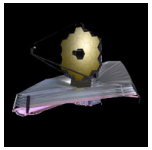

2304 - Hot Take on a Cool World: Does Trappist-1c Have an Atmosphere?

Cycle: 1, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
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	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[M dwarfs, M stars]

Observation

Proposal 2304, Observation 1

Thu Oct 14 00:00:39 GMT 2021

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Diagnostics

(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.

(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

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	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[M dwarfs, M stars]

Template

Subarray
FULL

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F1500W	FASTR1	13	298	1	None	1	298	11574.692	54020

Special Requirements

Phase 0.9595709274573754 to 0.9767747881138114 with period 2.421937 Days and zero-phase 2457258.58728 HJD
Aperture PA Range 74.449705 to 154.449705 Degrees (V3 69.61545176 to 149.61545176)
Aperture PA Range 254.4499705 to 334.449705 Degrees (V3 249.61571726 to 329.61545176)
Time Series Observation
No Parallel

Observation

Proposal 2304, Observation 2

Thu Oct 14 00:00:39 GMT 2021

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Diagnostics

(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.

(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

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	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[M dwarfs, M stars]

Template

Subarray
FULL

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F1500W	FASTR1	13	298	1	None	1	298	11574.692	54020

Special Requirements

Phase 0.9595709274573754 to 0.9767747881138114 with period 2.421937 Days and zero-phase 2457258.58728 HJD
Aperture PA Range 74.449705 to 154.449705 Degrees (V3 69.61545176 to 149.61545176)
Aperture PA Range 254.4499705 to 334.449705 Degrees (V3 249.61571726 to 329.61545176)
Time Series Observation
No Parallel

Observation

Proposal 2304, Observation 3

Thu Oct 14 00:00:39 GMT 2021

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Diagnostics

(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.

(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

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	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[M dwarfs, M stars]

Template

Subarray
FULL

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F1500W	FASTR1	13	297	1	None	1	297	11535.841	54020

Special Requirements

Phase 0.9595709274573754 to 0.9767747881138114 with period 2.421937 Days and zero-phase 2457258.58728 HJD
Aperture PA Range 74.449705 to 154.449705 Degrees (V3 69.61545176 to 149.61545176)
Aperture PA Range 254.4499705 to 334.449705 Degrees (V3 249.61571726 to 329.61545176)
Time Series Observation
No Parallel

Observation

Proposal 2304, Observation 4

Thu Oct 14 00:00:39 GMT 2021

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Diagnostics

(Observation 4) 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.

(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

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	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[M dwarfs, M stars]

Template

Subarray
FULL

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F1500W	FASTR1	13	297	1	None	1	297	11535.841	54020

Special Requirements

Phase 0.9595709274573754 to 0.9767747881138114 with period 2.421937 Days and zero-phase 2457258.58728 HJD
Aperture PA Range 74.449705 to 154.449705 Degrees (V3 69.61545176 to 149.61545176)
Aperture PA Range 254.4499705 to 334.449705 Degrees (V3 249.61571726 to 329.61545176)
Time Series Observation
No Parallel