

1981 - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-Dwarf Planet Atmospheres

Cycle: 1, Proposal Category: GO

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JWST Proposal 1981 (Created: Wednesday, January 18, 2023 at 6:01:25 PM Eastern Standard Time) - Overview

OBSERVATIONS

Folder Observation	Label	Observing Template	Science Target
GJ 4102b			
41	Visit 1	NIRSpec Bright Object Time Series	(4) GJ-4102
42	Visit 2	NIRSpec Bright Object Time Series	(4) GJ-4102
44	Visit 4	NIRSpec Bright Object Time Series	(4) GJ-4102
45	Visit 5	NIRSpec Bright Object Time Series	(14) GJ-4102A
43	Visit 3	NIRSpec Bright Object Time Series	(4) GJ-4102
WOLF 437b			
11	Visit 1	NIRSpec Bright Object Time Series	(1) WOLF-437
12	Visit 2	NIRSpec Bright Object Time Series	(1) WOLF-437
GJ 1132b			
21	Visit 1	NIRSpec Bright Object Time Series	(2) GJ-1132
22	Visit 2	NIRSpec Bright Object Time Series	(2) GJ-1132
GJ-341b			
31	Visit 1	NIRCam Grism Time Series	(3) GJ-341
32	Visit 2	NIRCam Grism Time Series	(3) GJ-341
33	Visit 3	NIRCam Grism Time Series	(3) GJ-341
TRAPPIST-1h			
51	Visit 1	NIRSpec Bright Object Time Series	(5) TRAPPIST-1
52	Visit 2	NIRSpec Bright Object Time Series	(5) TRAPPIST-1
53	Visit 3	NIRSpec Bright Object Time Series	(5) TRAPPIST-1

ABSTRACT

One of JWST's four pillars of science points to finding the building blocks of life elsewhere in the universe. Planets orbiting M-dwarf stars represent our best (and only) opportunity to measure the spectrum of a potentially-habitable planet in the next decade. The quest towards habitability begins with a simple question: Does this planet have an atmosphere? Whether or not terrestrial M-dwarf planets can retain their atmospheres is a hotly debated topic and only a large observational campaign acquiring exoplanet transmission spectra can provide unequivocal evidence of atmospheres. Understanding which M-dwarf planets have atmospheres will focus future theoretical efforts and could provide the first evidence of a "cosmic shoreline", a universal division between planets with and without substantial atmospheres. Even the population of planets with tenuous atmospheres will inform us about atmospheric escape processes.

JWST Proposal 1981 (Created: Wednesday, January 18, 2023 at 6:01:25 PM Eastern Standard Time) - Overview

In this study, we will obtain transmission spectra of nine terrestrial planets orbiting the nearest M dwarfs using instrument modes that are sensitive to CO2 at 4.3 microns and CH4 at 3.3 microns, the strongest such features in JWST's wavelength range. Upon successful completion of this campaign, we will know which transiting M-dwarf planets within 15 parsecs have atmospheres and, of those that do, the fundamental diversity in their basic atmospheric compositions. We will know how the presence of an atmosphere correlates with planet irradiation and escape velocity, and how the evolutionary history of M dwarfs shapes the atmospheres of the planets that orbit them. Ultimately, this study will generate new sparks of life in M-dwarf planet research.

OBSERVING DESCRIPTION

We will perform time-series observations of five terrestrial exoplanets orbiting the nearest M dwarfs to determine which planets have atmospheres and, of those that do, the fundamental diversity in their basic atmospheric composition.

The fundamental parameter that determines the length of our time-series observations is the transit duration. Additionally, for each visit, we will require a few hours of baseline both before and after the transit to identify and effectively model any instrument systematics. We compute the exposure times, phase constraints, and signal-to-noise ratio (SNR) for each observation based on the JWST ETC, ExoCTK, and PandExo estimates. We require a total of 76 hours (including overheads) for the given primary targets. Below we provide details of each observation.

WOLF 347b: 2 transits, NIRSpec/G395

GJ 1132b: 2 transits, NIRSpec/G395

GJ 341b: 3 transits, NIRCam/F444W, PA constraints

GJ 4102b: 3 transits, NIRSpec/G395

TRAPPIST-1h: 3 transits, NIRSpec/PRISM, avoid multi-planet transits

All of the NIRSpec/G395H targets are too bright for TA and rely on a faint, nearby companion to avoid saturation. GJ 341 has PA constraints to avoid contamination from nearby targets. We will avoid TRAPPIST-1h transits that overlap with transits from other planets within the same system. The Visit Planner shows that there is a sufficient number of transit opportunities available for each target.

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Proposal 1981 - Targets - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-Dwarf Pla...

