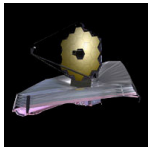

5269 - A Multi-wavelength Survey of Irradiated Disks Around a B-star

Cycle: 3, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
MIRI MRS				
	1	1	MIRI Medium Resolution Spectroscopy	(1) 414-50092
	2	2	MIRI Medium Resolution Spectroscopy	(2) 551-51201
	3	3	MIRI Medium Resolution Spectroscopy	(3) 881-50220
	4	4	MIRI Medium Resolution Spectroscopy	(4) 808-50020
	5	5	MIRI Medium Resolution Spectroscopy	(5) 338-51180
	6	6	MIRI Medium Resolution Spectroscopy	(6) 252-52365
	7	7	MIRI Medium Resolution Spectroscopy	(7) 313-48277

ABSTRACT

Most stars form in clustered environments, with protoplanetary disks exposed to different levels of external irradiation. This means that most planets form in irradiated disks. With this proposal, we aim to carry out a comprehensive, multi-wavelength survey with JWST MIRI MRS and ALMA Band 6 to unveil irradiated disk chemistry—typical disk chemistry—in a holistic manner. We target seven proplyds in NGC 1977, the only ones known to exist around a B star, 42 Ori. These proplyds are assailed by an external UV field 1e4-1e6 times the ISM average, and thus lie in the range where we expect the most significant chemical effects, while planet formation is still possible. Our goals are to explore how the chemical and physical structure

of the inner (< 10 au) and outer disk are affected by the level of FUV/EUV external irradiation. Since volatiles are transported both via gas advection and pebble drift, the outer and inner disk chemistry and structure are intimately linked. Hence, the inner disk chemistry revealed by JWST can only be fully understood in the light of outer disk observations with ALMA. We aim to obtain a complete MIRI MRS spectrum with SNR > 300 to perform a deep search for inner disk ionization (CH3+), photochemistry (H2O/OH, carbon chains, organics), icy pebble drift (hot and cold water vapor), and gas-phase C/O ratio (H2O, CO2, carbon chains) tracers. With ALMA, we propose to observe in 3 settings to obtain high SNR disk-integrated spectra for similar chemical tracers: HCO+ (ionization), HCN/CN ratios (photochemistry), carbon chains and CS/SO (C/O ratios), 13CO and C18O as optically-thin gas tracers, and dust emission to inform pebble drift models.5

OBSERVING DESCRIPTION

We propose to observe seven proplyds with MIRI MRS. The sensitivity was calculated based on observed SED of disks within similar irradiation environments in Orion A. We require 3 integrations of 40 groups in the short wavelength range and 3 integrations of 45 groups in the medium and long ranges to guarantee a SNR > 300 at the continuum throughout channels 1-3, even if fluxes are 50% lower than expected. We do not expect saturation even if the continuum or line emision were 10x brighter than expected. We use a 4-point dither pattern optimized for point sources, as we expect all disks to be unresolved.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	414-50092	RA: 05 35 24.1411 (83.8505879d) Dec: -04 50 9.07 (-4.83585d) Equinox: J2000	Proper Motion RA: 0.284 mas/yr Proper Motion Dec: -1.3650000937559525 mas/yr Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Proplyds, Protoplanetary disks]* *Extended=NO*				
(2)	551-51201	RA: 05 35 25.5150 (83.8563125d) Dec: -04 51 20.65 (-4.85574d) Equinox: J2000	Proper Motion RA: 0.417 mas/yr Proper Motion Dec: -1.2409999044393771 mas/yr Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Proplyds, Protoplanetary disks]* *Extended=NO*				
(3)	881-50220	RA: 05 35 28.8268 (83.8701117d) Dec: -04 50 22.63 (-4.83962d) Equinox: J2000	Proper Motion RA: 0.934 mas/yr Proper Motion Dec: 1.964 mas/yr Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Proplyds, Protoplanetary disks]* *Extended=NO*				
(4)	808-50020	RA: 05 35 28.0760 (83.8669833d) Dec: -04 50 2.06 (-4.83391d) Equinox: J2000	Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Proplyds, Protoplanetary disks]* *Extended=NO*				
(5)	338-51180	RA: 05 35 23.3810 (83.8474208d) Dec: -04 51 18.06 (-4.85502d) Equinox: J2000	Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Proplyds, Protoplanetary disks]* *Extended=NO*				
(6)	252-52365	RA: 05 35 22.5353 (83.8438971d) Dec: -04 52 37.07 (-4.87696d) Equinox: J2000	Proper Motion RA: 1.363 mas/yr Proper Motion Dec: -1.1559999165910995 mas/yr Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Proplyds, Protoplanetary disks]* *Extended=NO*				
(7)	313-48277	RA: 05 35 23.1393 (83.8464137d) Dec: -04 48 27.52 (-4.80764d) Equinox: J2000	Proper Motion RA: 1.068 mas/yr Proper Motion Dec: -1.3540000736611546 mas/yr Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Proplyds, Protoplanetary disks]* *Extended=NO*				

