

S. A. Getty, W. B. Brinckerhoff, T. Cornish, S. A. Ecelberger, X. Li, M. A. Merrill Floyd, N. Chanover, K. Uckert, D. Voelz, X. Xiao, R. Tawalbeh, D. Glenar, J. E. Elsila, and M. Callahan, "Laser Time-of-Flight Mass Spectrometer for Future In Situ Planetary Missions", International Workshop on Instrumentation for Planetary Missions, 2012.

Laser desorption/ionization time-of-flight mass spectrometry (LD-TOF-MS) is a versatile, low-complexity instrument class that holds significant promise for future landed *in situ* planetary missions that emphasize compositional analysis of surface materials. Here we describe a 5kg-class instrument that is capable of detecting and analyzing a variety of analytes directly from rock or ice samples. Through laboratory studies of a suite of representative samples, we show that detection and analysis of key mineral composition, small organics, and particularly, higher molecular weight organics are well suited to this instrument design. A mass range exceeding 100,000 Da has recently been demonstrated. We describe recent efforts in instrument prototype development and future directions that will enhance our analytical capabilities targeting organic mixtures on primitive and icy bodies. We present results on a series of standards, simulated mixtures, and meteoritic samples.