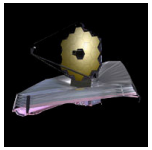

4564 - A multiwavelength study of protoplanetary disk ionization

Cycle: 2, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1		MIRI Medium Resolution Spectroscopy	(1) V-SZ-CHA
	4		MIRI Medium Resolution Spectroscopy	(1) V-SZ-CHA
	2		MIRI Medium Resolution Spectroscopy	(2) ASS-CHA-T-2-54
	3		MIRI Medium Resolution Spectroscopy	(3) V-TW-HYA

ABSTRACT

We aim to determine whether the magnetorotational instability (MRI) could be the elusive driver of turbulent accretion in protoplanetary disks. To accomplish this, we will measure the amount of X-ray induced disk ionization in a sample of three protoplanetary disks, leveraging the unique

synergy provided by Chandra, HST, and JWST to simultaneously measure X-ray through UV luminosities and the fluxes of mid-infrared [Ne II] and [Ne III] fine structure lines. When combined with thermochemical modeling, these simultaneous Chandra, HST, and JWST observations will characterize the high-energy radiation spectrum impinging on the disk and lead to a measurement of the disk ionization fraction, which will test if the MRI is responsible for accretion in protoplanetary disks.

OBSERVING DESCRIPTION

This is a coordinated program with HST (GO 17521) and Chandra, with HST as the primary programs. We request that a given object be observed as simultaneous as possible (within 1 hr of the HST observation). For JWST, we request to use MIRI MRS in all channels in 5.09hr, including overheads. We use exisitng Spitzer IRS spectra to estimate the SNR and the required exposure times. We require a SNR greater than 100 to detect and measure the fluxes of our emission lines of interest. The same observing strategy will be used for all three targets. We will do target acquisition with 4 groups/integration using the FND filter. We will use the 4-point dithering in the default (negative) direction, the FASTR1 readout, and the full subarray. We will use 1 integration/exposure and 1 exposure/dithering position. The numbers of group/integration to achieve the required SNR are 25, 100, and 10 for SZ Cha, T 54, and TW Hya, respectively. Nod-in-scene is sufficient as the targets are essentially point sources.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	V-SZ-CHA	RA: 10 58 16.6399 (164.5693329d) Dec: -77 17 17.15 (-77.28810d) Equinox: J2000		
Comments: *Category=Star* *Description=[Pre-main sequence stars, Protoplanetary disks, T Tauri stars]*				
(2)	ASS-CHA-T-2-54	RA: 11 12 42.5584 (168.1773267d) Dec: -77 22 22.93 (-77.37304d) Equinox: J2000		
Comments: *Category=Star* *Description=[Pre-main sequence stars, Protoplanetary disks, T Tauri stars]*				
(3)	V-TW-HYA	RA: 11 01 51.8195 (165.4659146d) Dec: -34 42 17.25 (-34.70479d) Equinox: J2000		
Comments: *Category=Star* *Description=[Pre-main sequence stars, Protoplanetary disks, T Tauri stars]*				

Observation

Proposal 4564, Observation 1

Fri May 23 00:00:09 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(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)	V-SZ-CHA	RA: 10 58 16.6399 (164.5693329d) Dec: -77 17 17.15 (-77.28810d) Equinox: J2000		

Comments:
Category=Star
Description=[Pre-main sequence stars, Protoplanetary disks, T Tauri stars]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	FAST	4	1	1	11.1	167119.14

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	NO	FULL	Allow Auto Reorder

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	POINT SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SHORT(A)	MRSLONG		FASTR1	25	1	1	Dither 1	4	4	277.504	
1	SHORT(A)	MRSSHORT		FASTR1	25	1	1	Dither 1	4	4	277.504	
2	MEDIUM(B)	MRSLONG		FASTR1	25	1	1	Dither 1	4	4	277.504	
2	MEDIUM(B)	MRSSHORT		FASTR1	25	1	1	Dither 1	4	4	277.504	
3	LONG(C)	MRSLONG		FASTR1	25	1	1	Dither 1	4	4	277.504	
3	LONG(C)	MRSSHORT		FASTR1	25	1	1	Dither 1	4	4	277.504	

