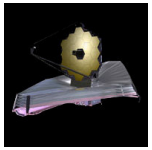

2260 - Caught in the act of dispersing their disks? MIRI MRS can tell

Cycle: 1, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
MIRI MRS				
	3	TCha	MIRI Medium Resolution Spectroscopy	(3) TCHA
	5	TCha_sky	MIRI Medium Resolution Spectroscopy	(5) TCHASKY
	4	V4046Sgr	MIRI Medium Resolution Spectroscopy	(4) V4046SGR
	6	V4046Sgr_sky	MIRI Medium Resolution Spectroscopy	(6) V4046SKY

ABSTRACT

Transition disks are planet-forming disks with large dust gaps or cavities, from a few to tens of au. Based on spectrally resolved 12.8 micron [NeII] profiles, several of them have been also found to drive slow (~5 km/s) winds, compatible with star-driven photoevaporative flows. Regardless of whether the gaps/cavities are created by planets or photoevaporation, these systems might be in the unique stage of dispersing their disks. However, line profiles alone cannot exclude MHD winds which might drive evolution but not dispersal. Here, we propose MIRI MRS observations of two transition disks with a large dust cavity (>30 au in radius) and a small (=<4 au) inner disk plus evidence for a slow [NeII] wind. MIRI MRS is the only instrument that can spatially resolve [NeII] emission near or exterior to the cavity radius as expected in the photoevaporative wind scenario.

Along with [NeII], we will map the emission from other forbidden and H recombination lines to constrain the ionization fraction of the flowing gas, hence wind mass loss rates. Our project will establish how much time is left for planet formation and migration in these two systems and provide a pathfinder for future observations aiming at clarifying how disks disperse.

OBSERVING DESCRIPTION

We aim at spatially resolving disk winds from the transition objects TCha and V4046Sgr. For this goal we will use MIRI MRS IFU and target several forbidden lines, in particular the [NeII] at 12.8micron, and the strongest of the HI recombination lines at 12.37micron. As the selected lines fall in different grating settings, we will obtain the full spectrum from ~4.9 to 28micron. The exposure time is set to achieve a S/N >25 at the cavity radius in the [NeIII] at 15.55micron (Channel3, MEDIUMB), the cavity sizes are known from mm ALMA images and the [NeIII] emission is conservatively assumed to be 1/20 of the measured [NeII] flux. Target acquisition is not needed and we select 4-Point dithering for the expected extended emission. The maximum number of groups is chosen not to saturate the continuum at any wavelength and the number of integrations is changed to achieve the requested S/N. As we use an extended source dither pattern and several of our lines of interest are in Channel3, we also request a dedicated sky pointing for background subtraction.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(3)	TCHA	RA: 11 57 13.5269 (179.3063621d) Dec: -79 21 31.52 (-79.35876d) Equinox: J2000		
Comments: *Category=Star* *Description=[Pre-main sequence stars, Protoplanetary disks]*				
(4)	V4046SGR	RA: 18 14 10.4819 (273.5436746d) Dec: -32 47 34.52 (-32.79292d) Equinox: J2000	Proper Motion RA: 3.510 mas/yr Proper Motion Dec: -52.721 mas/yr Epoch of Position: 2016	
Comments: *Category=Star* *Description=[Pre-main sequence stars, Protoplanetary disks]*				
(5)	TCHASKY	RA: 11 56 32.0000 (179.1333333d) Dec: -79 20 9.50 (-79.33597d) Equinox: J2000		
Comments: *Category=Calibration* *Description=[Telescope/sky background]*				
(6)	V4046SKY	RA: 18 14 10.4900 (273.5437083d) Dec: -32 47 2.40 (-32.78400d) Equinox: J2000		
Comments: *Category=Calibration* *Description=[Telescope/sky background]*				

Observation

Proposal 2260, Observation 3: TCha Mon Jul 31 18:03:11 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 3:1) Warning (Form): Data Excess over lower threshold

(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)	TCHA	RA: 11 57 13.5269 (179.3063621d) Dec: -79 21 31.52 (-79.35876d) Equinox: J2000		

