Outer Solar System Posters, Tue. p.m., LPI                  |
| Provalov A. A.         | Dynamics of Impacts ... Venus, Wed. a.m., Rm. A             | Romanek C. S.         | Venus Geophysics, Mon. p.m., Rm. A                          |
| Provalov A. A.         | Venus Impact Crater Posters, Tue. p.m., LPI                 | Romashova T. V.       | Planetary Geochemistry Posters, Thu. p.m., LPI              |
| Pun A.                 | Achondrites and Irons Posters, Tue. p.m., LPI               | Rosenqvist Y.         | Achondrites and Irons Posters, Tue. p.m., LPI               |
| Quezada-Muñeton J. M.  | Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C      | Ross D. K. *          | Geol./Geophysics: Mar/Mercury Posters, Thu. p.m., LPI       |
| Quezada-Muñeton J. M.  | Terres. Cratering and Field Studies Posters, Thu. p.m., LPI | Rothery D. A.         | Planetary Geochemistry, Thu. a.m., Rm. C                    |
| Radicati di Brozolo F. | Cosmic Dust Posters, Thu. p.m., LPI                         | Rotto S. L. *         | Geol./Geophysics: Mar/Mercury Posters, Thu. p.m., LPI       |
| Raitala J.             | Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A           | Rotto S. L.           | Mars ... Surface Properties and Processes, Thu. a.m., Rm. A |
| Ramsey M. S.           | Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI         | Roush T. L.           | Mars: Channels and Oceans Posters, Thu. p.m., LPI           |
| Randall C. E.          | Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D       | Roush T. L. *         | Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI         |
| Rank D.                | Martian Spectral ... Data, Wed. a.m., Rm. D                 | Rowan L.              | Martian Spectral ... Data, Wed. a.m., Rm. D                 |
| Rao M. N.              | Solar Wind/Cosmic Ray Irrad. Posters, Thu. p.m., LPI        | Rowland S. K.         | Impact Cratering: Theory and Exper., Tue. p.m., Rm. C       |
| Raubertas R. F.        | Magellan at Venus, Mon. a.m., Rm. A                         | Rubie D. C.           | Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A          |
| Reagan M. K.           | Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C      | Rubin A. E. *         | Planetary Geochemistry, Thu. a.m., Rm. C                    |
| Rebhan H.              | Moon Comes to You Posters, Tue. p.m., LPI                   |                       | Meteorite Parent Bodies, Mon. a.m., Rm. B                   |

- Rudnyk M. \*

Russell S. S.

Russell S. S.

Russell S. S.

Rutherford M. J.

Rutherford M. J.

Ruzicka A.

Ryan E. V. \*

Rybakov V. A.

Ryder G. \*

Ryder G.

Ryder G.

Sagar B.

Sahagian D. L.

Sahuaro High School

Saiki K.

Saiki K.

Saito J.

Sakimoto S. E. H. \*

Salisbury J. W.

Salisbury J. W.

Sammis C. G.

Sandford C. A.

Sandford S. A.

Sandford S. A. \*

Sandwell D. T. \*

Sarkar I. C.

Saunders R. S.

Saunders R. S. \*

Saunders R. S.

Saunders R. S.

Saunders R. S.

Saunders R. S.

Sazonova L. V.

Scala A. A.

Schaber G. G.

Schaber G. G. \*

Schaber G. G.

Schaber G. G.

Schenk P. M.

Schenk P. M.

Schenk P. M.

Schenk P. M.

Schlutter D. J.

Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
Chondrulea and Inclusions Posters, Tue. p.m., LPI  
Impacts and Boundary Prob. Posters, Thu. p.m., LPI  
Stardust, Thu. p.m., Rm. B  
Offerings from the Moon, Fri. a.m., Rm. A  
Moon Comes to You Posters, Tue. p.m., LPI  
Chondrulea and Inclusions Posters, Tue. p.m., LPI  
Impact Cratering: Theory and Exper., Tue. p.m., Rm. C  
Venus Impact Crater Posters, Tue. p.m., LPI  
Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
Terres. Cratering and Field Studies Posters, Thu. p.m., LPI  
Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
Terres. Cratering and Field Studies Posters, Thu. p.m., LPI  
Chondrules, Tue. p.m., Rm. B  
Mars: Channels and Oceans Posters, Thu. p.m., LPI  
Achondritea and Irons Posters, Tue. p.m., LPI  
Assorted Achondrites, Mon. p.m., Rm. B  
Achondritea and Irons Posters, Tue. p.m., LPI  
Venus Volcanism, Tue. p.m., Rm. A  
Lab. Remote Sensing Posters, Tue. p.m., LPI  
Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
Venus Geophysica, Mon. p.m., Rm. A  
Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI  
Lab. Remote Sensing Posters, Tue. p.m., LPI  
Origin and Evol. of Planetary Sys., Mon. p.m., Rm. C  
Venus Geophysics, Mon. p.m., Rm. A  
Magellan at Venus, Mon. a.m., Rm. A  
Dynamics of Impacts ... Venua, Wed. a.m., Rm. A  
Magellan at Venus, Mon. a.m., Rm. A  
Planetary Volcanism Posters, Tue. p.m., LPI  
Venus Geomorphology Posters, Tue. p.m., LPI  
Venus Tectonics Posters, Tue. p.m., LPI  
Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A  
Terres. Cratering and Field Studiea Posters, Thu. p.m., LPI  
Martian Spectral ... Data, Wed. a.m., Rm. D  
Dynamics of Impacts ... Venua, Wed. a.m., Rm. A  
Magellan at Venus, Mon. a.m., Rm. A  
Venus Impact Crater Posters, Tue. p.m., LPI  
Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A  
Planetary Volcanism Posters, Tue. p.m., LPI  
Outer Solar System Posters, Tue. p.m., LPI  
Planetary Volcanism Posters, Tue. p.m., LPI  
Venus Impact Crater Posters, Tue. p.m., LPI  
Cosmic Dust and Comets, Thu. a.m., Rm. B

