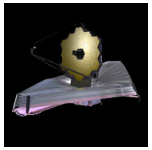

4829 - A spectroscopic exploration of a directly imaged multiplanet system in the mid infrared

Cycle: 3, Proposal Category: GO

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1	MRS on target	MIRI Medium Resolution Spectroscopy	(1) HD-218396
	2	MRS on reference	MIRI Medium Resolution Spectroscopy	(2) HD-218261
	3	MRS on target	MIRI Medium Resolution Spectroscopy	(1) HD-218396
	4	MRS on reference	MIRI Medium Resolution Spectroscopy	(2) HD-218261
	5	MRS on target	MIRI Medium Resolution Spectroscopy	(1) HD-218396
	6	MRS on reference	MIRI Medium Resolution Spectroscopy	(2) HD-218261

ABSTRACT

As the first directly imaged multiplanet system, HR8799 is a prime target for spectral characterization of exoplanet atmospheres. We aim to obtain spatially resolved spectroscopy at high contrast of the HR8799 system with MIRI-MRS to characterize with the very same observing mode, both the planets' atmospheres as well as the inner disk, by providing totally unique information unattainable with other JWST instruments, nor from the ground. MIRI-MRS will detect H2O, CO allowing us to carry out a comprehensive C/O analysis of the four planets at once. It can also possibly detect NH3 which would be unprecedented, and clarify the debate on CH4. Last but not least, MIRI-MRS can identify Silicates clouds for the first time in the atmosphere of young imaged planets.

OBSERVING DESCRIPTION

The observations are obtained with MIRI-MRS on the target, HR8799, using sequentially the 3 grating positions to cover the full spectral range. Exposure times are determine to achieve the detection of the exoplanets in the system as well as the inner disk. The number of groups and integrations are different for the SHORT sub-band and the MEDIUM and LONG sub-bands

A reference star is chosen to subtract the diffraction further. It is observed in the very same mode at HR8799 and should be executed back-to-back. Linking the two observations is actually not a strong requirement, the most important being to obtain the target and reference star observations in the same setup (dithering in particular)

We will be reducing the data with various post processing techniques like molecular mapping (cross correlation of MRS spaxels with atmosphere models) and reference star differential imaging.

Proposal 4829 - Targets - A spectroscopic exploration of a directly imaged multiplanet system in the mid infrared

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HD-218396	RA: 23 07 28.8357 (346.8701487d) Dec: +21 08 2.54 (21.13404d) Equinox: J2000	Proper Motion RA: 0.007739495616806925 sec of time/yr Proper Motion Dec: -0.05003999999644293 arcsec/yr Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Exoplanets, F stars]*				
(2)	HD-218261	RA: 23 06 32.2006 (346.6341692d) Dec: +19 54 39.15 (19.91087d) Equinox: J2000	Proper Motion RA: 0.02034197180624256 sec of time/yr Proper Motion Dec: 0.005057000000000001 arcsec/yr Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[F stars]*				

Observation

Proposal 4829, Observation 1: MRS on target Mon Oct 14 13:00:10 GMT 2024

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

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

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

(MRS on target (Obs 1)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HD-218396	RA: 23 07 28.8357 (346.8701487d) Dec: +21 08 2.54 (21.13404d) Equinox: J2000	Proper Motion RA: 0.007739495616806925 sec of time/yr Proper Motion Dec: -0.05003999999644293 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Exoplanets, F stars]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	1 HD-218396	FND	FAST	10	1	1	27.75	175217.16

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	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	120	8	1	Dither 1	4	32	10733.855	175217
1	SHORT(A)	MRSSHORT		FASTR1	120	8	1	Dither 1	4	32	10733.855	175217

Special Requirements	
	Aperture PA Range 70.0 to 85.0 Degrees (V3 70.0 to 85.0) Offset 0.0 arcsec, -0.5 arcsec Group Observations 1, 2, Non-interruptible Group Observations 1, 2, 3, 4, 5, 6 within 3 Days Same V3 PA 1, 2

Observation

Proposal 4829, Observation 2: MRS on reference

Mon Oct 14 13:00:10 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.

