



**Mercury:  
Space Environment,  
Surface, and  
Interior**

**THE FIELD MUSEUM, CHICAGO, ILLINOIS**

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**OCTOBER 4–5, 2001**

**CONFERENCE PROGRAM**

MERCURY: SPACE ENVIRONMENT,  
SURFACE, AND INTERIOR

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THE FIELD MUSEUM, CHICAGO, ILLINOIS  
OCTOBER 4-5, 2001

SPONSORS

Lunar and Planetary Institute  
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Mark Robinson, *Northwestern University*  
G. Jeffrey Taylor, *University of Hawai'i*

## SCIENTIFIC ORGANIZING COMMITTEE

Mark Robinson, *Northwestern University*  
Marty Slade, *Jet Propulsion Laboratory*  
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Sean Solomon, *Carnegie Institution*  
Ann Sprague, *University of Arizona*  
Paul Spudis, *Lunar and Planetary Institute*  
G. Jeffrey Taylor, *University of Hawai'i*  
Faith Vilas, *NASA Johnson Space Center*  
Meenakshi Wadhwa, *The Field Museum*  
Thomas Watters, *National Air and Space Museum*

**Thursday, October 4, 2001**  
**SURFACE GEOLOGY AND REMOTE SENSING**  
**8:30 a.m.**

**Chairs: F. Vilas**  
**P. D. Spudis**

Robinson M. S. \*  
*WELCOME AND ANNOUNCEMENTS*

Murray B. \*  
*The Mariner 10 View of Mercury Nearly Three Decades Later [INVITED]*

Spudis P. D. \*  
*The Geological History of Mercury [INVITED]*

**9:45–10:00 a.m. BREAK**

Robinson M. S. \* Taylor G. J. Lucey P. G. Hawke B. R.  
*Complexity of the Mercurian Crust*

Ksanfomality L. V. \*  
*Resolved Ground Based Observation of Mercury*

Blewett D. T. \* Hawke B. R. Lucey P. G.  
*Reflectance Spectra of Lunar Pure Anorthosites and of Mercury*

Burbine T. H. \* McCoy T. J. Cloutis E. A.  
*Reflectance Spectra of Aubrites, Sulfides, and E Asteroids: Possible Implications for Mercury*

Warell J. \*  
*Disk-resolved Multicolor Photometry and Spectroscopy of Mercury*

Wagner R. J. \* Wolf U. Ivanov B. A. Neukum G.  
*Application of an Updated Impact Cratering Chronology Model to Mercury's Time-Stratigraphic System*

**Thursday, October 4, 2001**  
**SURFACE COMPOSITIONS AND GEOLOGY**  
**Poster Talks**  
**11:30 a.m.**

- Cook A. C. Watters T. R. Robinson M. S.  
*Digital Elevation Model Mosaic of Mercury*
- Wilkison S. L. Robinson M. S. Watters T. R. Cook A. C.  
*Quality Assessment of Mariner 10 Digital Elevation Models*
- Gillis J. J. Robinson M. S.  
*Using Remotely Sensed Observations of Ancient Mare Deposits on the Moon as Possible Analogs to the Intercrater Plains on Mercury*
- Robinson M. S. Hawke B. R.  
*Low Albedo, Blue, and Opaque Rich Spectral Anomalies in the Mercurian Crust*
- Wilson J. K. Mendillo M. Baumgardner J.  
*High Definition Imaging of Mercury's Surface and Atmosphere*
- Milkovich S. M. Head J. W. III  
*Identification of Mercurian Volcanism: Resolution Effects and Implications for MESSENGER*
- Neukum G. Ivanov B. A. Wagner R.  
*Crater Production Function and Cratering Chronology for Mercury*
- Kereszturi A.  
*In Search of Lunar Like Rilles on Mercury*
- Ksanfomality L. Sprague A. Cremonese C. Jorda L. Thomas N. Warell J.  
*Properties of the Hermean Surface*
- Potter A. E. Anderson C. M. Killen R. M. Morgan T. H.  
*Ratio of Sodium to Potassium in the Mercurian Exosphere*
- Sprague A. L. Russell R. W. Lynch D. K. Mazuk A. L. Donaldson K. K.  
*Mid-Infrared Spectroscopy of Mercury's Surface with BASS*

**12:00–1:30 p.m. LUNCH**

**Thursday, October 4, 2001**  
**TECTONICS AND INTERIOR**  
**1:30 p.m.**

**Chairs: T. R. Watters**  
**M. A. Slade**

Watters T. R. \* Schultz R. A. Robinson M. S. Cook A. C.  
*Mechanical Modeling of the Discovery Rupes Thrust Fault:  
Implications for the Thickness of the Elastic Lithosphere of Mercury*

Nimmo F. \*  
*Constraining the Mean Crustal Thickness on Mercury*

Hauck S. A. II \* Dombard A. J. Phillips R. J. Solomon S. C.  
*Mercury's Thermal, Tectonic, and Magmatic Evolution*