Observation

Proposal 5269, Observation 1: 1

Fri Nov 01 13:00:09 GMT 2024

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)	414-50092	RA: 05 35 24.1411 (83.8505879d)	Proper Motion RA: 0.284 mas/yr	
		Dec: -04 50 9.07 (-4.83585d)	Proper Motion Dec: -1.3650000937559525 mas/yr	
		Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Proplyds, Protoplanetary disks]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
FND	All MRS	YES	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		IMAGER	F560W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
1	SHORT(A)	MRSLONG		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
1	SHORT(A)	MRSSHORT		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
2		IMAGER	F770W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
2	MEDIUM(B)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
2	MEDIUM(B)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3		IMAGER	F1000W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
3	LONG(C)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3	LONG(C)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387

Observation

Proposal 5269, Observation 2: 2

Fri Nov 01 13:00:09 GMT 2024

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)	551-51201	RA: 05 35 25.5150 (83.8563125d)	Proper Motion RA: 0.417 mas/yr	
		Dec: -04 51 20.65 (-4.85574d)	Proper Motion Dec: -1.2409999044393771 mas/yr	
		Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Proplyds, Protoplanetary disks]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
FND	All MRS	YES	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		IMAGER	F560W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
1	SHORT(A)	MRSLONG		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
1	SHORT(A)	MRSSHORT		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
2		IMAGER	F770W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
2	MEDIUM(B)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
2	MEDIUM(B)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3		IMAGER	F1000W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
3	LONG(C)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3	LONG(C)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387

Observation

Proposal 5269, Observation 3: 3

Fri Nov 01 13:00:09 GMT 2024

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)	881-50220	RA: 05 35 28.8268 (83.8701117d)	Proper Motion RA: 0.934 mas/yr	
		Dec: -04 50 22.63 (-4.83962d)	Proper Motion Dec: 1.964 mas/yr	
		Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Proplyds, Protoplanetary disks]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
FND	All MRS	YES	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		IMAGER	F560W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
1	SHORT(A)	MRSLONG		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
1	SHORT(A)	MRSSHORT		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
2		IMAGER	F770W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
2	MEDIUM(B)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
2	MEDIUM(B)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3		IMAGER	F1000W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
3	LONG(C)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3	LONG(C)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387

Observation

Proposal 5269, Observation 4: 4

Fri Nov 01 13:00:09 GMT 2024

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
(4)	808-50020	RA: 05 35 28.0760 (83.8669833d) Dec: -04 50 2.06 (-4.83391d) Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Proplyds, Protoplanetary disks]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
FND	All MRS	YES	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		IMAGER	F560W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
1	SHORT(A)	MRSLONG		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
1	SHORT(A)	MRSSHORT		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
2		IMAGER	F770W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
2	MEDIUM(B)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
2	MEDIUM(B)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3		IMAGER	F1000W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
3	LONG(C)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3	LONG(C)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387

Observation

Proposal 5269, Observation 5: 5

Fri Nov 01 13:00:09 GMT 2024

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(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)	338-51180	RA: 05 35 23.3810 (83.8474208d) Dec: -04 51 18.06 (-4.85502d) Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Proplyds, Protoplanetary disks]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
FND	All MRS	YES	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		IMAGER	F560W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
1	SHORT(A)	MRSLONG		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
1	SHORT(A)	MRSSHORT		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
2		IMAGER	F770W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
2	MEDIUM(B)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
2	MEDIUM(B)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3		IMAGER	F1000W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
3	LONG(C)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3	LONG(C)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387

Observation

Proposal 5269, Observation 6: 6

Fri Nov 01 13:00:09 GMT 2024

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(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)	252-52365	RA: 05 35 22.5353 (83.8438971d)	Proper Motion RA: 1.363 mas/yr	
		Dec: -04 52 37.07 (-4.87696d)	Proper Motion Dec: -1.1559999165910995 mas/yr	
		Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Proplyds, Protoplanetary disks]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
FND	All MRS	YES	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		IMAGER	F560W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
1	SHORT(A)	MRSLONG		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
1	SHORT(A)	MRSSHORT		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
2		IMAGER	F770W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
2	MEDIUM(B)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
2	MEDIUM(B)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3		IMAGER	F1000W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
3	LONG(C)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3	LONG(C)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387

Observation

Proposal 5269, Observation 7: 7

Fri Nov 01 13:00:09 GMT 2024

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(7)	313-48277	RA: 05 35 23.1393 (83.8464137d)	Proper Motion RA: 1.068 mas/yr	
		Dec: -04 48 27.52 (-4.80764d)	Proper Motion Dec: -1.3540000736611546 mas/yr	
		Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Proplyds, Protoplanetary disks]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
FND	All MRS	YES	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		IMAGER	F560W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
1	SHORT(A)	MRSLONG		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
1	SHORT(A)	MRSSHORT		FASTR1	40	3	1	Dither 1	4	12	1354.22	178387
2		IMAGER	F770W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
2	MEDIUM(B)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
2	MEDIUM(B)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3		IMAGER	F1000W	FASTR1	8	2	1	Dither 1	4	8	188.703	178387
3	LONG(C)	MRSLONG		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387
3	LONG(C)	MRSSHORT		FASTR1	45	3	1	Dither 1	4	12	1520.722	178387