

Extracting the Lowest Eclipse Signals : Multiband Spitzer Observations of TrES-1

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TrES-1 is one of the first transiting planets detected and directly observed ; yet, it is one of the coolest hot-Jupiters ever observed by the Spitzer Space Telescope and, thus, its eclipse signals are among the weakest. Despite the available Spitzer data in multiple bands, the intrinsically low signal-to-noise and the non-ideal observations of that time conspired against further characterization in the infrared.

We took this opportunity to show the full capabilities of our Photometry for Orbits, Eclipses, and Transits (POET) pipeline and show our most recent developments such as optimal photometry and the differential-evolution Markov chain algorithms. We will present our analysis of the archival Spitzer eclipse data in the 3.6, 4.5, 5.8, 8.0, and 16-micron bands and subsequent atmospheric characterization.

We will make an emphasis on the statistical analyses and the systematics and correlated noise treatment, matured after years of experience by our group and the community. Comparing, e.g., the different methods to assess correlated noise.