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	WOLF-437	RA: 12 47 55.5675 (191.9815313d) Dec: +09 44 57.91 (9.74942d)	Proper Motion RA: -0.06820279992207054 sec of time/yr	
		Equinox: J2000	Proper Motion Dec: -0.4600339999115022 arcsec/yr	
		Equiliox. J2000	Parallax: 0.1237756"	
			Epoch of Position: 2015.5	
Comments	: This object was generated by the	e targetselector and retrieved from the SIMBAD database.	•	
Category=	n=[M dwarfs]			
(2)	GJ-1132	RA: 10 14 50.1768 (153.7090700d)	Proper Motion RA: -0.10335027422347062 sec of	
		Dec: -47 09 17.77 (-47.15494d)	time/yr	
		Equinox: J2000	Proper Motion Dec: 0.414512 arcsec/yr	
		1	Parallax: 0.0793206"	
			Epoch of Position: 2015.5	
Comments	: This object was generated by the	e targetselector and retrieved from the SIMBAD database.		
Category=	rallax per Tony's suggestion =Star m=[M dwarfs]			
(3)	GJ-341	RA: 09 21 35.8504 (140.3993767d)	Proper Motion RA: -0.11297682918319278 sec of	
		Dec: -60 16 52.21 (-60.28117d)	time/yr	
		Equinox: J2000	Proper Motion Dec: 0.18209 arcsec/yr	
		•	Epoch of Position: 2015.5	
Category=	n: This object was generated by the Star Star = [M dwarfs]	e targetselector and retrieved from the SIMBAD database.		
(4)	GJ-4102	RA: 19 20 57.1076 (290.2379483d)	Proper Motion RA: 0.1761679932340912 sec of	
		Dec: -82 33 35.24 (-82.55979d)	time/yr	
		Equinox: J2000	Proper Motion Dec: -1.2302199999567165 arcsec/yr	
		_1	Epoch of Position: 2015.5	
Category=	:: This object was generated by the -Unidentified on=[Infrared sources, Visible sour	e targetselector and retrieved from the SIMBAD database.		
(5)	TRAPPIST-1	RA: 23 06 30.3341 (346.6263921d)	Proper Motion RA: 0.062299806210057845 sec of	
		Dec: -05 02 36.46 (-5.04346d)	time/yr	
		Equinox: J2000	Proper Motion Dec: -0.479402999985723 arcsec/yr	
		_quon. 02000	Epoch of Position: 2015.5	
Category=	:: This object was generated by the =Star m=[M dwarfs]	e targetselector and retrieved from the SIMBAD database.		
(11)	WOLF437-TARGETAQ-	RA: 12 47 50.8779 (191.9619912d)	Proper Motion RA: -4.221782721885151E-4 sec of	
()	OPTION1	Dec: +09 45 39.47 (9.76096d)	time/yr	
		Equinox: J2000	Proper Motion Dec: -0.004376999959276873 arcsec/y	r
		Equinox. 32000	Epoch of Position: 2015.5	
Category=	:: This object was generated by the -Unidentified m=[Infrared sources, Visible sour	e targetselector and retrieved from the SIMBAD database. rces]		
l .				

Proposal 1981 - Targets - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-Dwarf Pla.. (12) WOLF437-TARGETAO-RA: 12 48 0.4697 (192.0019571d) OPTION2 Dec: +09 45 9.17 (9.75255d) Equinox: J2000 Comments: This object was generated by the targetselector and retrieved from the 2MASS database. Category=Unidentified Description=[Infrared sources] (14)GJ-4102A RA: 19 20 57.1077 (290.2379487d) Proper Motion RA: 0.17622771481353314 sec of time/yr Dec: -82 33 35.24 (-82.55979d) Proper Motion Dec: -1.23029700009738 arcsec/yr Equinox: J2000 Parallax: 0.0801134" Epoch of Position: 2015.5 Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Added Parallax per Tony's suggestion Category=Star Description=[M dwarfs] (21)GJ1132-TARGETAQ RA: 10 14 47.5083 (153.6979512d) Proper Motion RA: -0.007 arcsec/yr Proper Motion Dec: 0.007931 arcsec/yr Dec: -47 08 56.17 (-47.14894d) Equinox: J2000 Epoch of Position: 2015.5 Comments: This object was generated by the targetselector and retrieved from the 2MASS database. K=14.089J = 14.356I recommend NRSRAPIDD6 with F140X for SNR~150. Category=Unidentified Description=[Infrared sources, Visible sources] (41) GJ-4102-TARGETAQ RA: 19 21 4.4901 (290.2687087d) Proper Motion RA: -17.178 mas/yr Dec: -82 33 2.09 (-82.55058d) Proper Motion Dec: 12.029 mas/yr Epoch of Position: 2015.5 Equinox: J2000 Comments: Fairly high proper motions but not moving out of the FoV any time soon. Distance from target = 24.3" 2MASS 19210447-8233020 Jmag = 15.5https://vizier.u-strasbg.fr/viz-bin/VizieR-5?-ref=VIZ5fb7e5325c20&-out.add=.&-source=II/246/out&2MASS===19210447-8233020Gaia DR2 6347643492312233856 https://vizier.u-strasbg.fr/viz-bin/VizieR-5?-ref=VIZ5fb7e5325c20&-out.add=.&-source=I/345/gaia2&-c=290.26813836944%20-82.55052996389,eq=ICRS,rs=2&-out.orig=0 Instrument set-up: WATA, CLEAR, SUB32, NRSRAPID Category=Unidentified Description=[Infrared sources, Visible sources]

Proposal 1981 - Targets - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-Dwarf Pla...

