



2304 - Hot Take on a Cool World: Does Trappist-1c Have an Atmosphere?

Cycle: 1, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
Observation Folder				
	1		MIRI Imaging	(1) TRAPPIST-1
	2		MIRI Imaging	(1) TRAPPIST-1
	3		MIRI Imaging	(1) TRAPPIST-1
	4		MIRI Imaging	(1) TRAPPIST-1

ABSTRACT

Rocky exoplanets are abundant in the Galaxy. However, it is still unknown how often, and under what conditions, these small worlds can maintain atmospheres. Here we propose to measure thermal emission from the dayside of TRAPPIST-1c, a terrestrial exoplanet with temperature similar to that of Venus. This planet is the coolest rocky world with thermal emission that can be detected with JWST. Our observations will constrain the planet's surface pressure and the atmospheric carbon dioxide abundance, and distinguish at 4 sigma confidence between a bare rock planet and a Venus-like composition. The presence of a thick atmosphere would be a positive indication that the TRAPPIST-1 planets formed in a volatile-rich environment, motivating an aggressive observing program for the cooler, potentially habitable planets in this remarkable system.

OBSERVING DESCRIPTION

Our observations consist of time series photometry during four eclipses of the planet TRAPPIST-1c.

For each eclipse, the observations will be performed with the MIRI F1500W filter and must be executed in a continuous sequence.

Each of the four visits must be timed to coincide with eclipses of the planet (which occur approximately every 2.4 days).

Proposal 2304 - Targets - Hot Take on a Cool World: Does Trappist-1c Have an Atmosphere?

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	TRAPPIST-1	RA: 23 06 30.3341 (346.6263921d) Dec: -05 02 36.46 (-5.04346d) Equinox: J2000	Proper Motion RA: 0.062299806210057845 sec of time/yr Proper Motion Dec: -0.479402999985723 arcsec/yr Epoch of Position: 2015.5	
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=Star Description=[M dwarfs, M stars]				

Proposal 2304 - Observation 1 - Hot Take on a Cool World: Does Trappist-1c Have an Atmosphere?

Fri Oct 21 20:02:21 GMT 2022

Observation	<p>Proposal 2304, Observation 1</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: MIRI Imaging</p>																															
Diagnostics	<p>(Observation 1) Warning (Form): Exposure Duration exceeds the limit of 10000.0 seconds. Above this limit it is possible that a High Gain Antenna move may occur during the exposure.</p> <p>(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>																															
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Proposal 2304 - Observation 2 - Hot Take on a Cool World: Does Trappist-1c Have an Atmosphere?

Fri Oct 21 20:02:21 GMT 2022

Observation	<p>Proposal 2304, Observation 2</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: MIRI Imaging</p>																															
Diagnostics	<p>(Observation 2) Warning (Form): Exposure Duration exceeds the limit of 10000.0 seconds. Above this limit it is possible that a High Gain Antenna move may occur during the exposure.</p> <p>(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>																															
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Diagnostics	<p>(Observation 3) Warning (Form): Exposure Duration exceeds the limit of 10000.0 seconds. Above this limit it is possible that a High Gain Antenna move may occur during the exposure.</p> <p>(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>																															
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Proposal 2304 - Observation 4 - Hot Take on a Cool World: Does Trappist-1c Have an Atmosphere?

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Observation	<p>Proposal 2304, Observation 4</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: MIRI Imaging</p>																															
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