

1846 - A Search for Signatures of Volcanism and Geodynamics on the Hot Rocky Exoplanet LHS 3844b

Cycle: 1, Proposal Category: GO

INVESTIGATORS

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Ms. Emily Whittaker (CoI)	University of Maryland

OBSERVATIONS

Folder	Observation	Label	Observing Template	Science Target
LHS 38	44b eclipse			
	1		MIRI Low Resolution Spectroscopy	(1) LHS-3844
	2		MIRI Low Resolution Spectroscopy	(1) LHS-3844
	102		MIRI Low Resolution Spectroscopy	(1) LHS-3844
	3		MIRI Low Resolution Spectroscopy	(1) LHS-3844

ABSTRACT

Rocky planets orbiting close to M-dwarf stars are among the most common planets known in the Galaxy. While many of these worlds have similar masses and radii to the Solar System terrestrial planets, they may have vastly different geology due to their short-period orbits. Here we propose to observationally constrain the past and present geology of the hot rocky exoplanet LHS 3844b by measuring its thermal emission spectrum with

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JWST Proposal 1846 (Created: Wednesday, October 11, 2023 at 2:00:10 PM Eastern Standard Time) - Overview

MIRI/LRS. Recent Spitzer observations of this planet indicate that it is most likely a bare rock, inviting detailed study of the surface. Our proposed emission spectrum will tightly constrain the surface fractions of different types of rock, including basalt (expected from volcanism akin to present-day Earth), ultramafic rock (expected from a solidified magma ocean or high-temperature volcanism), and granite (an indicator of crustal reprocessing). Our data will also be highly sensitive to trace amounts of sulfur dioxide that could arise from ongoing volcanic outgassing (> 3sigma detection of 100 parts per million sulfur dioxide in 0.01 bar atmosphere). Together, these measurements will provide the first empirical constraints on the geologic history of a rocky exoplanet orbiting an M-dwarf.

OBSERVING DESCRIPTION

The observations consist of time series spectroscopy of the LHS 3844 system with MIRI/LRS in slitless spectroscopy mode. The observations must be timed to coincide with secondary eclipses of the planet and executed in a continuous sequence. LHS 3844 is an M-dwarf with K mag = 9.1, so we can directly acquire the target.

Proposal 1846 - Targets - A Search for Signatures of Volcanism and Geodynamics on the Hot Rocky Exoplanet LHS 3844b

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