(42) GJ-4102-TARGETAQ-J2000 RA: 19 21 4.4901 (290.2687087d)

Dec: -82 33 2.09 (-82.55058d) Proper Motion Dec: 12.029 mas/yr

Equinox: J2000

Epoch of Position: 2000.0

Proper Motion RA: -17.178 mas/yr

Comments: Fairly high proper motions but not moving out of the FoV any time soon. Distance from target = 24.3"
2MASS 19210447-8233020

Jmag = 15.5

https://vizier.u-strasbg.fr/viz-bin/VizieR-5?-ref=VIZ5fb7e5325c20&-out.add=.&-source=II/246/out&2MASS===19210447-8233020

Gaia DR2 6347643492312233856

https://vizier.u-strasbg.fr/viz-bin/VizieR-5?-ref=VIZ5fb7e5325c20&-out.add=.&-source=I/345/gaia2&-c=290.26813836944%20-82.55052996389,eq=ICRS,rs=2&-out.orig=0

Instrument set-up: WATA, CLEAR, SUB32, NRSRAPID Category=Unidentified Description=[Infrared sources, Visible sources]

Observation	Proposal 19 Diagnostic S Observing T	981 - Observation 81, Observation 41: Vis Status: Warning emplate: NIRSpec Bright	i it 1 t Object Time Serie	s								Wed Jan 18	rsity of M-D 3 23:01:25 GMT 2023
(Visit 1 (Obs 41)) 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 41:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											g the exposure.		
Fixed Targets	# Name Target Coordinates (4) GJ-4102 RA: 19 20 57.1076 (290.2379483d) Dec: -82 33 35.24 (-82.55979d) Equinox: J2000 Comments: This object was generated by the targetselector and retrieved from the SIMBAD Category=Unidentified Description=[Infrared sources, Visible sources]					Targ. Coord. Corrections Proper Motion RA: 0.1761679932340917 time/yr Proper Motion Dec: -1.230219999956716 Epoch of Position: 2015.5 database.							
Acquisition	1	Target 41 GJ-4102- TARGETAQ	TA Method WATA	Subarray SUB32	Filter CLEAR	Readou NRSRA		Groups/In	nt In	tegrations/Exp	Total Integrations	Total Exposure Time 0.26	ETC Wkbk.Calc ID 76169
Template	Subarray SUB2048												
Spectral Elements	1	Grating/Filter G395H/F290LF		g Groups/	Int Integ	rations/Exp	Exposur 1	es/Dith	Total Dith	1158	l Integrations	Total Exposure Time 10468.876	ETC Wkbk.Calc ID 76169
Special Requirements	Phase 0.9548 Time Series No Parallel A		.0290882 Days and	zero-phase 24586	26.20653 HJD								

Observation	Proposal 19 Diagnostic S Observing T	981 - Observation 42: Vis 81, Observation 42: Vis Status: Warning emplate: NIRSpec Bright (\$42)) Warning (Form): E	i t 2 t Object Time Serie	S								Wed Jan 18	rsity of M-D 3 23:01:26 GMT 2023
(Visit 2 (Obs 42)) Warning (Form): Exposure Duration exceeds the limit of 10000.0 seconds. Above this limit it is possib (Visit 42:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											ay occur daring	, and on possible	
Fixed Targets	# Name Target Coordinates (4) GJ-4102 RA: 19 20 57.1076 (290.2379483d) Dec: -82 33 35.24 (-82.55979d) Equinox: J2000 Comments: This object was generated by the targetselector and retrieved from the SIMBAD Category=Unidentified Description=[Infrared sources, Visible sources]					Targ. Coord. Corrections Proper Motion RA: 0.1761679932340912 time/yr Proper Motion Dec: -1.2302199999567165 Epoch of Position: 2015.5							
Acquisition	1	Target 41 GJ-4102- TARGETAQ	TA Method WATA	Subarray SUB32	Filter CLEAR	Readou NRSRA		Groups/In	1	tegrations/Exp	Total Integrations	Total Exposure Time 0.26	ETC Wkbk.Calc ID 76169
Template	Subarray SUB2048												
Spectral Elements	1	Grating/Filter G395H/F290LF		g Groups/	Int Integr	rations/Exp	Exposur 1	es/Dith	Total Dit	hers Tota	l Integrations	Total Exposure Time 10468.876	ETC Wkbk.Calc ID 76169
Special Requirements	Time Series	8 to 0.9754 with period 2 Observation Attachments	.0290882 Days and	zero-phase 24586	26.20653 HJD								

