The Transiting Exoplanet Community Early Release Science Program

Scientific Category:	Planets and Planet Formation
Scientific Keywords:	Extrasolar Planets, Planetary Atmospheres, Transits
Instruments:	NIRSPEC, NIRISS, MIRI, NIRCAM
Proprietary Period:	0 months
Allocation Information (in hours):	
Science Time:	52.1
Charged Time:	78.1

Abstract

JWST presents the opportunity to transform our understanding of planets and the origins of life by revealing the atmospheric compositions, structures, and dynamics of transiting exoplanets in unprecedented detail. However, the high-precision, time-series observations required for such investigations have unique technical challenges, and our prior experience with HST, Spitzer, and Kepler indicates that there will be a steep learning curve when JWST becomes operational.

We propose an ERS program to accelerate the acquisition and diffusion of technical expertise for transiting exoplanet observations with JWST. This program will also provide a compelling set of representative datasets, which will enable immediate scientific breakthroughs. We will exercise the time-series modes of all four instruments that have been identified as the consensus highest priority by the community, observe the full suite of transiting planet characterization geometries (transits, eclipses, and phase curves), and target planets with host stars that span an illustrative range of brightnesses. The proposed observations were defined through an inclusive and transparent process that had participation from JWST instrument experts and international leaders in transiting exoplanet studies. The targets have been vetted with previous measurements, will be observable early in the mission, and have exceptional scientific merit. We will engage the community with a two-phase Data Challenge that culminates with the delivery of planetary spectra, time-series instrument performance reports, and open-source data analysis toolkits.

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