



6219 - MIRI LRS Slit for transiting exoplanet observations

Cycle: 3, Proposal Category: GO

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Dr. Thomas P. Greene (CoI) (US Admin CoI)	NASA Ames Research Center

OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
Observation Folder				
	1		MIRI Low Resolution Spectroscopy	(1) HAT-P-12MAIN
	2		MIRI Low Resolution Spectroscopy	(2) HAT-P-12BCKG

ABSTRACT

JWST Proposal 6219 (Created: Tuesday, March 4, 2025, 9:00:09PM Eastern Standard Time) - Overview

In this calibration proposal we offer to explore the feasibility of using the MIRI LRS in fixed-slit mode for the atmospheric characterisation of transiting exoplanets, observed when the planet passes in front of its host star. We aim to explore the possibility of expanding the range of accessible targets for TSOs with the MIRI LRS mode; exploiting the superior sensitivity of the LRS fixed-slit mode to probe cooler, lower-mass and fainter stars than are accessible with the LRS slitless mode, and avoiding some of the challenging systematics observed in the SLITLESSPRISM subarray so far. These observations will allow us to (1) compare the performance of the instrument in fixed-slit and slitless configurations for a known target that has been extensively observed with JWST (2) understand the parameter space of exoplanet physical properties in which the LRS in fixed-slit mode is most valuable for time series observations; and (3) produce a calibration recipe for these observations that can be adopted by the JWST calibration pipeline and offered to the community.

This calibration proposal has been approved by STScI MIRI team members (please see helpdesk ticket INC0194552).

OBSERVING DESCRIPTION

We chose to observe the transit of HAT-P-12b with the MIRI LRS fixed-slit mode as a Time Series Observation (TSO). The observation consists of a total of 1552 integrations composed of 9 groups and divided into 3 exposures/dither. We chose 3 exposures/dither to make sure that we remain below the 10 000 s exposure limit set for MIRI LRS slit observations. The dithering pattern we chose is the MAPPING one with 2 spatial steps that removes integrally the target from the slit to obtain a proper background estimation. HAT-P-12b is the most suited target for this calibration proposal as it has been extensively observed with JWST NIRISS, NIRSpec and MIRI LRS slitless during cycle 1 (PID 1281) and is observable with the LRS in fixed-slit mode; which has a lower dynamic range than its slitless counterpart.

Proposal 6219 - Targets - MIRI LRS Slit for transiting exoplanet observations

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HAT-P-12MAIN	RA: 13 57 33.4669 (209.3894454d) Dec: +43 29 36.60 (43.49350d) Equinox: J2000	Proper Motion RA: -134.793 mas/yr Proper Motion Dec: -44.22900005920383 mas/yr Parallax: 0.0070448" Epoch of Position: 2000	
<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Category=Star</i> <i>Description=[Exoplanets]</i> <i>Extended=NO</i></p>				
(2)	HAT-P-12BCKG	RA: 13 57 29.0000 (209.3708333d) Dec: +43 29 36.60 (43.49350d) Equinox: J2000	Parallax: 0.0070448" Epoch of Position: 2000	
<p><i>Comments:</i> <i>Category=Unidentified</i> <i>Description=[Blank field]</i> <i>Extended=NO</i></p>				

Fixed Targets

Proposal 6219 - Observation 1 - MIRI LRS Slit for transiting exoplanet observations

Wed Mar 05 02:00:09 GMT 2025

Observation	Proposal 6219, Observation 1 Diagnostic Status: Error Observing Template: MIRI Low Resolution Spectroscopy Background Observations:[Observation 2]																												
	(Observation 1) Error (Form): The TIME SERIES requirement is not allowed for this type of observation. See details in the diagnostic browser. (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.																												
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	FULL				true																								
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1	FASTR1	6	1	1	1	1	16.65		F1500W																				

Proposal 6219 - Observation 1 - MIRI LRS Slit for transiting exoplanet observations

Spectral Elements	#	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Exposures/Dith	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
	1	FASTR1	9	1326	1326	1	1	36794.255	229958
Special Requirements	Phase 0.92715 to 0.94021 with period 3.2130576 Days and zero-phase 2459987.425609 HJD Time Series Observation No Parallel Attachments								
	Group Observations 1, 2, Non-interruptible								

Proposal 6219 - Observation 2 - MIRI LRS Slit for transiting exoplanet observations

Wed Mar 05 02:00:09 GMT 2025

Observation	Proposal 6219, Observation 2 Diagnostic Status: Error Observing Template: MIRI Low Resolution Spectroscopy Background Observation For: [Observation 1]							
	(Observation 2) Error (Form): The TIME SERIES requirement is not allowed for this type of observation. See details in the diagnostic browser. (Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.							
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Comments: Category=Unidentified Description=[Blank field] Extended=NO								
Acquisition	#	Target						
	1	NONE						
Template	AcqFilter	Subarray	Obtain Verification Image?					
		FULL	false					
Dithers	#	Dither Type	No. Spectral Steps	Spectral Step Offset	No. Spatial Steps	Spatial Step Offset		
	1	NONE						
Spectral Elements	#	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Exposures/Dith	Total Dithers	Total Exposure Time ETC Wkbk.Calc ID
	1	FASTR1	9	10	10	1	1	274.729

Proposal 6219 - Observation 2 - MIRI LRS Slit for transiting exoplanet observations

Special Requirements

Time Series Observation
No Parallel Attachments
Group Observations 1, 2, Non-interruptible