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Observation	• ′	Observation 44: Vis	sit 4									Wed Jan 18	3 23:01:26 GMT 2023
ati	Diagnostic Statu	_											
ez	Observing Temp	late: NIRSpec Brigh	nt Object Time Serie	S									
ps													
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cs	(Visit 4 (Obs 44)) Warning (Form): I	Exposure Duration e	xceeds the limit o	f 10000.0 secon	nds. Above this li	mit it is po	ssible that a	High Ga	ain Antenna move m	nay occur during	g the exposure.	
sti	(Visit 44:1) Warı	ning (Form): Overhe	eads are provisional	until the Visit Plan	nner has been r	un.							
Diagnostics													
iag													
Ω													
ည	# Name Target Coordinates (4) GJ-4102 RA: 19 20 57.1076 (290.2379483d)							rd. Correc			Miscella	ineous	
Fixed Targets	(4) G.	J-4102		0 57.1076 (290.23 33 35.24 (-82.559			Proper Mo time/yr	tion RA: 0.	.1761679	932340912 sec of			
Та			Equinox:		,		Proper Mo	tion Dec: -	1.230219	9999567165 arcsec	/yr		
eq			•				Epoch of I	Position: 20	15.5				
Ϋ́	Comments: This Category=Unide	object was generate	AD database.										
_	Description=[Inf	niijieu rared sources, Visil	ole sources]										
Acquisition	#	Target	TA Method	Subarray	Filter	Reado	ıt Pattern	Groups/I	nt	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
sit	1	41 GJ-4102-	WATA	SUB32	CLEAR	NRSRA	APIDD6	3		1	1	0.26	76169
ä		TARGETAQ											
ΑC													
	Subarray												
lat	SUB2048												
η	SCB2040												
Template													
Spectral Elements	#	Grating/Filter	Readout Pat	tern Groups/	Int In	tegrations/Exp	Exposu	res/Dith	Total l	Dithers Tota	al Integrations	Total Exposure Time	ETC Wkbk.Calc
ne	1	G395H/F290L	P NRSRAPID	9	12	224	1		1	1224	ļ	11065.548	76169
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ınts			2.0290882 Days and	zero-phase 24586	26.20653 HJD								
Jer	Time Series Obso No Parallel Attac												
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cia													
Special Requireme													
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Pro	nnosal 198	1 - Observation	on 45 - Tell N	/le How I'm :	Supposed T	o Breathe V	Vith No A	ir· Measurin	a the Prevale	nce and Dive	rsity of M-D	
Observation	Proposal 1981 Diagnostic Sta	Observation 45: Visi	t 5	ic How Him	<u>oupposed i</u>	<u>o breame v</u>	<u>vitir 140 7</u>	Mr. Wedsum	g trie i revale		3 23:01:26 GMT 2023	
Diagnostics O	(Visit 5 (Obs 4 (Visit 45:1) Wa	5)) Warning (Form): Exrning (Form): Overhea				ove this limit it is po	ssible that a I	High Gain Antenna m	nove may occur during	g the exposure.		
		Name GJ-4102A	Target Co	ordinates 57.1077 (290.23794	1874)		ord. Correcti		Miscella	neous		
Fixed Targets		JJ-4102A		3 35.24 (-82.559796		Proper Motion RA: 0.17622771481353314 sec of time/yr Proper Motion Dec: -1.23029700009738 arcsec/yr Parallax: 0.0801134"						
xed	Comments: Thi	s object was generated	by the targetselecto	r and retrieved fron	a the SIMBAD data	•	Position: 201:	5.5				
L.	Added Parallax Category=Star Description=[1											
tion	#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/In	t Integration	s/Exp Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	
Acquisition	1	42 GJ-4102- TARGETAQ- J2000	WATA	SUB32	CLEAR	NRSRAPIDD6	3	1	1	0.26	76169	
ite	Subarray											
Template	SUB2048											
_		Grating/Filter	Readout Patte	ern Groups/Int	Integration	ons/Exp Exposu	res/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	
Spectral Elements	1	G395H/F290LP	NRSRAPID	9	1224	1		1	1224	11065.548	76169	
Spe												

<u>Pro</u>	pposal 1981 - Observation 45 - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-D
Requirer	Phase 0.9599 to 0.9804 with period 2.0290882 Days and zero-phase 2458626.20653 HJD Time Series Observation No Parallel Attachments
Special	

Observation 3	Proposal 198 Diagnostic S	981 - Observati 81, Observation 43: Vis tatus: Warning emplate: NIRSpec Brigh	sit 3		n Supposed	d To Brea	athe W	ith No	Air: Mea	asuring the	<u>e Prevale</u>		rsity of M-D 3 23:01:26 GMT 2023
(Visit 3 (Obs 43)) 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 43:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. # Name Target Coordinates Targ. Coord. Corrections Miscellaneous													
Fixed Targets	# Name Target Coordinates (4) GJ-4102 RA: 19 20 57.1076 (290.2379483d) Dec: -82 33 35.24 (-82.55979d) Equinox: J2000 Comments: This object was generated by the targetselector and retrieved from the SIMBAD Category=Unidentified Description=[Infrared sources, Visible sources]					Targ. Coord. Corrections Proper Motion RA: 0.1761679932340912 time/yr Proper Motion Dec: -1.230219999956716 Epoch of Position: 2015.5 database.							
Acquisition	# 1	Target 41 GJ-4102- TARGETAQ	TA Method WATA	Subarray SUB32	Filter CLEAR	Readou NRSRA		Groups/In	nt Int	egrations/Exp	Total Integrations	Total Exposure Time 0.26	ETC Wkbk.Calc ID 76169
Template	Subarray SUB2048												
Spectral Elements	1	Grating/Filter G395H/F290LF		g Groups/	Integ Integ	rations/Exp	Exposur 1	es/Dith	Total Dith	ers Tota	l Integrations	Total Exposure Time 10468.876	ETC Wkbk.Calc ID 76169
Special Requirements	Phase 0.9548 Time Series No Parallel A		.0290882 Days and	zero-phase 24586	26.20653 HJD								