- Sharpton V. L.  
 Shaw J.  
 Shearer C. K. \*  
 Shearer C. K. \*  
 Shesher T. D.  
 Shepard M. K.  
 Shervais J. W.  
 Shevchenko V. V.  
 Shih C.-Y.  
 Shih C.-Y. \*  
 Shoemaker E. M. \*  
 Shortreed M.  
 Shukolyukov A. \*  
 Shukolyukov Yu. A.  
 Shukolyukov Yu. A.  
 Shumskaya T. V.  
 Shuvalov V. V.  
 Signer P.  
 Simon C.  
 Simon S. B. \*  
 Simon S. B.  
 Simonelli D. P.  
 Simpson R. A. \*  
 Singer R. B.  
 Singer R. B.  
 Singer R. B.  
 Sinyaeva N. V.  
 Sisteron J. M. \*  
 Sjogren W. L. \*  
 Skorov Yu. V.  
 Slade M. A.  
 Slade M. A.  
 Slane F. A.  
 Smirnov G. V.  
 Smith G. A.  
 Smith J. V.  
 Smither C. L. \*  
 Smoliar M. I.  
 Smrekar S. E.  
 Smrekar S. E.  
 Smrekar S. E.  
 Smyth J. R. \*  
 Smythe W.
- Venus Impact Crater Posters, Tue. p.m., LPI  
 Mars: Glaciation Posters, Thu. p.m., LPI  
 Assorted Achondrites, Mon. p.m., Rm. B  
 Mars Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
 Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
 Lab. Remote Sensing Posters, Tue. p.m., LPI  
 Mars Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Assorted Achondrites, Mon. p.m., Rm. B  
 Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
 Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
 Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
 Nebular Processes and CAIs, Wed. a.m., Rm. B  
 Nebular Processes and CAIs, Wed. a.m., Rm. B  
 Stardust, Thu. p.m., Rm. B  
 Achondrites and Irons Posters, Tue. p.m., LPI  
 Mars: Atmosphere Posters, Thu. p.m., LPI  
 Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
 Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
 Chondrulea, Tue. p.m., Rm. B  
 Nebular Processes and CAIs, Wed. a.m., Rm. B  
 Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C  
 Dynamics of Impacts ... Venus, Wed. a.m., Rm. A  
 Mars Spectra: Oba. Data/Lab Posters, Thu. p.m., LPI  
 Mars ... Surface Properties and Processes, Thu. a.m., Rm. A  
 Martian Spectral ... Data, Wed. a.m., Rm. D  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Mars Spectra: Oba. Data/Lab Posters, Thu. p.m., LPI  
 Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
 Venus Geophysics, Mon. p.m., Rm. A  
 Cosmic Dust Posters, Thu. p.m., LPI  
 Geol./Geophysica: Mars/Mercury Posters, Thu. p.m., LPI  
 Mars: Channels and Oceans Posters, Thu. p.m., LPI  
 Planetary Geochemistry, Thu. a.m., Rm. C  
 Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
 Field Trip to the Moon, Wed. a.m., Rm. C  
 Chondrite Studies Posters, Thu. p.m., LPI  
 Impact Cratering: Theory and Exper., Tue. p.m., Rm. C  
 Achondrites and Irons Posters, Tue. p.m., LPI  
 Magellan at Venus, Mon. a.m., Rm. A  
 Venus Tectonics Posters, Tue. p.m., LPI  
 Geol./Geophysica: Mars/Mercury Posters, Thu. p.m., LPI  
 Planetary Geochemistry, Thu. a.m., Rm. C
- Snyder G. A. \*  
 Sobolev N. V.  
 Soczi R. A.  
 Soderblom L. A. \*  
 Solomatov V. S. \*  
 Solomon S. C. \*  
 Solomon S. C.  
 Solomon S. C.  
 Solotin C.  
 Southon J.  
 Spanne P.  
 Spargur C. S.  
 Spettel B.  
 Spettel B.  
 Spettel B.  
 Spettel B.  
 Spittel B.  
 Spitz A. H. \*  
 Sprague A. L.  
 Spudia P. D. \*  
 Squyres S. W.  
 Squyres S. W.  
 Stacy N. J. S.  
 Stacy N. J. S.  
 Stadermann F. J.  
 Stanley C.  
 Stanisberry J. A.  
 Steele I. M.  
 Steele I. M. \*  
 Steele I. M.  
 Stephan T. \*  
 Stepinski T. F. \*  
 Stern S. A.  
 Stevenson D. J.  
 Stewart B. W. \*  
 Stewart D. R.  
 Stewart G. R. \*  
 Stofan E. R.  
 Stofan E. R.
- Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
 Planetary Geochemistry Posters, Thu. p.m., LPI  
 Planetary Geochemistry Posters, Thu. p.m., LPI  
 Dynamics of Impacts ... Venus, Wed. a.m., Rm. A  
 Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
 Magellan at Venus, Mon. a.m., Rm. A  
 Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A  
 Venus Geophysics, Mon. p.m., Rm. A  
 Venus Tectonics Posters, Tue. p.m., LPI  
 Geol./Geophysica: Mars/Mercury Posters, Thu. p.m., LPI  
 Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D  
 Chondrite Studies Posters, Thu. p.m., LPI  
 Martian Spectral ... Data, Wed. a.m., Rm. D  
 Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
 Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
 Chondrules, Tue. p.m., Rm. B  
 Impact Cratering: Theory and Exper., Tue. p.m., Rm. C  
 Planetary Geochemistry, Thu. a.m., Rm. C  
 Reduced Meteorites, Tue. a.m., Rm. B  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Field Trip to the Moon, Wed. a.m., Rm. C  
 Magellan at Venus, Mon. a.m., Rm. A  
 Mars: Channels and Oceans Posters, Thu. p.m., LPI  
 Dynamics of Impacts ... Venus, Wed. a.m., Rm. A  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
 Venus Geomorphology Posters, Tue. p.m., LPI  
 Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C  
 Chondrulea, Tue. p.m., Rm. B  
 Meteorite Parent Bodies, Mon. a.m., Rm. B  
 Reduced Meteorites, Tue. a.m., Rm. B  
 Antarctic Micromet. and LDEF, Wed. p.m., Rm. C  
 Origin and Evol. of Planetary Sys., Mon. p.m., Rm. C  
 Moon Comes to You Posters, Tue. p.m., LPI  
 Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C  
 Acapulcoites and Stony-Iron Meteorites ..., Fri. a.m., Rm. B  
 Planetary Geochemistry Posters, Thu. p.m., LPI  
 Origin and Evol. of Planetary Sys., Mon. p.m., Rm. C  
 Dynamics of Impacts ... Venus, Wed. a.m., Rm. A  
 Magellan at Venus, Mon. a.m., Rm. A  
 Planetary Volcanism Posters, Tue. p.m., LPI  
 Venus Geomorphology Posters, Tue. p.m., LPI  
 Venus Tectonics Posters, Tue. p.m., LPI  
 Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A

