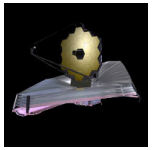

7875 - The only known atmosphere on a rocky exoplanet?

Cycle: 4, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1	Eclipse 1	MIRI Medium Resolution Spectroscopy	(1) -rho01-Cnc
	2	Eclipse 2	MIRI Medium Resolution Spectroscopy	(1) -rho01-Cnc
	3	Eclipse 3	MIRI Medium Resolution Spectroscopy	(1) -rho01-Cnc

ABSTRACT

55 Cnc e is so far the only rocky exoplanet with convincing--though not uncontroversial--evidence of an atmosphere, in the form of a MIRI/LRS eclipse 8 sigma shallower than that of an airless zero-albedo world. It is also the only exoplanet with evidence of emission variability from multiple

telescopes spanning multiple years. We propose to observe three eclipses of the planet with MIRI/MRS in the Medium sub-band. These observations will allow us to confirm the existence of an atmosphere, probe the wavelength dependence of its emission variability, and constrain its carbon dioxide abundance through the 15 um CO2 absorption feature. As an old, ultra-hot (Teq=2000 K), and ultra-short-period planet, 55 Cnc e may seem a-priori like a particularly hostile place for any gaseous envelope. Understanding whether and/or how such an envelope exists on 55 Cnc e, the most observationally favorable super-Earth, has strong implications for the survivability of rocky planet atmospheres more generally.

OBSERVING DESCRIPTION

We request three 4.8 h MRS time series observations with the "medium" sub-band, covering 3 eclipses of 55 Cnc e. Each visit starts roughly 2.2 h before the eclipse, cover the 1.6 h eclipse, and end 1.0 h after the eclipse. We request 9 groups/integration for MRSSHORT and 50 groups/integration for MRSLONG, which safely avoids saturation for detectors.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	-rho01-Cnc	RA: 08 52 35.8111 (133.1492129d)	Proper Motion RA: -485.681 mas/yr	
		Dec: +28 19 50.95 (28.33082d)	Proper Motion Dec: -233.51700001512654 mas/yr	
		Equinox: J2000	Parallax: 0.0794482"	
			Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.
Category=Star
Description=[K dwarfs]
Extended=NO

Observation

Proposal 7875, Observation 1: Eclipse 1

Wed Feb 18 00:00:25 GMT 2026

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Eclipse 1 (Obs 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.

(Eclipse 1 (Obs 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): Data Excess over lower threshold

(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)	-rho01-Cnc	RA: 08 52 35.8111 (133.1492129d)	Proper Motion RA: -485.681 mas/yr	
		Dec: +28 19 50.95 (28.33082d)	Proper Motion Dec: -233.51700001512654 mas/yr	
		Equinox: J2000	Parallax: 0.0794482"	
			Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.
Category=Star
Description=[K dwarfs]
Extended=NO

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID
1	SAME	FND	FAST	4	1	1	11.1	253919

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	NO	FULL	Allow Auto Reorder

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
1	MEDIUM(B)	MRSLONG		FASTR1	50	123	1	None	1	123	17405.051	253919
1	MEDIUM(B)	MRSSHORT		FASTR1	9	630	1	None	1	630	17479.977	253919

Special Requirements	
	Phase 0.301 to 0.359 with period 0.73654625 Days and zero-phase 2459370.807543 HJD Time Series Observation No Parallel Attachments

Observation

Proposal 7875, Observation 2: Eclipse 2

Wed Feb 18 00:00:25 GMT 2026

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Eclipse 2 (Obs 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.

(Eclipse 2 (Obs 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): Data Excess over lower threshold

(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)	-rho01-Cnc	RA: 08 52 35.8111 (133.1492129d)	Proper Motion RA: -485.681 mas/yr	
		Dec: +28 19 50.95 (28.33082d)	Proper Motion Dec: -233.51700001512654 mas/yr	
		Equinox: J2000	Parallax: 0.0794482"	
			Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.
Category=Star
Description=[K dwarfs]
Extended=NO

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID
1	SAME	FND	FAST	4	1	1	11.1	253919

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	NO	FULL	Allow Auto Reorder

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
1	MEDIUM(B)	MRSLONG		FASTR1	50	123	1	None	1	123	17405.051	253919
1	MEDIUM(B)	MRSSHORT		FASTR1	9	630	1	None	1	630	17479.977	253919

Special Requirements	
	Phase 0.301 to 0.359 with period 0.73654625 Days and zero-phase 2459370.807543 HJD Time Series Observation No Parallel Attachments

Observation

Proposal 7875, Observation 3: Eclipse 3

Wed Feb 18 00:00:25 GMT 2026

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Eclipse 3 (Obs 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.

(Eclipse 3 (Obs 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): Data Excess over lower threshold

(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)	-rho01-Cnc	RA: 08 52 35.8111 (133.1492129d)	Proper Motion RA: -485.681 mas/yr	
		Dec: +28 19 50.95 (28.33082d)	Proper Motion Dec: -233.51700001512654 mas/yr	
		Equinox: J2000	Parallax: 0.0794482"	
			Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.
Category=Star
Description=[K dwarfs]
Extended=NO

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID
1	SAME	FND	FAST	4	1	1	11.1	253919

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	NO	FULL	Allow Auto Reorder

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
1	MEDIUM(B)	MRSLONG		FASTR1	50	123	1	None	1	123	17405.051	253919
1	MEDIUM(B)	MRSSHORT		FASTR1	9	630	1	None	1	630	17479.977	253919

Special Requirements	
	Phase 0.301 to 0.359 with period 0.73654625 Days and zero-phase 2459370.807543 HJD Time Series Observation No Parallel Attachments