Stellar science unveiled at space conference

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Los Alamos National Laboratory staff speak on technologies for planetary exploration and analysis

LOS ALAMOS, New Mexico, March 8, 2011—This week Los Alamos National Laboratory will be represented in more than 20 papers to be given at the 42nd Lunar and Planetary Science Conference in Houston.The papers include

- Mars, lunar, and Venus analog studies with laser-induced breakdown (LIBS) and Raman spectroscopies. These analysis techniques have been pioneered by LANL for use on Mars and for a potential mission to land on Venus. One of the LANL studies also explores the application of LIBS for lunar samples, which is timely, as

NASA and several other national space agencies are planning to use LIBS on lunar landers.

- Statistical treatments of LIBS data, which will significantly improve the accuracy of this technique both for planetary science and for other unrelated applications.
- Calibrations of the ChemCam and CheMin instruments for Mars. These two instruments represented by LANL are now mounted in and on the one-ton rover Curiosity, which is being prepared for launch in November. These presentations discuss the final calibrations that have been done on these instruments prior to launch.
- Rationale for lunar polar exploration. Thanks to the LANL Neutron Spectrometer, which orbited the Moon on the Lunar Prospector spacecraft a dozen years ago, and to subsequent experiments such as LCROSS, water ice is known to exist at the lunar poles. This presentation lays out a scientific basis for sending a lander or rover to these regions for further study.
- Studies of the response of the Martian subsurface ice and groundwater. The Medusae Fossae Formation may have once been covered with surface ice, and this study shows how rapidly the subsurface reacts to climate change.
- Reactions of clay minerals with sulfur-rich brine, for the purpose of understanding the final mineral products that might be found on the Red Planet.
- New measurements of the solar isotopic composition, based on solar-wind samples collected by the Genesis mission, which flew from 2001 to 2004 and crashed upon re-entry in the Utah desert in 2004.
- Analysis of 40 years of compiled solar-wind data, and comparison with the sample collected by Genesis, working to understand the Genesis samples in the context of data collected since the dawn of the space age.
- Simulations of the Genesis Solar Wind Concentrator. This is the only one among the various LANL instrument to return from space, and it brought back some of the few undamaged samples from the Genesis mission. Computer simulations are being used to further characterize the samples.

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Los Alamos National Laboratory **www.lanl.gov** **(505) 667-7000** **Los Alamos, NM**

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