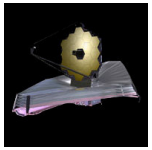

2327 - Water Ice Clouds and Weather on the Coldest Brown Dwarf

Cycle: 1, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
Dr. Andrew Skemer (PI)	**University of California - Santa Cruz**
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Dr. Katelyn Allers (CoI)	Bucknell University
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Dr. Richard Freedman (CoI)	SETI Institute
Dr. Roxana Lupu (CoI)	Eureka Scientific Inc.
Dr. Channon Visscher (CoI)	Space Science Institute
Dr. Thomas R. Geballe (CoI)	NOIRLab - Gemini North (HI)
Dr. Emily Martin (CoI)	University of California - Santa Cruz
Aarynn Carter (CoI)	University of California - Santa Cruz

OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1		NIRSpec Bright Object Time Series	(1) WISE-J085510.74-071442.5

ABSTRACT

Exoplanets and brown dwarfs colder than 350K are predicted to have water ice clouds in their photospheres. Of these, the best candidate for early JWST studies of hydrological cycles is the nearby, cold, free-floating brown dwarf, WISE 0855. WISE 0855 shows evidence for water clouds, and with an effective temperature of 250 K, its spectrum is similar to Jupiter's. But, crucially, WISE 0855 is warm enough to lack the thick ammonia clouds blanketing Jupiter, giving us a clear view of its water clouds. In this proposal we seek to obtain a time-series G395M spectrum to unambiguously detect WISE 0855's solid-state water ice feature, probe its variability, and look for spectral correlations between water vapor and water ice in a time series that could be due to evaporation and condensation. The data will provide our first opportunity to study the hydrological cycle of an extrasolar world.

OBSERVING DESCRIPTION

The proposal is to obtain an 11 hours time-series observation of a cold brown dwarf using the NIRSPEC G395M grating in BOTS mode. The acquisitions will be WATA with the SUB2048 subarray and the clear filter. The target has a large proper motion and parallax, which are known. There are no scientific requirements for when the observations must take place. The observation is non-interruptible. No parallel observations are planned.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	WISE-J085510.74-071442.5	RA: 08 55 4.0620 (133.7669250d) Dec: -07 14 34.16 (-7.24282d) Equinox: J2000	Proper Motion RA: -8118.396 mas/yr Proper Motion Dec: 680.546 mas/yr Parallax: 0.448528" Epoch of Position: 2022.9	

Comments: Coordinates copied from JWST-1230, which had a successful acquisition
Category=Star
Description=[Brown dwarfs]
Extended=NO

Observation

Proposal 2327, Observation 1

Mon Aug 07 22:00:57 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec Bright Object Time Series

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
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Comments: Coordinates copied from JWST-1230, which had a successful acquisition
Category=Star
Description=[Brown dwarfs]
Extended=NO

Acquisition

#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	WATA	SUB2048	CLEAR	NRSRAPID	3	1	1	3.628	51610

Template

Subarray
SUB2048

Spectral Elements

#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	G395M/F290LP	NRSRAPID	996	44	1	1	44	39569.837	51610

Special Requirements

Time Series Observation
No Parallel Attachments