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

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
F1000W	ALL	NO	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	EXTENDED 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	14	1	Dither 1	4	56	4029.358	
1	SHORT(A)	MRSSHORT		FASTR1	25	14	1	Dither 1	4	56	4029.358	
2	MEDIUM(B)	MRSLONG		FASTR1	25	14	1	Dither 1	4	56	4029.358	
2	MEDIUM(B)	MRSSHORT		FASTR1	25	14	1	Dither 1	4	56	4029.358	
3	LONG(C)	MRSLONG		FASTR1	25	14	1	Dither 1	4	56	4029.358	
3	LONG(C)	MRSSHORT		FASTR1	25	14	1	Dither 1	4	56	4029.358	

Special Requirements	Sequence Observations 3, 5 within 1 Days

Observation

Proposal 2260, Observation 5: TCha_sky Mon Jul 31 18:03:11 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 5:1) Warning (Form): Data Excess over lower threshold

(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(5)	TCHASKY	RA: 11 56 32.0000 (179.1333333d) Dec: -79 20 9.50 (-79.33597d) Equinox: J2000		

Comments:
Category=Calibration
Description=[Telescope/sky background]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
F1000W	ALL	NO	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	EXTENDED 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	14	1	Dither 1	4	56	4029.358	
1	SHORT(A)	MRSSHORT		FASTR1	25	14	1	Dither 1	4	56	4029.358	
2	MEDIUM(B)	MRSLONG		FASTR1	25	14	1	Dither 1	4	56	4029.358	
2	MEDIUM(B)	MRSSHORT		FASTR1	25	14	1	Dither 1	4	56	4029.358	
3	LONG(C)	MRSLONG		FASTR1	25	14	1	Dither 1	4	56	4029.358	
3	LONG(C)	MRSSHORT		FASTR1	25	14	1	Dither 1	4	56	4029.358	

Special Requirements	Sequence Observations 3, 5 within 1 Days

Observation

Proposal 2260, Observation 4: V4046Sgr Mon Jul 31 18:03:11 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 4:1) Warning (Form): Data Excess over lower threshold

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(4)	V4046SGR	RA: 18 14 10.4819 (273.5436746d)	Proper Motion RA: 3.510 mas/yr	
		Dec: -32 47 34.52 (-32.79292d)	Proper Motion Dec: -52.721 mas/yr	
		Equinox: J2000	Epoch of Position: 2016	

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

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
F1500W	ALL	NO	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	EXTENDED 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	30	11	1	Dither 1	4	44	3774.054	
1	LONG(C)	MRSSHORT		FASTR1	30	11	1	Dither 1	4	44	3774.054	
2	MEDIUM(B)	MRSLONG		FASTR1	30	11	1	Dither 1	4	44	3774.054	
2	MEDIUM(B)	MRSSHORT		FASTR1	30	11	1	Dither 1	4	44	3774.054	
3	SHORT(A)	MRSLONG		FASTR1	30	11	1	Dither 1	4	44	3774.054	
3	SHORT(A)	MRSSHORT		FASTR1	30	11	1	Dither 1	4	44	3774.054	

Special Requirements	Sequence Observations 4, 6 within 1 Days

Observation

Proposal 2260, Observation 6: V4046Sgr_sky Mon Jul 31 18:03:11 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 6:1) Warning (Form): Data Excess over lower threshold

(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(6)	V4046SKY	RA: 18 14 10.4900 (273.5437083d) Dec: -32 47 2.40 (-32.78400d) Equinox: J2000		

Comments:
Category=Calibration
Description=[Telescope/sky background]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
F1500W	ALL	NO	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	EXTENDED 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	30	11	1	Dither 1	4	44	3774.054	
1	LONG(C)	MRSSHORT		FASTR1	30	11	1	Dither 1	4	44	3774.054	
2	MEDIUM(B)	MRSLONG		FASTR1	30	11	1	Dither 1	4	44	3774.054	
2	MEDIUM(B)	MRSSHORT		FASTR1	30	11	1	Dither 1	4	44	3774.054	
3	SHORT(A)	MRSLONG		FASTR1	30	11	1	Dither 1	4	44	3774.054	
3	SHORT(A)	MRSSHORT		FASTR1	30	11	1	Dither 1	4	44	3774.054	

Special Requirements	Sequence Observations 4, 6 within 1 Days