Solomatov V. S. \* Reese C. C.  
*Mantle Convection and Thermal Evolution of Mercury Revisited*

Head J. W. III \* Wilson L.  
*Theoretical Aspects of Magma Generation, Ascent and Eruption  
on Mercury and Comparison with Composition and Morphology  
of Surface Features*

Noble S. K. \* Pieters C. M.  
*Space Weathering in the Mercurian Environment*

Hapke B. W. \*  
*Space Weathering and the Composition of the Crust of Mercury*

Potts L. V. \* von Frese R. R. B. Shum C. K.  
*Rheological Inferences on the Mercurian Crust from Crater  
Morphometric Analyses of the Moon, Mars, and Mercury*

**3:30–3:45 p.m. BREAK**

**Thursday, October 4, 2001**

**POLES**

**3:45 p.m.**

**Chairs: M. A. Slade  
T. R. Watters**

Harmon J. K. \*

*Mercury Radar Imaging at Arecibo [INVITED]*

Butler B. J. \* Slade M. A. Muhleman D. O.

*The Nature of the Mercury Polar Radar Features*

Harcke L. J. \* Zebker H. A. Jurgens R. F. Slade M. A.

*Radar Imaging of Mercury's North and South Poles  
at 3.5 cm Wavelength*

**Thursday, October 4, 2001**  
**ATMOSPHERE, MAGNETIC FIELD, AND ORIGIN**

**Poster Talks**

**4:45 p.m.**

- Koehn P. L. Zurbuchen T. H. Fisk L. A. Gloeckler G.  
*Measuring the Plasma Environment at Mercury: The Fast Imaging Plasma Spectrometer*
- Zurbuchen T. H. Koehn P. L. Fisk L. A. Gloeckler G. Kabin K.  
*The Mercury Plasma Environment: MHD Predictions and Mercury Pickup Ions*
- Orsini S. De Angelis E. Di Lellis A. M. Barabash S. Daglis I. A. Delcourt D. Kallio E. Killen R. Livi S. Milillo A. Mura A. Wurz P. Zanza V.  
*Scientific Merits and Technical Aspects of a Thermal/Energetic Neutral Particle Detector On Board the ESA BepiColombo Mission*
- Brandt P. C. Mitchell D. G. Barabash S.  
*ENA Imaging at Mercury? Lessons from IMAGE/HENA*
- Holmström M. Barabash S. Lukyanov A.  
*Neutral Atom Imaging Near Mercury*
- Frahm R. A. Link R. Winningham J. D. Coates A. J. Norberg O.  
*The Electron Environment at Mercury*
- Laakso H. Grad R. Johlander B. Klinge D. Lebreton J.-P.  
*Electric Field Double Probe Antenna for the BepiColombo/MMO Satellite*
- Kallio E. Janhunen P.  
*On the Modeling of the Mercury-Solar Wind Interaction by a Quasineutral Hybrid Model*
- Cooper B. Potter A. E. Killen R. M. Morgan T. H.  
*Mid-Infrared Spectra of Mercury*
- Prentice A. J. R.  
*Gas Ring Condensation Model for the Origin and Bulk Chemical Composition of Mercury*
- Marakushev A. A. Chaplygin O. V. Bobrov A. V.  
*Specific Character of the Formation of Mercury as the Densest Planet*



Warell J. Karlsson O. Skoglöv E.  
*A Study of Mercury-like Orbits*

Holin I. V.  
*Estimation of Mercury's Obliquity and Physical Librations by  
Earth-based Radar Speckle Displacement Interferometry*

**5:15–6:15 p.m. POSTER SESSION**

**6:15–8:00 p.m. RECEPTION**

**Friday, October 5, 2001**  
**ATMOSPHERE AND MAGNETIC FIELD**  
**8:30 a.m.**

**Chairs: J. A. Slavin**  
**A. L. Sprague**

Sprague A. L. \*

*Mercury's Atmospheric Species [INVITED]*

Killen R. M. \* Morgan T. H.

*Ar Atmosphere: Implications for Structure and  
Composition of Mercury's Crust*

Hunten D. M.\* Sprague A. L.

*Diurnal Variation of Na and K at Mercury*

Yakshinskiy B. V.\* Madey T. E.

*Photon- and Electron-stimulated Desorption of Alkalis from Model  
Mineral Surfaces: Relation to Planetary Atmospheres*

Potter A. E. \* Killen R. M. Morgan T. H.

*The Distant Sodium Tail of Mercury*

**10:00–10:15 a.m. BREAK**

Russell C. T. \*

*The Magnetic Field and Magnetosphere of Mercury [INVITED]*

Aurnou J. M. \* Al-Shamali F. M.

*Applying Numerical Dynamo Models to Mercury*

Grard R. \* Laakso H.

