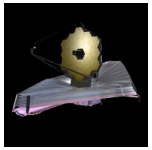

4525 - Observations of the HD169142 system with MIRI

Cycle: 3, Proposal Category: GTO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	2	HD169142-F1065C	MIRI Coronagraphic Imaging	(1) HD-169142
	3	HD169142-BGD	MIRI Coronagraphic Imaging	(2) HD-169142-BACKGROUND
	4	HD170120-F1065C	MIRI Coronagraphic Imaging	(13) HD-170120
	5	HD170120-BGD	MIRI Coronagraphic Imaging	(14) HD-170120-BACKGROUND
	1	HD-169142-MRS	MIRI Medium Resolution Spectroscopy	(6) HD-169142-MRS

ABSTRACT

Understanding the conditions in which planets form requests searching for planets at early evolutionary stages (<10Myr) when they are still embedded in their parent proto-planetary disk. In the first million years young planets are accreting material leading to the formation of a circumplanetary disk (CPD). CPDs are expected to radiate a significant amount of flux at long wavelengths in particular in the mid-IR spectral range (Zhu 2015, Chen & Szulagyi 2022). We propose to target a candidate protoplanet HD169142 b, identified at near-IR with SPHERE (Hammond et al. 2023, Gratton et al. 2019), to test the presence of a CPD. The system is seen face-on with the candidate located in a gap at about 0.32’’. The candidate protoplanet will be observed with the coronagraph mode of MIRI and the disk with the Medium Resolution Mode of MIRI.

OBSERVING DESCRIPTION

To observe the protoplanet in the HD169142 system and determine if a circumplanetary disk (CDP) is present, we will use the coronagraph of MIRI at 10.65 microns. We follow the classical observing approach :

1) target observation and associated background observation to remove the glowstick
2) reference star observation and associated background observation, in order to remove the residuals in the target observations.

According to CPD models, the flux at 10 microns can vary from about 170Jy (contrast = 7.10-5) to a few mJy. Considering the most pessimistic case and assuming the contrast is essentially background limited (for contrast lower than a few 10-5) we could reach a SNR of 12 in 20 minutes of

integrations. We propose to double this time because the CPD could be even fainter if optically thin (Ngroup=500, Nint=20).

To study the disk we use full MRS observations.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HD-169142	RA: 18 24 29.7772 (276.1240717d) Dec: -29 46 49.91 (-29.78053d) Equinox: J2000	Proper Motion RA: -1.793530599894799E-4 sec of time/yr Proper Motion Dec: -0.037878999955864856 arcsec/yr Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Protoplanetary disks]*				
(2)	HD-169142-BACKGROUND	RA: 18 24 39.5000 (276.1645833d) Dec: -29 49 55.00 (-29.83194d) Equinox: J2000		
Comments: *Category=Calibration* *Description=[Telescope/sky background]*				
(6)	HD-169142-MRS	RA: 18 24 29.7800 (276.1240833d) Dec: -29 46 49.33 (-29.78037d) Equinox: J2000	Proper Motion RA: -2.335 mas/yr Proper Motion Dec: -37.878999955864856 mas/yr Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Protoplanetary disks]*				
(13)	HD-170120	RA: 18 28 34.4326 (277.1434692d) Dec: -19 46 30.60 (-19.77517d) Equinox: J2000	Proper Motion RA: -0.985 mas/yr Proper Motion Dec: -1.2150000429755892 mas/yr Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[M stars]*				
(14)	HD-170120-BACKGROUND	RA: 18 28 48.0000 (277.2000000d) Dec: -19 50 18.00 (-19.83833d) Equinox: J2000	Proper Motion RA: -0.985 mas/yr Proper Motion Dec: -1.2150000429755892 mas/yr Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Calibration* *Description=[Telescope/sky background]*				
(15)	TYC-6856-102-1	RA: 18 24 26.0204 (276.1084183d) Dec: -29 47 43.48 (-29.79541d) Equinox: J2000	Proper Motion RA: 2.355 mas/yr Proper Motion Dec: -4.348999982539681 mas/yr Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[K stars]*				

Observation

Proposal 4525, Observation 2: HD169142-F1065C Fri Jul 19 17:00:18 GMT 2024

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Imaging

Background Observations:[HD169142-BGD (Obs 3)]

Diagnostics

(HD169142-F1065C (Obs 2)) Warning (Form): Science observations should be linked to at least one other compatible science observation by an Aperture PA Offset of 1-14 degrees

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HD-169142	RA: 18 24 29.7772 (276.1240717d) Dec: -29 46 49.91 (-29.78053d) Equinox: J2000	Proper Motion RA: -1.793530599894799E-4 sec of time/yr Proper Motion Dec: -0.037878999955864856 arcsec/yr Epoch of Position: 2015.5	

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

Acquisition

#	Target	Filter	Quadrant	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	1	FAST	4	1	1	0.959	156165

Template

Repeat observation
NO

Dithers

#	Dither Type
1	NONE

Spectral Elements

#	Coron Mask/Filter	Subarray	Mask	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	4QPM/F1065C	MASK1065	4QPM	F1065C	FASTR1	500	20	1	1	20	2401.354	156165

PSF References

HD170120-F1065C (Obs 4) (PSF Reference; Filters [F1065C])

