Thursday, March 20, 2003
POSTER SESSION II
7:00 p.m. Fitness Center

Instruments and Techniques for Mars

Lawrence D. J. Elphic R. C. Prettyman T. H. Wiens R. C.
Effects of an RTG Power Source on Neutron Spectroscopy Measurements on the Martian Surface **[#1763]**
The neutron spectroscopy technique of measuring near-surface water on the Martian surface is not only feasible with an RTG-power source, but may increase the flexibility of surface science operations by enabling high-precision measurements to be made in minutes.

Herd R. Spray J. Samson C. Miller S. Christie I.
3D Imaging and Modelling with a Space-qualified Laser Camera System: Development of Terrestrial Applications and Potential for Planetary Exploration **[#1718]**
A Laser Camera System has been used to image Earth rocks, meteorites and other objects. Their origin can be discerned and their detailed characteristics can be stored, documented and studied. A version mounted on a rover could aid in Mars or other planetary exploration.

Calle C. I. Buhler C. R. Mantovani J. G. Groop E. E. Buehler M. G. Nowicki A. W.
A Wheel Electrometer to Measure Electrostatic Fields on the Martian Surface **[#1772]**
A system of embedded sensors that can be incorpo-rated into the wheel of any future mission rover would provide for an unobtrusive way to measure the distribution of electrostatic fields on the Martian surface and to measure variations in soil eletrostatic response.

Stoker C. R. Richter L. Smith W. H. Lemke L. G. Hammer P. Dalton J. B. Glass B. Zent A.
The Mars Underground Mole (MUM): A Subsurface Penetration Device with In Situ Infrared Reflectance and Raman Spectroscopic Sensing Capability **[#1201]**
Mars Underground Mole is an instrument that burrrows underground and performs *in situ* sensing of hydrated minerals, clays, carbonates, sulfates, ice and organic compounds. It also can bring samples to the surface.

Lucey P. G. Wilcox B. B. Gillis J. J. Hamilton V. E.
Mini-SMIFTS: A High Spatial Resolution Thermal Infrared Spectrometer for Mars Landers **[#1365]**
We are developing an imaging infrared spectrometer for Mars landed missions that will provide significantly higher spatial resolution than mini-TES, and collect these data at much higher rates.

Wiens R. C. Maurice S. Cremers D. A. Chevrel S.
The Applicability of Laser-Induced Breakdown Spectroscopy (LIBS) to Mars Exploration **[#1646]**
Laser Induced Breakdown Spectroscopy is ideally suited to investigate Mars surface elemental composition from an *in situ* rover.

Cremers D. A. Brown K. Gibson L. Ferris M. J. Wiens R. C. Maurice S. Sallé B.
Analysis of Water Ice and Ice/Dust Mixtures Using Laser-Induced Breakdown Spectroscopy (LIBS) **[#1715]**
Laser-Induced Breakdown Spectroscopy (LIBS) is being evaluated for the analysis of water ice and ice dust mixtures under Mars atmospheric conditions. Characteristics of the method including element detection limits and the ability to determine ice/dusts ratios are being studied.

Lacour J. L. Sallé B. Brennetot R. Vors E. Fichet P. Rivoallan A. Fabre C. Dubessy J. Maurice S. Wiens R. C. Cremers D. A.
Laser Induced Breakdown Spectroscopy Under Martian Conditions: Optimization of Operating Conditions **[#1582]**
Laser Induced Breakdown Spectroscopy for *in situ* Mars geochemical analysis: optimization of paramaters with a statistical design of experiments.

Swindle T. D. Bode R. Boynton W. V. Kring D. A. Williams M. Chutjian A. Darrach M. R. Cremers D. A. Wiens R. C. Baldwin S. L.
AGE (Argon Geochronology Experiment): An Instrument for In Situ Geochronology on the Surface of Mars **[#1488]**
The AGE (Argon Geochronology Experiment) instrument is designed to produce K-Ar and cosmic-ray exposure ages *in situ* on the surface of Mars with <20% age uncertainty. A combined UA/JPL/LANL project, it uses LIBS and a miniature mass spectrometer.

Stopar J. D. Lucey P. G. Sharma S. K. Hubble H. W. Misra A. K.
Perfomance of a Remote Raman System: Defining Remote Raman Efficiency **[#1450]**
In testing the performance of a remote Raman system for lander use, we define "remote Raman efficiency" as the ratio of incident laser irradiance to Raman irradiance emitted from a surface. This efficiency is quantified for rock and mineral samples.