Stöffler D.	Achondrites and Irons Posters, Tue. p.m., LPI
Stolper E. M.	Field Trip to the Moon, Wed. a.m., Rm. C
Stone J.	Meteorite Parent Bodies, Mon. a.m., Rm. B
Straub D. W.	Reduced Meteorites, Tue. a.m., Rm. B
Strickland E. L. III	Tecton. and Volc.: Moon and Mars, Wed. p.m., Rm. A
Strom R. B.	Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C
Strom R. G. *	Offerings from the Moon, Fri. a.m., Rm. A
Strom R. G.	Planetary Geochemistry Posters, Thu. p.m., LPI
Strom R. G.	Moon Comes to You Posters, Tue. p.m., LPI
Strom R.	Mars Spectra: Oba. Data/Lab Posters, Thu. p.m., LPI
Sudo M.	Instruments and Future ... Explor. Posters, Tue. p.m., LPI
Sugita S.	Offerings from the Moon, Fri. a.m., Rm. A
Sullivan R.	Cosmic Dust and Comets, Thu. a.m., Rm. B
Sunshine J. M. *	Nebular Processes and CAIs, Wed. a.m., Rm. B
Suppe J. *	Cosmic Dust and Comets, Thu. a.m., Rm. B
Suppe J.	Chondrite Studies Posters, Thu. p.m., LPI
Suppe J.	Cosmic Dust and Comets, Thu. a.m., Rm. B
Sutton S. R. *	Cosmic Dust Posters, Thu. p.m., LPI
Sutton S. R.	Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C
Sutton S. R.	Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI
Sutton S. R.	Geol./Geophysics: Mars/Mercury Posters, Thu. p.m., LPI
Swan P. D.	Dynamics of Impacts ... Venus, Wed. a.m., Rm. A
Swan P. D.	Lab. Remote Sensing Posters, Tue. p.m., LPI
Swindle T. D.	Origins and Evol. of Planetary Sys., Mon. p.m., Rm. C
Swindle T. D.	Moon Comes to You Posters, Tue. p.m., LPI
Swindle T. D.	Acapulcoitea and Stony-Iron Meteorites ..., Fri. a.m., Rm. B
Swindle T. D.	Dynamics of Impacts ... Venus, Wed. a.m., Rm. A
Sylvester P. J. *	Moon Comes to You Posters, Tue. p.m., LPI
Szydlik P. P.	Solar System Formation Posters, Tue. p.m., LPI
Takata T. *	Venus Geomorphology Posters, Tue. p.m., LPI
Takatori K.	Venus: Tecton. and Volc. Assoc., Tue. a.m., Rm. A
Takeda H.	Terrestrial Impacts and K/T Boundary, Thu. p.m., Rm. C
Takeda H. *	Solar Wind/Cosmic Ray Irradiation, Wed. p.m., Rm. D
Takeda H. *	Chondrite Studies Posters, Thu. p.m., LPI
Takeda H. *	Achondrites and Irons Posters, Tue. p.m., LPI
Takeda H.	Assorted Achondritea, Mon. p.m., Rm. B
Tanaka K. L.	Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C
Tanaka K. L.	Galileo: Gaspra Encounter/Asteroids, Fri. a.m., Rm. C
Tanner W. G. Jr.	Mars ... Surface Properties and Processes, Thu. a.m., Rm. A
Tantayanan R.	Mars: Channels and Oceans Posters, Thu. p.m., LPI
Tatsumoto M.	Dust Env. in Earth Orbit Posters, Thu. p.m., LPI
Tatsumoto M.	Martian Spectral ... Data, Wed. a.m., Rm. D
Tatsumoto M. *	Evol. of the Lunar Crust and Mantle, Tue. a.m., Rm. C
Tatsumoto M.	Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C
Tatsumoto M. *	Planetary Geochemistry, Thu. a.m., Rm. C
Tatsumoto M.	Moon Comes to You Posters, Tue. p.m., LPI
Tatsumura M. J.	Venus Tectonics Posters, Tue. p.m., LPI
	Taylor G. J.
	Taylor L. A.
	Taylor L. A. *
	Taylor L. A.
	Tejfel V. G.
	Teucher R.
	Theriault A. M. *
	Thiel K. *
	Thiemens M. H. *
	Thomas H.
	Thomas K. L.
	Thomas K. L. *
	Thomas K. L.
	Thomas P. C. *
	Thompson T. W.
	Thornhill G. D.
	Thouvenot E. J. P.
	Tielens A. G. G. M.
	Tielens A. G. G. M.
	Timma C.
	Tingle T. N.
	Toksöz M. N.
	Tompkins S.
	Tonka W. B.
	Törmänen T.
	Törmänen T. *
	Toselli A. J.
	Traub-Metlay S. G. *
	Traub-Metlay S. G.
	Treiman A. H.
	Treiman A. H. *
	Treiman A. H.
	Tsou P.
	Tavetkov V. M.
	Turcotte D. L.
	Tuzzolino A. J.
	Tyburczy J. A.
	Tyler G. L.
	Vander Auwera J.

