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THERMAL EMISSION AND DUST PROPERTIES OF COMET HALE-BOPP

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The early detection and strong activity at large heliocentric distance, R, provided an unprecedented opportunity to observe Hale-Bopp in the thermal infrared over a wide range in solar heating. Even at R > 4 AU, strong thermal continuum emission and a strong silicate feature indicated a large abundance of submicron sized silicate and absorbing grains. The temperature excess above that of a theoretical black body was the highest ever seen in a comet at R > 1 AU. Photometry, imaging, and spectroscopy were carried out from the ground as well as with the Infrared Space Observatory. The 8–13 micron spectra revealed broad silicate emission, similar to that seen in P/Halley and several new and long period comets. Detailed spectral structure in the feature was consistent over time and with different instruments. Spectra at 16–40 microns taken with the ISO SW'S displayed pronounced emission peaks due to crystalline olivine, consistent with the 11.25 micron peak. Imaging of the inner coma at sub–arcsec resolution revealed temporally variable structure similar to optical images. The observations will be summarized and the composition and size distribution of the grains will be discussed.