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TITLE: In Situ Techniques for Mineralogy and Geochemistry of Small Bodies

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ABSTRACT BODY: In situ exploration of planetary surfaces employs multiple techniques that, when used together, yield important information about their formation histories and evolution. Combined geochemistry and mineralogy measurements reveal the phases present, their composition, morphology, and isotope ratios of constituents. Small and primitive bodies often present a special case where little to no compositional information has been obtained from ground-based or remote measurements. For example, Trojan asteroids and other D-type objects as well as Phobos and Deimos exhibit relatively featureless reflectance spectra as obtained by remote measurements. Yet samples of primitive material in the meteorite collection (e.g. Allende) reveal a fine grained structure with many phases and a wealth of chemical information. On-surface measurements are therefore a necessary component for understanding the origins of these solar system bodies. We will present measurement techniques that could provide microscopic mineralogy and isotope geochemistry. We will discuss instrumentation and measurements relevant to small body exploration - focusing more specifically on our recent results from the techniques of microscopic time-resolved Raman spectroscopy, Laser Induced Breakdown Spectroscopy (LIBS), and Tunable Laser Spectroscopy (TLS).

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Additional Details

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