Proposal 1981 - Observation 11 - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-D.

Proposal 1981, Observation 11: Visit 1 Observation Wed Jan 18 23:01:26 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec Bright Object Time Series

(Visit 1 (Obs 11)) 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 (Obs 11)) Warning (Form): The slew between the acquisition exposure and the farthest science exposure is 76.153 Arcsec (larger than the recommended limit of 38.000 Arcsec) and may result in reduced or no schedulability. See more information in the diagnostic browser.

(Visit 11:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	WOLF-437	RA: 12 47 55.5675 (191.9815313d)	Proper Motion RA: -0.06820279992207054 sec of	
ဟ္			Dec: +09 44 57.91 (9.74942d)	time/yr	
rgets			Equinox: J2000	Proper Motion Dec: -0.4600339999115022 arcsec/yr	
l ë			_1	Parallax: 0.1237756"	
ΙË				Epoch of Position: 2015.5	
e G	Comments: T	his object was generated by the	targetselector and retrieved from the SIMBAD database.	•	

Added Parallax per Tony's suggestion

Category=Star

Description=[M dwarfs]

Extended=NO

Diagnostics

I.	ion	#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	quisi	1	11 WOLF437- TARGETAQ- OPTION1	WATA	SUB32	F140X	NRSRAPIDD6	3	1	1	0.26	76169

Subarray

Ę	וַנ	Subarray									
1 - 3	2	SUB2048									
	elliplate										
_	-										
	<u> </u>	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
		1	G395H/F290LP	NRSRAPID	3	3507	1	1	3507	12725.079	76169
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]	Specifial										
	ָב ע										
نُ	ว์										

<u> </u>	roposal 1981 - Observation 11 - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-D
l Dogniromonts	Phase 0.9356 to 0.9640 with period 1.4671214 Days and zero-phase 2459670.58857 HJD Time Series Observation No Parallel Attachments
Special	

Proposal 1981 - Observation 12 - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-D.

Proposal 1981, Observation 12: Visit 2 Observation

Wed Jan 18 23:01:26 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec Bright Object Time Series

Diagnostics (Visit 2 (Obs 12)) 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 (Obs 12)) Warning (Form): The slew between the acquisition exposure and the farthest science exposure is 76.153 Arcsec (larger than the recommended limit of 38.000 Arcsec) and may result in reduced or no schedulability. See more information in the diagnostic browser.

(Visit 12:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	WOLF-437	RA: 12 47 55.5675 (191.9815313d)	Proper Motion RA: -0.06820279992207054 sec of	
S			Dec: +09 44 57.91 (9.74942d)	time/yr	
get			Equinox: J2000	Proper Motion Dec: -0.4600339999115022 arcsec/yr	
arç			24umom v2000	Parallax: 0.1237756"	
Ĭ				Epoch of Position: 2015.5	
ed	Comments: T	his object was generated by the t	targetselector and retrieved from the SIMBAD database.	•	

Added Parallax per Tony's suggestion

Category=Star

Description=[M dwarfs]

Extended=NO

tion	#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
quisi	1	11 WOLF437- TARGETAQ- OPTION1	WATA	SUB32	F140X	NRSRAPIDD6	3	1	1	0.26	76169

Subarray

Ę	וַנ	Subarray									
1 - 2	2	SUB2048									
Tomplate											
Ŀ	-	"	C 4 TON	D 1 (D)	C # 1	T	T. (D)(1	T (I Did	m . 17	T () F	PERCHANILL C. I
Flomonte		#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
}		1	G395H/F290LP	NRSRAPID	3	3507	1	1	3507	12725.079	76169
ដ	ן נֿ										
2	<u> </u>										
{	ן נו										
Spectral	2										

<u>Pro</u>	pposal 1981 - Observation 12 - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-D
Requirements	Phase 0.9356 to 0.9640 with period 1.4671214 Days and zero-phase 2459670.58857 HJD Time Series Observation No Parallel Attachments
Special	