(MRS on reference (Obs 2)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	HD-218261	RA: 23 06 32.2006 (346.6341692d) Dec: +19 54 39.15 (19.91087d) Equinox: J2000	Proper Motion RA: 0.02034197180624256 sec of time/yr Proper Motion Dec: 0.005057000000000001 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[F stars]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	2 HD-218261	FND	FAST	10	1	1	27.75	175217.17

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	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	120	4	1	Dither 1	4	16	5361.377	175217
1	SHORT(A)	MRSSHORT		FASTR1	120	4	1	Dither 1	4	16	5361.377	175217

Special Requirements	Offset 0.0 arcsec, -0.5 arcsec Group Observations 1, 2, Non-interruptible Group Observations 1, 2, 3, 4, 5, 6 within 3 Days Same V3 PA 1, 2

Observation

Proposal 4829, Observation 3: MRS on target

Mon Oct 14 13:00:10 GMT 2024

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.

(MRS on target (Obs 3)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HD-218396	RA: 23 07 28.8357 (346.8701487d) Dec: +21 08 2.54 (21.13404d) Equinox: J2000	Proper Motion RA: 0.007739495616806925 sec of time/yr Proper Motion Dec: -0.05003999999644293 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Exoplanets, F stars]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	1 HD-218396	FND	FAST	10	1	1	27.75	175217.16

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	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	MEDIUM(B)	MRSLONG		FASTR1	120	8	1	Dither 1	4	32	10733.855	175217
1	MEDIUM(B)	MRSSHORT		FASTR1	120	8	1	Dither 1	4	32	10733.855	175217

Special Requirements	
	Aperture PA Range 70.0 to 85.0 Degrees (V3 70.0 to 85.0) Offset 0.0 arcsec, -0.5 arcsec Group Observations 3, 4, Non-interruptible Group Observations 1, 2, 3, 4, 5, 6 within 3 Days Same V3 PA 3, 4

Observation

Proposal 4829, Observation 4: MRS on reference

Mon Oct 14 13:00:10 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.

(MRS on reference (Obs 4)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	HD-218261	RA: 23 06 32.2006 (346.6341692d) Dec: +19 54 39.15 (19.91087d) Equinox: J2000	Proper Motion RA: 0.02034197180624256 sec of time/yr Proper Motion Dec: 0.005057000000000001 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[F stars]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	2 HD-218261	FND	FAST	10	1	1	27.75	175217.17

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	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	MEDIUM(B)	MRSLONG		FASTR1	120	4	1	Dither 1	4	16	5361.377	175217
1	MEDIUM(B)	MRSSHORT		FASTR1	120	4	1	Dither 1	4	16	5361.377	175217

Special Requirements	
	Offset 0.0 arcsec, -0.5 arcsec Group Observations 3, 4, Non-interruptible Group Observations 1, 2, 3, 4, 5, 6 within 3 Days Same V3 PA 3, 4

Observation

Proposal 4829, Observation 5: MRS on target Mon Oct 14 13:00:10 GMT 2024

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.

(MRS on target (Obs 5)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HD-218396	RA: 23 07 28.8357 (346.8701487d) Dec: +21 08 2.54 (21.13404d) Equinox: J2000	Proper Motion RA: 0.007739495616806925 sec of time/yr Proper Motion Dec: -0.05003999999644293 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Exoplanets, F stars]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	1 HD-218396	FND	FAST	10	1	1	27.75	175217.16

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	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	120	8	1	Dither 1	4	32	10733.855	175217
1	LONG(C)	MRSSHORT		FASTR1	120	8	1	Dither 1	4	32	10733.855	175217

Special Requirements	
	Aperture PA Range 70.0 to 85.0 Degrees (V3 70.0 to 85.0) Offset 0.0 arcsec, -0.5 arcsec Group Observations 5, 6, Non-interruptible Group Observations 1, 2, 3, 4, 5, 6 within 3 Days Same V3 PA 5, 6

Observation

Proposal 4829, Observation 6: MRS on reference

Mon Oct 14 13:00:10 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.

(MRS on reference (Obs 6)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	HD-218261	RA: 23 06 32.2006 (346.6341692d) Dec: +19 54 39.15 (19.91087d) Equinox: J2000	Proper Motion RA: 0.02034197180624256 sec of time/yr Proper Motion Dec: 0.005057000000000001 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[F stars]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	2 HD-218261	FND	FAST	10	1	1	27.75	175217.17

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	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	120	4	1	Dither 1	4	16	5361.377	175217
1	LONG(C)	MRSSHORT		FASTR1	120	4	1	Dither 1	4	16	5361.377	175217

Special Requirements	
	Offset 0.0 arcsec, -0.5 arcsec Group Observations 5, 6, Non-interruptible Group Observations 1, 2, 3, 4, 5, 6 within 3 Days Same V3 PA 5, 6