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# **The Hubble Space Telescope PanCET Program: An Optical to Infrared Transmission Spectrum of the hot Jupiter KELT-7b**

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We present the first optical to infrared (0.3–5.0 micron) transmission spectrum of the ultra-hot Jupiter KELT-7b, which orbits a bright ( $V = 8.54$ ) F-type star. With an equilibrium temperature of  $\sim 2048$  K, the planet inhabits a parameter space where we can explore current exoplanet atmosphere theories regarding thermal dissociation, H<sub>2</sub> opacity, and aerosol formation. KELT-7b was observed in transit with the Hubble Space Telescope (HST) Space Telescope Imaging Spectrograph (STIS) and Wide Field Camera 3 (WFC3) as part of the Panchromatic Comparative Exoplanet Treasury (PanCET) program. We derive transit depths across the STIS and WFC3 bandpasses, and present the HST STIS results for the first time. We combine our STIS and WFC3 transmission spectra with photometric data from TESS Sectors 19, 43, 44, and 45, as well as previously published Spitzer Infrared Array Camera (IRAC) data at 3.6 and 4.5 microns. We examine the atmospheric properties of KELT-7b using the isothermal equilibrium chemistry PLATON retrieval code with the *dynesty* nested sampling package, analyzing the full optical to infrared spectrum for the first time. We discuss the implications of our results within the context of current hot Jupiter formation and migration theories.