		981 - Observatio 81, Observation 21: Visit		<u>le How I'm</u>	Supposed	To Breathe	With No	Air: Measurin	g the Prevale		rsity of M-D 3 23:01:26 GMT 2023
Observation	Diagnostic S	Status: Warning emplate: NIRSpec Bright								wed sail 10	23.01.20 GW1 2023
Diagnostics	(Visit 1 (Obs (Visit 21:1)	s 21)) Warning (Form): Ex Warning (Form): Overhead	•			Above this limit it is	possible that a	High Gain Antenna п	nove may occur during	g the exposure.	
	#	Name	Target Co		700 1)		Coord. Correc		Miscella	neous	
ts	(2)	GJ-1132		50.1768 (153.7090) 9 17.77 (-47.15494)	,	Proper time/y		.10335027422347062	sec of		
lge			Equinox: J		u)	=		.414512 arcsec/yr			
Ta							x: 0.0793206"	15.5			
Fixed Targets	Comments:	This object was generated	by the targetselecto	r and retrieved from	n the SIMBAD d		of Position: 20	15.5			
Ē	Added Paral Category=St Description=	lax per Tony's suggestion tar		v							
tion	#	Target	TA Method	Subarray	Filter	Readout Patte	ern Groups/I	nt Integration	s/Exp Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
Acquisition	1	21 GJ1132- TARGETAQ	WATA	SUB32	F140X	NRSRAPIDD	5 3	1	1	0.26	76169
ate	Subarray										
Template	SUB2048										
ants	#	Grating/Filter	Readout Patte	rn Groups/Int	Integr	ations/Exp Exp	osures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
Spectral Elements	1	G395H/F290LP	NRSRAPID	14	814	1		1	814	11030.091	134424
Spe											

<u> 19</u>	roposal 1981 - Observation 21 - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-D
Requirements	Phase 0.9480 to 0.9736 with period 1.6289287 Days and zero-phase 2457184.55759 HJD Time Series Observation No Parallel Attachments
Special	

Pro	posal 198	1 - Observatio	on 22 - Tell I	Me How I'm	Suppose	d To Brea	the With	No Air	: Measurin	a the Prevale	nce and Dive	rsity of M-D
Observation	Proposal 1981, Diagnostic Stat	Observation 22: Visi	it 2		Саррово	<u>a 10 510a</u>	THE TYPE	140 7 111	· measaiii	g the Frevere		3 23:01:26 GMT 2023
Diagnostics)) Warning (Form): E: ning (Form): Overhea	ads are provisional u	ntil the Visit Planne			-			nove may occur during		
Fixed Targets	(2) Comments: This	lame dJ-1132 object was generated per Tony's suggestion declared to the control of the control	RA: 10 14 Dec: -47 (Equinox:		d)	P ti P P E	Targ. Coord. (croper Motion me/yr roper Motion arallax: 0.079 poch of Positi	RA: -0.1033 Dec: 0.4145 3206"	35027422347062	Miscella sec of	neous	
Acquisition	1	Target 21 GJ1132- TARGETAQ	TA Method WATA	SUB32	Filter F140X	Readout NRSRAF	Pattern Green 3	oups/Int	Integration 1	s/Exp Total Integrations	Total Exposure Time 0.26	ETC Wkbk.Calc ID 76169
Template	Subarray SUB2048											
Spectral Elements	1	Grating/Filter G395H/F290LP	Readout Patt NRSRAPID	ern Groups/In	t Inte	grations/Exp	Exposures/D	ith To	tal Dithers	Total Integrations 814	Total Exposure Time 11030.091	ETC Wkbk.Calc ID 134424

	pposal 1981 - Observation 22 - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-D
Requirements	Phase 0.9480 to 0.9736 with period 1.6289287 Days and zero-phase 2457184.55759 HJD Time Series Observation No Parallel Attachments
Special	

Pro	posal 1981 -	Observation	31 - Tell Me I	How I'm Supp	osed To Bre	eathe With No	Air: Measurin	g the Prevale	nce and Dive	ersity of M-D
	Proposal 1981, Obs									18 23:01:26 GMT 2023
aţi.	Diagnostic Status: V	Warning								
Observation	Observing Template:	: NIRCam Grism Tim	ne Series							
psq										
_										
<u> S</u>						imit it is possible that a	High Gain Antenna n	nove may occur during	the exposure.	
St	(Visit 31:1) Warning	(Form): Overheads a	are provisional until the	e Visit Planner has be	een run.					
١ğ										
Diagnostics										
	# Name	2	Target Coordin	ates		Targ. Coord. Correc	ctions	Miscella	neous	
Targets	(3) GJ-34	1	RA: 09 21 35.85	604 (140.3993767d)		Proper Motion RA: -0).11297682918319278	sec of		
۳. ا			Dec: -60 16 52.2	21 (-60.28117d)		time/yr				
l≝			Equinox: J2000			Proper Motion Dec: 0	-			
Fixed	Commenter This object		th a tama ata al acton and	matriana d from the CI	MBAD databasa	Epoch of Position: 20	15.5			
ΙÊ	Category=Star		the targetselector and	retrievea from the Sh	MBAD aaiabase.					
┢	Description=[M dwa	urfs] Target	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure	ETC Wkbk.Calc
Acquisition	#	Target	Subarray	rittei	Readout Fattern	Groups/Int	integrations/Exp	Total Integrations	Time	ID ETC WRDR.Calc
Lisi	1	SAME	SUB32TATSGRIS M	F405N+F444W	RAPID	3	1	1	0.062	76169
l g										
H	C-1					Nf Ott Ch-	1-			
Template	Subarray SUBGRISM128					No. of Output Cha	inneis			
[윤	SODGRISW128					7				
Ē										
Spectral Elements	#	Short Pupil+Filter	Long Pupil+Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
Ę	1	WLP8+F212N	GRISMR+F444W	BRIGHT1	3	4652	1	4652	18891.493	76169
I₩										
<u></u>										
탏										
၂ၕွ										
ts (Phase 0 9828 to 0 98	83 with period 7 576	8707 Days and zero-pl	hase 2458544 0874 H	ID					
	Aperture PA Range	5 to 35 Degrees (V3 5	5.36622083 to 35.3662	2083)						
Ĭ	Aperture PA Range	135 to 175 Degrees (\)	3 75.36622083 to 110. V3 135.36622083 to 1	75.36622083)						
ΙΞ̈́			V3 185.36622083 to 2 V3 255.36622083 to 29							
edi	Aperture PA Range	315 to 355 Degrees (V	V3 315.36622083 to 3	55.36622083)						
Ř	Time Series Observa No Parallel Attachmo									
cia										
Special Requiremen										
လ										

