

High Contrast Imaging of Exoplanets and Exoplanetary Systems with JWST

Scientific Category: Planets and Planet Formation

Scientific Keywords: Coronagraphy, Disks, Extrasolar Planets, Planetary Atmospheres

Instruments: NIRSPEC, MIRI, NIRISS, NIRCAM

Proprietary Period: 0 months

Allocation Information (in hours):

Science Time: 18.4

Charged Time: 38.8

Abstract

JWST will transform our ability to characterize directly imaged planets and circumstellar debris disks, including the first spectroscopic characterization of directly imaged exoplanets at wavelengths beyond 5 microns, providing a powerful diagnostic of cloud particle properties, atmospheric structure, and composition. To lay the groundwork for these science goals, we propose a 39-hour ERS program to rapidly establish optimal strategies for JWST high contrast imaging. We will acquire: a) coronagraphic imaging of a newly discovered exoplanet companion, and a well-studied circumstellar debris disk with NIRCAM & MIRI; b) spectroscopy of a wide separation planetary mass companion with NIRSPEC & MIRI; and c) deep aperture masking interferometry with NIRISS. Our primary goals are to: 1) generate representative datasets in modes to be commonly used by the exoplanet and disk imaging communities; 2) deliver science enabling products to empower a broad user base to develop successful future investigations; and 3) carry out breakthrough science by characterizing exoplanets for the first time over their full spectral range from 2-28 microns, and debris disk spectrophotometry out to 15 microns sampling the 3 micron water ice feature. Our team represents the majority of the community dedicated to exoplanet and disk imaging and has decades of experience with high contrast imaging algorithms and pipelines. We have developed a collaboration management plan and several organized working groups to ensure we can rapidly and effectively deliver high quality Science Enabling Products to the community. co-PI's Andrew Skemer (UCSC) & Beth Biller (Edinburgh).

Investigators:

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