



7683 - A Parched Giant orbiting a Red Dwarf: Fact or Fiction?

Cycle: 4, Proposal Category: GO

INVESTIGATORS

<i>Name</i>	<i>Institution</i>
Dr. Shubham Kanodia (PI)	Carnegie Institution of Washington
Dr. Nicole L. Wallack (CoI) (CoPI) (Contact)	Carnegie Institution of Washington
Dr. Jacob Lustig-Yaeger (CoI)	The Johns Hopkins University Applied Physics Laboratory
Dr. Caleb Canas (CoI)	NASA Goddard Space Flight Center
Dr. Anjali A. A. Piette (CoI) (ESA Member)	University of Birmingham
Dr. Knicole Colon (CoI)	NASA Goddard Space Flight Center
Dr. Peter Gao (CoI)	Carnegie Institution of Washington
Prof. Ravit Helled (CoI) (ESA Member)	Universitat Zurich
Dr. Johanna Teske (CoI)	Carnegie Institution of Washington
Dr. Kevin Stevenson (CoI)	The Johns Hopkins University Applied Physics Laboratory
Dr. Dana R. Louie (CoI)	Catholic University of America
Megan Delamer (CoI)	The Pennsylvania State University
Dr. Shang-Min Tsai (CoI)	University of California - Riverside
Giannina Guzman Caloca (CoI)	University of Maryland
Dr. Suvrath Mahadevan (CoI)	The Pennsylvania State University
Mr. Henrik Knierim (CoI) (ESA Member)	Universitat Zurich
Dr. Jessica Libby-Roberts (CoI)	The Pennsylvania State University
Dr. Simon Mueller (CoI) (ESA Member)	Universitat Zurich

OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
TOI-5205b Eclipse				
	1	Eclipse1	MIRI Low Resolution Spectroscopy	(1) TOI-5205

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
	2	Eclipse2	MIRI Low Resolution Spectroscopy	(1) TOI-5205

ABSTRACT

JWST has revealed the lowest water abundances ever seen for an exoplanet, in the mid M-dwarf hosted gas giant --- TOI-5205b. Given the presence of obvious star spot crossings in three JWST transits of TOI-5205b and clear impacts of stellar contamination on the transmission spectra, we propose to observe two secondary eclipses of TOI-5205b with MIRI/LRS. Our observations will either (I) independently confirm this extraordinarily low water abundance & validate existing transit light source (TLS) corrections, or (II) accurately estimate a higher water abundance, which will inform existing TLS models and benchmark new techniques for correcting against stellar contamination effects.

OBSERVING DESCRIPTION

We propose to observe 2 eclipses of TOI-5205b using MIRI/LRS. Using 252 groups per integration and 780 integrations per exposure, which will allow us to achieve an efficient observation. We will observe the 1.4 hour eclipse with 1 hour preceding ingress and 1 post egress to allow for a substantial out of eclipse baseline. This will allow us to correct long term instrumental systematics and provide a precise out-of-eclipse baseline. We also pad the observation with 1.75 hours on either side of the secondary eclipse to account for the 3 sigma uncertainty on the eccentricity of the planet. We also include additional 45 minutes at the beginning of each of our observations that will be discarded to account for the initial ramp. Lastly, we also include a 60 minute buffer before the eclipses to allow for flexibility with scheduling.

Proposal 7683 - Targets - A Parched Giant orbiting a Red Dwarf: Fact or Fiction?

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	TOI-5205	RA: 20 55 4.9164 (313.7704850d) Dec: +24 21 38.71 (24.36075d) Equinox: J2000	Proper Motion RA: 41.678 mas/yr Proper Motion Dec: 52.074 mas/yr Parallax: 0.0114641" Epoch of Position: 2000	
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
<i>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.</i>					
<i>Category=Star</i>					
<i>Description=[Exoplanet Systems, Exoplanets, M dwarfs, M stars]</i>					

Proposal 7683 - Observation 1 - A Parched Giant orbiting a Red Dwarf: Fact or Fiction?

Mon Mar 31 20:00:08 GMT 2025

Observation	Proposal 7683, Observation 1: Eclipse1 Diagnostic Status: Warning Observing Template: MIRI Low Resolution Spectroscopy									
Diagnostics	(Eclipse1 (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): Overheads are provisional until the Visit Planner has been run.									
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Acquisition	#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	
	1	1 TOI-5205	F1500W	FAST	4	1	1	0.636	225928	
Template	Subarray				Obtain Verification Image?					
	SLITLESSPRISM				true					
Dithers	#	Dither Type	No. Spectral Steps	Spectral Step Offset	No. Spatial Steps	Spatial Step Offset				
	1	NONE								
Pointing Verification	#	PV Readout Pattern	PV Groups/Int	PV Integrations/Exp	PV Total Integrations	PV Exposures/Dith	PV Total Dithers	PV Total Exposure Time	PV ETC Wkbk.Calc ID	Filter
	1	FASTR1	5	1	1	1	1	0.795		F1500W

Proposal 7683 - Observation 1 - A Parched Giant orbiting a Red Dwarf: Fact or Fiction?

Spectral Elements	#	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Exposures/Dith	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
Special Requirements	1	FASTR1	252	780	780	1	1	31384.795	227136
	Phase 0.36713 to 0.39268 with period 1.630757000 Days and zero-phase 2459443.471790 HJD Aperture PA Range 175 to 290 Degrees (V3 170.16455103 to 285.16455103) Aperture PA Range 350 to 110 Degrees (V3 345.16455103 to 105.16455103) Time Series Observation No Parallel Attachments Group Observations 1, 2 within 108 Days								

Proposal 7683 - Observation 2 - A Parched Giant orbiting a Red Dwarf: Fact or Fiction?

Mon Mar 31 20:00:08 GMT 2025

Observation	Proposal 7683, Observation 2: Eclipse2 Diagnostic Status: Warning Observing Template: MIRI Low Resolution Spectroscopy																											
	(Eclipse2 (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): Overheads are provisional until the Visit Planner has been run.																											
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