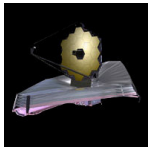

1874 - JWST spectrophotometry of brown dwarf pulsars

Cycle: 1, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
LSRJ1835+3259 NIRISS SOSS				
	1	NIRISS Full Orbit	NIRISS Single-Object Slitless Spectroscopy	(1) LSRJ1835+3259

ABSTRACT

Our understanding of magnetic activity in low-mass stars and brown dwarfs was revolutionised by the discovery of brown dwarf "pulsars", with pulsed radio emission caused by massively scaled-up analogs of Jupiter's aurorae. These discoveries showed that the transition to planet-like magnetospheres occurs at the end of the stellar main sequence.

The brown dwarf pulsars all show optical/NIR variability. It is claimed that this is causally linked to the radio emission and probably caused by the impact of auroral electrons on the brown dwarf atmosphere. These auroral electrons may therefore have a profound impact on the atmosphere; altering the opacity, providing local heating, destroying dust clouds and triggering pre-biotic chemistry in the brown dwarfs. Since aurora are expected on exoplanets, similar effects may be in play.

The claim that the radio aurora cause the optical/NIR variability in brown dwarf pulsars is yet to be established. In particular, a model that claims elevayed H- opacity is the driver needs to be rigorously tested. Here we propose JWST spectrophotometry of a benchmark brown dwarf pulsar that we will use to understand the mechanism by which auroral electrons induce optical/NIR variability.

OBSERVING DESCRIPTION

APT to obtain a time-series of spectra of LSR J1835+3259 with NIRISS/SOSS, with the aim of creating lightcurves for each spectral bin and measuring the spectrum of the surface feature causing the variabilty.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	LSRJ1835+3259	RA: 18 35 37.8804 (278.9078350d)	Proper Motion RA: -72.840 mas/yr	
		Dec: +32 59 53.31 (32.99814d)	Proper Motion Dec: -754.841 mas/yr	
		Equinox: J2000	Parallax: 0.1758244"	
			Epoch of Position: 2000.0	

Comments: High proper motion source. Position, proper motion and parallax from Gaia DR2
Category=Star
Description=[Brown dwarfs, Flare stars, M dwarfs]
Extended=NO

Observation

Proposal 1874, Observation 1: NIRISS Full Orbit

Wed Mar 31 05:01:20 GMT 2021

Diagnostic Status: Warning

Observing Template: NIRISS Single-Object Slitless Spectroscopy

Diagnostics

(NIRISS Full Orbit (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.

(Exposure) 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)	LSRJ1835+3259	RA: 18 35 37.8804 (278.9078350d) Dec: +32 59 53.31 (32.99814d) Equinox: J2000	Proper Motion RA: -72.840 mas/yr Proper Motion Dec: -754.841 mas/yr Parallax: 0.1758244" Epoch of Position: 2000.0	

Comments: High proper motion source. Position, proper motion and parallax from Gaia DR2
Category=Star
Description=[Brown dwarfs, Flare stars, M dwarfs]
Extended=NO

Acquisition

#	Target	Acquisition Mode	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	SOSSFAINT	F480M	NISRAPID	19	1	1	1.024	31944

Template

Subarray	Include F277W Exposure?
SUBSTRIP256	true

Spectral Elements

#	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	NISRAPID	4	475	1	475	13057.978	31944
2	NISRAPID	4	30	1	30	824.714	31944

Special Requirements

Aperture PA Range 95 to 270 Degrees (V3 94.43012982 to 269.43012982)
Time Series Observation
No Parallel