*The Charged Particle Environment of Mercury and  
Related Electric Phenomena*

Gjerleov J. W. \* Slavin J. A.

*Magnetosphere-Regolith/Exosphere Coupling: Differences and  
Similarities to the Earth Magnetosphere-Ionosphere Coupling*

**Friday, October 5, 2001**

**MISSION RELATED**

**Poster Talks**

**11:30 a.m.**

Gold R. E. McNutt R. L. Jr. Santo A. G. Solomon S. C.  
MESSENGER Team

*The MESSENGER Scientific Payload*

Choo T. H. Murchie S. L. Jen J. S.

*The MESSENGER Science Planning Tool*

Erard S.

*IMS: The Infrared Mapping Spectrometer of the BepiColombo Mission*

Colangeli L. Palumbo P. Barbieri C. Bellucci G. Bini A. Blanco A.  
Cremonese G. Della Corte V. Fonti S. Mazzotta Epifani E. Preti G.  
Yano H. Vergara S.

*A Multi-Colour Imaging System for the Bepi Colombo Mercury Lander*

Hawkins S. E. III Boldt J. D. Darlington E. H. Grey M. P. Kardian C. J.  
Murchie S. L. Peacock K. Schaefer E. D. Williams B. D.

*Overview of the MESSENGER Mercury Dual Imaging System*

Oberst J. Wagner R. Hoffmann H. Jaumann R. Neukum G.

*A Combined Stereo Camera/Laser Altimeter Experiment Package  
for the BepiColombo Polar Orbiter*

Cremonese G. Achilli V. Barbieri C. Caporali A. Capria M. T.  
Colangeli L. Forlani G. Fornasier S. Lazzarin M. Marzari F.  
Marinangeli L. Naletto G. Palumbo P. Ragazzoni R. Salemi G.  
Verani S.

*A Wide Angle Camera for BepiColombo*

Dunkin S. K. Grande M. Kellett B. J.

*X-Ray Science on ESA's BepiColombo Mission to Mercury*

Grande M. Dunkin S. K. Kellett B. J.

*CIXS — An X-Ray Spectrometer for ESA's BepiColombo  
Mission to Mercury*

Starr R. D. Ho G. C. Schlemm C. Gold R. E. Goldsten J. O.  
Boynton W. V. Trombka J. I.

*The X-Ray Spectrometer for Mercury Messenger*

d'Uston C. Bruckner J. Feldman W. C. Gasnault O. Hasebe N.  
Lawrence D. J. Maurice S. Prettyman T. H.

*Measuring the Chemical Composition of the Surface of Mercury  
Using Orbital Gamma-Ray and Neutron Spectroscopy*

McClintock W. E. Holsclaw G. M.

*The Mercury Atmospheric and Surface Composition Spectrometer  
(MASCS) for the Mercury: Surface, Space Environment, Geochemistry,  
Ranging (MESSENGER) Mission*

Smith D. E. Zuber M. T. Peale S. J. Phillips R. J. Solomon S. C.

*Estimating the Libration of Mercury by Remote Sensing  
of Gravity and Altimetry*

Lognonné P. Giardini D. Mizutani H. Langevin Y.

*An Artificial Seismic Impact Experiment on Bepi-Colombo*

Anderson J. D. Schubert G. Asmar S. W. Jurgens R. F. Lau E. L.

Moore W. B. Slade M. A. III Standish E. M. Jr.

*Mercury's Global Topography from Radar Ranging Data*

**12:15–1:30 p.m. LUNCH**

**1:30–2:30 p.m. POSTER SESSION**

**Friday, October 5, 2001**  
**BULK COMPOSITION**  
**2:30 p.m.**

**Chairs: G. J. Taylor**  
**M. S. Robinson**

Taylor G. J. \* Scott E. R. D.

*Mercury: An End-Member Planet or a Cosmic Accident?*

Peale S. J. \* Phillips R. J. Solomon S. C. Smith D. E. Zuber M. T.

*A Procedure for Determining the Nature of Mercury's Core*

Margot J. L. \* Peale S. J. Slade M. A.

*Radar Techniques for the Measurement of Mercury's  
Obliquity and Librations*

Slade M. A. \* Jurgens R. F. Margot J. L. Standish E. M.

*Repeat-Orbit Interferometric Precision Measurement  
of Mercury Obliquity*

**Friday, October 5, 2001**

**MISSIONS**

**3:30 p.m.**

**Chairs: M. S. Robinson**

**G. J. Taylor**

Solomon S. C. \* McNutt R. L. Jr. Gold R. E. Santo A. G.  
MESSENGER Team

*The MESSENGER Mission to Mercury [INVITED]*

Grard R. \* Mukai T.

*BepiColombo, an Interdisciplinary Mission to the Planet Mercury  
[INVITED]*

Taylor G. J.

*GENERAL DISCUSSION*

**5:00 p.m.**

**ADJOURN**