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Optical and Infrared Phase Curves of the Lava Planet K2-141 b

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K2-141 b is a transiting, small (1.5 RE) Ultra-Short-Period (USP) planet orbiting its star every 6.7 hours discovered by the Kepler space telescope. The planet's high surface temperature of more than 2000 K makes it an excellent target for atmospheric studies by the observation of its thermal emission. We present 65 hours of continuous photometric observations of K2-141 b collected with Spitzer's IRAC Channel 2 at 4.5 microns spanning 10 full phases of the orbit. Our best fit model of the Spitzer data shows no significant offset of the thermal hotspot and is inconsistent with the observed offset of the well-studied USP planet 55 Cnc e at a 3.7 sigma level. We measure an eclipse depth of 142 +/- 40 ppm and an amplitude variation of 120 +/- 40 ppm in the infrared. The joint analysis of the observations collected in the two photometric bands favors a non-zero geometric albedo with $A_g = 0.26 \pm 0.07$ and a tentative temperature gradient. With a dayside temperature of 2141 -361 +352 K and a night-side temperature of 1077 -623 +473 K we also find no evidence of heat redistribution on the planet. We compare the observations to a 1D rock vapor model and a 1D circulation toy model and argue that the data are best explained by a thin rock vapor atmosphere with a thermal inversion.