Special Requirements	Between Dates 27-MAY-2024:02:30:11 and 27-MAY-2024:05:15:33

Observation

Proposal 4564, Observation 4 Fri May 23 00:00:09 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	V-SZ-CHA	RA: 10 58 16.6399 (164.5693329d) Dec: -77 17 17.15 (-77.28810d) Equinox: J2000		

Comments:
Category=Star
Description=[Pre-main sequence stars, Protoplanetary disks, T Tauri stars]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	FAST	4	1	1	11.1	167119.14

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	NO	FULL	Allow Auto Reorder

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	POINT SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	LONG(C)	MRSLONG		FASTR1	25	1	1	Dither 1	4	4	277.504	
1	LONG(C)	MRSSHORT		FASTR1	25	1	1	Dither 1	4	4	277.504	
2	MEDIUM(B)	MRSLONG		FASTR1	25	1	1	Dither 1	4	4	277.504	
2	MEDIUM(B)	MRSSHORT		FASTR1	25	1	1	Dither 1	4	4	277.504	
3	SHORT(A)	MRSLONG		FASTR1	25	1	1	Dither 1	4	4	277.504	
3	SHORT(A)	MRSSHORT		FASTR1	25	1	1	Dither 1	4	4	277.504	

Special Requirements	Between Dates 2025.157:20:52:40 and 2025.157:23:25:34

Observation

Proposal 4564, Observation 2 Fri May 23 00:00:09 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	ASS-CHA-T-2-54	RA: 11 12 42.5584 (168.1773267d) Dec: -77 22 22.93 (-77.37304d) Equinox: J2000		

Comments:
Category=Star
Description=[Pre-main sequence stars, Protoplanetary disks, T Tauri stars]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	FAST	4	1	1	11.1	167121.14

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	NO	FULL	Allow Auto Reorder

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	POINT SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	LONG(C)	MRSLONG		FASTR1	100	1	1	Dither 1	4	4	1110.016	
1	LONG(C)	MRSSHORT		FASTR1	100	1	1	Dither 1	4	4	1110.016	
2	MEDIUM(B)	MRSLONG		FASTR1	100	1	1	Dither 1	4	4	1110.016	
2	MEDIUM(B)	MRSSHORT		FASTR1	100	1	1	Dither 1	4	4	1110.016	
3	SHORT(A)	MRSLONG		FASTR1	100	1	1	Dither 1	4	4	1110.016	
3	SHORT(A)	MRSSHORT		FASTR1	100	1	1	Dither 1	4	4	1110.016	

Special Requirements	Between Dates 21-MAY-2024:22:00:00 and 23-MAY-2024:02:00:00

Observation

Proposal 4564, Observation 3 Fri May 23 00:00:09 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(3)	V-TW-HYA	RA: 11 01 51.8195 (165.4659146d) Dec: -34 42 17.25 (-34.70479d) Equinox: J2000		

Comments:
Category=Star
Description=[Pre-main sequence stars, Protoplanetary disks, T Tauri stars]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	FAST	4	1	1	11.1	167120.14

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	NO	FULL	Allow Auto Reorder

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	POINT SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	LONG(C)	MRSLONG		FASTR1	10	1	1	Dither 1	4	4	111.002	
1	LONG(C)	MRSSHORT		FASTR1	10	1	1	Dither 1	4	4	111.002	
2	MEDIUM(B)	MRSLONG		FASTR1	10	1	1	Dither 1	4	4	111.002	
2	MEDIUM(B)	MRSSHORT		FASTR1	10	1	1	Dither 1	4	4	111.002	
3	SHORT(A)	MRSLONG		FASTR1	10	1	1	Dither 1	4	4	111.002	
3	SHORT(A)	MRSSHORT		FASTR1	10	1	1	Dither 1	4	4	111.002	

Special Requirements	Between Dates 25-JAN-2025:14:00:00 and 25-JAN-2025:17:00:00