- Vanhala H.  
VanHecke G. R.  
Vaniman D. T.  
Vaniman D. T.  
Vempati R. K.  
Verchovsky A. B.  
Verchovsky A. B. \*  
Verronen M.  
Vetter S. K. \*  
Veverka J.  
Vickery A. M. \*  
Vincent C.  
Vitusen L.  
Vogt S. \*  
Vogt S.  
Vorder Bruegge R. W.  
Vorontsov A. K.  
Wacker J. F.  
Wadhwa M. \*  
Wadhwa M.  
Wagner J. D.  
Wagner J. D.  
Wagstaff J.  
Wald A. E.  
Wald A. E. \*  
Walker D.  
Walker R. J. \*  
Walker R. M.  
Walker R. M. \*  
Wall S. D.  
Wall S. D.  
Wang D.  
Wanke H.  
Wanke H. \*  
Warren J. L.  
Warren P. H. \*  
Wasilewski P.  
Wasserburg G. J.  
Wasserburg G. J.  
Wasserburg G. J.  
Wasserburg G. J.  
Wasson J. T. \*  
Watters T. R. \*  
Watts A. J.
- Solar System Formation Posters, Tue. p.m., LPI  
Outer Solar Sys./Rem. Sensing: Lab., Tue. a.m., Rm. D  
Instruments and Future ... Explor. Posters, Tue. p.m., LPI  
Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
Mars Spectra: Obs. Data/Lab Posters, Thu. p.m., LPI  
Chondrules and Inclusions Posters, Tue. p.m., LPI  
Stardust, Thu. p.m., Rm. B  
Solar System Formation Posters, Tue. p.m., LPI  
Mare Basalts ... and Copern. Ejecta, Mon. a.m., Rm. C  
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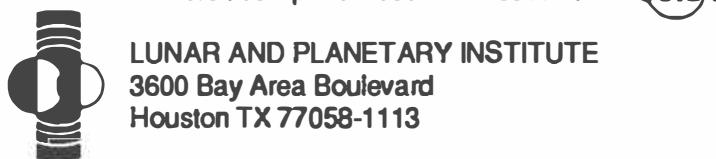
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# 23rd LPSC

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