Proposal 1981 - Observation 32 - Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-D. Proposal 1981, Observation 32: Visit 2 Wed Jan 18 23:01:26 GMT 2023 Observation **Diagnostic Status: Warning** Observing Template: NIRCam Grism Time Series Diagnostics (Visit 2 (Obs 32)) 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 32:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. Targ. Coord. Corrections Name **Target Coordinates** Miscellaneous **Fixed Targets** (3) GJ-341 RA: 09 21 35.8504 (140.3993767d) Proper Motion RA: -0.11297682918319278 sec of time/yr Dec: -60 16 52.21 (-60.28117d) Proper Motion Dec: 0.18209 arcsec/yr Equinox: J2000 Epoch of Position: 2015.5 Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=Star Description=[M dwarfs] Acquisition Target Filter Readout Pattern Groups/Int Integrations/Exp **Total Integrations** Total Exposure ETC Wkbk.Calc Subarray Time ID SAME SUB32TATSGRIS F405N+F444W **RAPID** 3 1 0.062 76169 **Template** No. of Output Channels Subarray SUBGRISM128 4 Spectral Elements ETC Wkbk.Calc Total Exposure Short Pupil+Filter Long Pupil+Filter Readout Pattern Groups/Int Integrations/Exp Exposures/Dith **Total Integrations** Time ID WLP8+F212N 3 4652 4652 18891.493 76169 GRISMR+F444W BRIGHT1 Phase 0.9828 to 0.9883 with period 7.5768707 Days and zero-phase 2458544.0874 HJD Aperture PA Range 5 to 35 Degrees (V3 5.36622083 to 35.36622083) Aperture PA Range 75 to 110 Degrees (V3 75.36622083 to 110.36622083) Aperture PA Range 135 to 175 Degrees (V3 135.36622083 to 175.36622083) Aperture PA Range 185 to 215 Degrees (V3 185.36622083 to 215.36622083) Aperture PA Range 255 to 290 Degrees (V3 255,36622083 to 290,36622083) Aperture PA Range 315 to 355 Degrees (V3 315.36622083 to 355.36622083) Time Series Observation No Parallel Attachments Special

	posal 1981 - Observation Proposal 1981, Observation 33: Visit 3			2222 10 010			<u> </u>		18 23:01:26 GMT 20:
2	Diagnostic Status: Warning	•						wed Jan	16 23.01.20 GWH 20.
ğ	Observing Template: NIRCam Grism Ti	ma Carias							
Open validi	Observing Template: NIRCam Grism 11	me Series							
<u>, </u>	(Visit 3 (Obs 33)) Warning (Form): Expo	osure Duration exceeds	the limit of 10000.0 s	seconds. Above this l	imit it is possible that a	High Gain Antenna n	nove may occur during	the exposure.	
Diagnostics	(Visit 33:1) Warning (Form): Overheads				·			•	
_	# Name	Target Coordin	nates		Targ. Coord. Correc	tions	Miscella	neous	
largets	(3) GJ-341	RA: 09 21 35.85	504 (140.3993767d)		Proper Motion RA: -0	.11297682918319278	sec of		
<u>ت</u>		Dec: -60 16 52.2	21 (-60.28117d)		time/yr				
-		Equinox: J2000			Proper Motion Dec: 0	.18209 arcsec/yr			
Lixed		•			Epoch of Position: 20	15.5			
<u> </u>	Comments: This object was generated by Category=Star	the targetselector and	retrieved from the SI	MBAD database.					
	Description=[M dwarfs]								
	# Target	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1 SAME	SUB32TATSGRIS M	F405N+F444W	RAPID	3	1	1	0.062	76169
	Subarray				No. of Output Cha	nnels			
lemplate	SUBGRISM128				4				
2112	# Short Pupil+Filte	r Long Pupil+Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
Spectral Elements	1 WLP8+F212N	GRISMR+F444W	BRIGHT1	3	4652	1	4652	18891.493	76169
าเร	Phase 0.9828 to 0.9883 with period 7.57 Aperture PA Range 5 to 35 Degrees (V3 Aperture PA Range 75 to 110 Degrees (V3	V3 75.36622083 to 110 (V3 135.36622083 to 1	.36622083)	(JD					