Haskin L. A. Wang A.
The Mars Microbeam Raman Spectrometer — An Improved Advanced Brassboard **[#1651]**
An advanced brassboard, the Mars Microbeam Raman Spectrometer is under development for eventual field testing. The new optical train gives improved detection sensitivity and spectral resolution.

Freeman J. J. Wang A. Kuebler K. E. Haskin L. A.
Raman Spectroscopic Characterization of the Feldspars — Implications for In Situ Surface Mineral Characterization in Planetary Exploration **[#1676]**
Based on Raman spectral patterns and Raman peak positions, low temperature Or-, Ab-, An-feldspars, high temperature plagioclase, orthoclase, sanidine, and anorthoclase can be distinguished from each others.

Sharma S. K. Beall G. H. Hubble H. W. Misra A. K. Chio C. H. Lucey P. G.
Telescopic Raman Measurements of Glasses of Mineral Compositions to a Distance of 10 Meters **[#1915]**
Telescopic Raman measurements are carried out on synthetic fused quartz and plagioclase composition glasses at a distance of 10 m.

Kuebler K. Wang A. Haskin L. A. Jolliff B. L.
A Study of Olivine Alteration to Iddingsite Using Raman Spectroscopy **[#1953]**
We present data from an olivine altering to iddingsite: the mineral assemblage and structural changes apparent in the Raman spectra and EMPA data. We also identify spectral features that will be useful indicators of olivine alteration on Mars.

Möller L. E. Tuller M. Baker L. Marshall J. Castiglione P. Kuhlman K.
Experimental Study of the Angle of Repose of Surrogate Martian Dust **[#1526]**
Accumulation of dust particles on solar cells and instruments will be a great challenge in the exploration of Mars. We present a recently developed test module to simulate Mars environmental conditions and measure the angle of repose of mineral dusts on spherical and planar surfaces.

Mazumder M. K. Biris A. S. Trigwell S. Calle C. I. Buhler C. R.
Measurement of Mars Dust Particle Size and Electrostatic Charge Distributions Using the E-SPART Analyzer **[#1895]**
Measurements of triboelectrically charged Martian simulant were taken using the E-SPART Analyzer providing both the size and charge distributions of the particles after contact with stainless steel beads.

Lepper K.
Single-grain Optical Dating Properties of JSC Mars-1: Preliminary Measurements of Radiation Dose Response and Sensitivity Change **[#1962]**
A preliminary evaluation of radiation dose response and measurement induced sensitivity change, two fundamental optical dating properties, of single sand-sized grains extracted from the JSC Mars-1 simulant.

Backman V. Chen K. Ulmer M. P. Wessels B. W. Robinson M. S.
An Innovative Light Scattering Technique for Characterizing Martian Soil **[#1616]**
Utilizing a propriety technique we have designed and prototyped a new remote sensing instrument called LSSMOP. This instrument detects DNA, protein, and virus-like organisms as well as gives basic morphologic information at the scale of 30–300 nm.

Hansen C. J. Paige D. A.
SPADE: A Rock Crushing and Sample Handling System Developed for Mars Missions **[#1527]**
A rock crusher and sample sorting and distribution system has been developed for use on a surface Mars mission. Prototype hardware has been built and tested. Results of rock crushing tests on 10 standard igneous and sedimentary rocks will be shown.

Yen A. S. Kim S. S.
Mars Oxidant and Radical Detector **[#1293]**
This instrument is designed to characterize the reactive nature of the martian surface environment and can detect, identify, and quantify radical species in soil samples, including those inferred to be present by the Viking experiments.

Kanik I. Johnson P. V. Beegle L. W. Cooks R. G. Laughlin B. C. Hill H. H.
Electrospray Ionization/Ion Mobility Spectrometer/Cylindrical Ion Trap Mass Spectrometer System for In Situ Detection of Organic Compounds **[#1292]**
The potential of an Electrospray Ionization/Ion Mobility Spectrometer/Cylindrical Ion Trap Mass Spectrometer (ESI/IMS/CIT-MS) as an analytical instrument for analyzing samples as part of a suite of instruments on the proposed 2009 Mars Science Lander (MSL) will be demonstrated.