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A time dependent model for the hot exoplanet WASP-18b

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Abstract

The energy deposition and redistribution in hot Jupiter atmospheres is not well understood currently, but is a major factor for their evolution and survival. We will present a time dependent radiative model for the atmosphere of WASP-18b which is a massive hot Jupiter exoplanet (10 MJup) orbiting an F6V star with an orbital period of only 0.94 days. The results of the model will be compared to new results from a Spitzer campaign to observe lightcurves at 3.6-micron and 4.5-micron. The observed phase curve flux variation – in particular the extremely dark night side of the planet – suggests that the efficiency of heat distribution from the day-side to the night-side of the planet is extremely inefficient. The amplitude, phase and shape of the phase variation in WASP-18b were also measured. This enables us to put strong constraints on the efficiency of heat redistribution in this planetary system and to determine the pressure level at which the heat distribution occurs.