Observation	Proposal 19 Diagnostic Observing	981 - Observation 51: Vision Status: Warning Femplate: NIRSpec Bright	it 1 Object Time Series									Wed Jan 15	rsity of M-D 8 23:01:26 GMT 2023
Diagnostics		os 51)) Warning (Form): E Warning (Form): Overhea	-				mit it is po	ssible that a	High Gain Ante	nna move ma	ay occur during	g the exposure.	
Fixed Targets	Category=S	Name TRAPPIST-1 This object was generated for a generated for	Dec: -05 02 Equinox: J2	30.3341 (346.620 36.46 (-5.04346 0000	6d)		Proper Mo time/yr Proper Mo		0622998062100			neous	
Acquisition	1	Target 5 TRAPPIST-1	TA Method WATA	Subarray SUB32	Filter F110W	Reador NRSRA		Groups/In	nt Integr	•	Total Integrations	Total Exposure Time 0.08	ETC Wkbk.Calc ID 76169
Template	Subarray SUB512												
Spectral Elements	1	Grating/Filter PRISM/CLEAR	Readout Patte R NRSRAPID	rn Groups/I		0550	Exposur 1	res/Dith	Total Dithers	10550)	Total Exposure Time 14531.992	T6169
Special Requirements	Phase 0.994	e 01-JAN-2024:00:00:00 14 to 0.9966 with period 18 6 Observation Attachments	8.765 Days and zero-p	ohase 2459877.0	2238 HJD								

Observation										Wed Jan 18	rsity of M-D 3 23:01:26 GMT 2023			
Diagnostics		52)) Warning (Form): E. Warning (Form): Overhea	-				mit it is pos	sible that a	High Gain Anten	na move ma	y occur during	g the exposure.		
Fixed Targets	Category=Sta						Targ. Coord. Corrections Proper Motion RA: 0.06229980621005 time/yr Proper Motion Dec: -0.4794029999857 Epoch of Position: 2015.5							
Acquisition	1	Target 5 TRAPPIST-1		Subarray SUB32	Filter F110W	Readou NRSRA		Groups/In	Integra		Total Integrations	Total Exposure Time 0.08	ETC Wkbk.Calc ID 76169	
Template	Subarray SUB512													
Spectral Elements	1	Grating/Filter PRISM/CLEAR	Readout Patter NRSRAPID	n Groups/Ir	105	egrations/Exp 550	Exposur 1	es/Dith	Total Dithers	10550	Integrations)	Total Exposure Time 14531.992	T6169	
Special Requirements		01-JAN-2024:00:00:00 to 0.9966 with period 18 Observation Attachments	3.765 Days and zero-pl	hase 2459877.02	2238 НЈД									

	Proposal 19	981 - Observation 53: Visi		<u>le How I'm</u>	<u> Supposed</u>	To Breathe	<u>With No Ai</u>	<u>r: Measurir</u>	ng the Prevale		rsity of M-D 3 23:01:26 GMT 2023
Observation	_	Status: Warning Template: NIRSpec Bright	Object Time Series								
Diagnostics		bs 53)) Warning (Form): Ex	-			Above this limit it is	possible that a Hig	gh Gain Antenna i	move may occur durinş	g the exposure.	
6	#	Name	Target Co	ordinates		Targ. (Coord. Correction	ıs	Miscella	neous	
Targets	(5) TRAPPIST-1 RA: 23 06 30.3341 (346.6263921d) Dec: -05 02 36.46 (-5.04346d)					time/yr		29980621005784			
Ļ			Equinox: J	2000		_		/9402999985723 a	arcsec/yr		
Fixed	Epoch of Position: 2015.5 Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=Star Description=[M dwarfs]										
tion	#	Target	TA Method	Subarray	Filter	Readout Patte	n Groups/Int	Integration	ns/Exp Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
Acquisition	1	5 TRAPPIST-1	WATA	SUB32	F110W	NRSRAPID	3	1	1	0.08	76169
te	Subarray										
Template	SUB512										
ents	#	Grating/Filter	Readout Patte	rn Groups/I	nt Integra	ntions/Exp Expo	sures/Dith T	otal Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
Spectral Elements	1	PRISM/CLEAR	NRSRAPID	5	10550	1	1		10550	14531.992	76169
Special Requirements	Phase 0.994	e 01-JAN-2024:00:00:00 44 to 0.9966 with period 18 s Observation Attachments	3.765 Days and zero-	phase 2459877.0	2238 HJD						