Additional Justification: false

Special Requirements	
	Aperture PA Range 79.83544897 to 89.83544897 Degrees (V3 75.0 to 85.0) Aperture PA Range 266.83544897 to 276.83544897 Degrees (V3 262.0 to 272.0) No Parallel Attachments Sequence Observations 1, 2, 3, 4, 5, Non-interruptible

Observation

Proposal 4525, Observation 3: HD169142-BGD Fri Jul 19 17:00:18 GMT 2024

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Imaging

Background Observation For: [HD169142-F1065C (Obs 2)]

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
(2)	HD-169142-BACKGROUND	RA: 18 24 39.5000 (276.1645833d) Dec: -29 49 55.00 (-29.83194d) Equinox: J2000		

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

Acquisition

#	Target
1	NONE

Template

AcqFilter	Repeat observation	Background Quadrant
FND	YES	1

Dithers

#	Dither Type
1	BACKGROUND

Spectral Elements

#	Coron Mask/Filter	Subarray	Mask	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	4QPM/F1065C	MASK1065	4QPM	F1065C	FASTR1	500	20	1	2	40	4802.708	156165

PSF References

Additional Justification: false

Special Requirements	
	No Parallel Attachments Sequence Observations 1, 2, 3, 4, 5, Non-interruptible

Observation

Proposal 4525, Observation 4: HD170120-F1065C Fri Jul 19 17:00:18 GMT 2024

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Imaging

Background Observations:[HD170120-BGD (Obs 5)]

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
(13)	HD-170120	RA: 18 28 34.4326 (277.1434692d)	Proper Motion RA: -0.985 mas/yr	
		Dec: -19 46 30.60 (-19.77517d)	Proper Motion Dec: -1.2150000429755892 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=[M stars]

Acquisition

#	Target	Filter	Quadrant	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	1	FAST	4	1	1	0.959	156165

Template

Repeat observation
NO

Dithers

#	Dither Type
1	9-POINT-SMALL-GRID

Spectral Elements

#	Coron Mask/Filter	Subarray	Mask	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	4QPM/F1065C	MASK1065	4QPM	F1065C	FASTR1	250	4	1	9	36	2163.591	156165

PSF References

PSF Reference: true

Special Requirements	
	No Parallel Attachments Sequence Observations 1, 2, 3, 4, 5, Non-interruptible

Observation

Proposal 4525, Observation 5: HD170120-BGD Fri Jul 19 17:00:18 GMT 2024

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Imaging

Background Observation For: [HD170120-F1065C (Obs 4)]

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
(14)	HD-170120-BACKGROUND	RA: 18 28 48.0000 (277.2000000d)	Proper Motion RA: -0.985 mas/yr	
		Dec: -19 50 18.00 (-19.83833d)	Proper Motion Dec: -1.2150000429755892 mas/yr	
		Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Calibration
Description=[Telescope/sky background]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Repeat observation	Background Quadrant
FND	YES	1

Dithers

#	Dither Type
1	BACKGROUND

Spectral Elements

#	Coron Mask/Filter	Subarray	Mask	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	4QPM/F1065C	MASK1065	4QPM	F1065C	FASTR1	250	4	1	2	8	480.798	156165

PSF References

Additional Justification: false

Special Requirements	
	No Parallel Attachments Sequence Observations 1, 2, 3, 4, 5, Non-interruptible

Observation

Proposal 4525, Observation 1: HD-169142-MRS Fri Jul 19 17:00:18 GMT 2024

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(HD-169142-MRS (Obs 1)) Warning (Form): Imager Filter overlap.

(HD-169142-MRS (Obs 1)) Warning (Form): Imager Filter overlap.

(HD-169142-MRS (Obs 1)) Warning (Form): Imager Filter overlap.

(HD-169142-MRS (Obs 1)) Warning (Form): The slew between the acquisition exposure and the farthest science exposure is 93.908 Arcsec (larger than the recommended limit of 80.000 Arcsec) and may result in reduced or no schedulability. See more information in the diagnostic browser.

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(6)	HD-169142-MRS	RA: 18 24 29.7800 (276.1240833d)	Proper Motion RA: -2.335 mas/yr	
		Dec: -29 46 49.33 (-29.78037d)	Proper Motion Dec: -37.878999955864856 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=[Protoplanetary disks]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	15 TYC-6856-102-1	F1500W	FAST	4	1	1	11.1	156158

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	YES	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		IMAGER	F1280W	FASTR1	6	4	1	Dither 1	4	16	299.704	156158
1	LONG(C)	MRSLONG		FASTR1	6	4	1	Dither 1	4	16	299.704	156158
1	LONG(C)	MRSSHORT		FASTR1	6	4	1	Dither 1	4	16	299.704	156158
2		IMAGER	F1280W	FASTR1	6	4	1	Dither 1	4	16	299.704	156158
2	MEDIUM(B)	MRSLONG		FASTR1	6	4	1	Dither 1	4	16	299.704	156158
2	MEDIUM(B)	MRSSHORT		FASTR1	6	4	1	Dither 1	4	16	299.704	156158
3		IMAGER	F1280W	FASTR1	6	4	1	Dither 1	4	16	299.704	156158
3	SHORT(A)	MRSLONG		FASTR1	6	4	1	Dither 1	4	16	299.704	156158
3	SHORT(A)	MRSSHORT		FASTR1	6	4	1	Dither 1	4	16	299.704	156158

Special Requirements	Sequence Observations 1, 2, 3, 4, 5, Non-interruptible