MID- AND FAR-INFRARED SPECTRA OF ANHYDROUS INTERPLANETARY DUST PARTICLES. L. P. Keller[1] and G. J. Flynn[2]. [1]Code KR, NASA Johnson Space Center, Houston, TX 77058. [2]Dept. of Physics, SUNY Plattsburgh, NY 12901. Lindsay.P.Keller@nasa.gov.

Introduction: IR spectroscopy is the primary means of mineralogical analysis of materials outside our solar system. The identity and properties of interstellar and circumstellar grains are inferred from spectral comparisons between astronomical observations and laboratory data from natural and synthetic materials. The overall objective of this study was to relate laboratory infrared (IR) spectra of primitive interplanetary dust particles (IDPs) to astronomical IR measurements of comets, asteroids and extrasolar objects (e.g. disks around young stars, outflows from evolved stars). The astronomical measurements provide a broad context for interpreting the IDP studies, while the laboratory measurements on IDPs provide an element of "ground truth" for the astronomical observations [1-2].

Results and Discussion: We obtained mid-IR spectra from 31 individuals anhydrous IDPs using IR microscopes on synchrotron beamlines at Brookhaven National Lab. Figure 1 shows the average anhydrous IDP spectrum compared with spectra from comets Hale-Bopp and Halley [3]. The IDP spectrum shows small peaks at positions that correspond to the strong peaks in enstatite and forsterite that are superimposed on a broad glassy silicate feature. The similarity between the comet and the average anhydrous IDP spectrum is remarkable. For 12 of the IDPs we also obtained IR spectra in the far-IR (15-50 µm) - the comparison to the Hale-Bopp data is still excellent over the wavelength range although pyroxene appears more abundant in the average IDP spectrum. The average anhydrous IDP spectrum is very similar to spectra of several Oort cloud comets that have high crystalline-to-amorphous silicate ratios [4] but is very different from spectra from the matrices of primitive chondritic meteorites.

References. [1] Sandford, S. A. *et al*. (1985) *ApJ*, 291, 838. [2] Bradley, J. P. *et al*. (1992) *ApJ*, 394, 643. [3] Hanner, M. S. *et al*. (1997) *EMP*, 79, 247. [4] Wooden, D. E. *et al*. (2004) *ApJ*, 612, L77.

Figure 1. IR emission spectra from Comets Hale-Bopp (dotted) and Halley (black line) compared to the average anhydrous IDP spectrum obtained in this study (red curve). The figure is adapted from [3].