



1179 - YSO Imaging

Cycle: 1, Proposal Category: GTO

INVESTIGATORS

<i>Name</i>	<i>Institution</i>
Dr. Jarron Michael Leisenring (PI)	University of Arizona
Dr. Marcia J. Rieke (CoI)	University of Arizona
Prof. Michael R. Meyer (CoI)	University of Michigan
Dr. Thomas P. Greene (CoI)	NASA Ames Research Center
Dr. Alexandra Greenbaum (CoI)	California Institute of Technology
Dr. Charles A. Beichman (CoI)	Jet Propulsion Laboratory
Dr. Doug Johnstone (CoI) (CSA Member)	National Research Council of Canada
Dr. Karl Misselt (CoI)	University of Arizona

OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
SAO-206462				
	2	SAO-206462-R1_SUB160	NIRCam Imaging	(1) SAO-206462
	3	SAO-206462-R2_SUB160	NIRCam Imaging	(1) SAO-206462
TW-HYA				
	5	TW-HYA-R1_M335R	NIRCam Coronagraphic Imaging	(2) TW-HYA
	8	TW-HYA-R2_M335R	NIRCam Coronagraphic Imaging	(2) TW-HYA
MWC-758				
	10	MWC-758-R1_SUB160	NIRCam Imaging	(3) MWC-758
	11	MWC-758-R2_SUB160	NIRCam Imaging	(3) MWC-758

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
HL-TAU				
	14	HL-TAU-R1_SUB160	NIRCam Imaging	(4) HL-TAU
	15	HL-TAU-R2_SUB160	NIRCam Imaging	(4) HL-TAU
PDS-70				
	18	PDS-70_R1_SUB160	NIRCam Imaging	(5) PDS-70
	19	PDS-70-R2_SUB160	NIRCam Imaging	(5) PDS-70

ABSTRACT

A complex myriad of physical processes contribute to the planet formation, likely including collisional growth of solids, particle aggregation in pressure bumps, non-linear solid growth, rapid gas accretion onto critical cores, and subsequent orbital migration. While a tremendous amount of information has been gathered over the past 30 years concerning the structure and evolution of circumstellar disks, practically no empirical constraints exist on the dominant physical processes at play in gas giant planet formation. The best way to test predictive theories is to observe planets in formation, and characterize them in terms of i) temperature, luminosity, orbital location, possibly accretion rates, ii) nature of any attendant circumplanetary disks, and iii) local physical conditions of the circumstellar disk.

We propose to search for and characterize forming protoplanets in the outer orbital regions of circumstellar disks around five carefully chosen young stellar objects: a) two with strong evidence for protoplanets based on previous observations and theoretical modelling of symmetric two arm spiral features (SAO 206462 and MWC 758); b) two with observed multiple rings of emission in both thermal emission and scattered light (TW Hya and HL Tau); c) one with two known sources with accretion signatures (PDS 70). While our main goal is the detection of forming protoplanets as compact objects, we will also be sensitive to extended thermal emission.

The Near-Infrared Camera (NIRCam) onboard the James Webb Space Telescope (JWST) will provide images of the surrounding circumstellar regions, searching for companions at unmatched sensitivities of Saturn masses in the outer regions of the disk. Simultaneous observations of the NIRCam's Short-Wave (SW) and Long-Wave (LW) channels will allow us to characterize any discovered objects. Coupled with recent advances in planet formation theory along with observational constraints from ground-based high contrast imaging, JWST presents the best opportunity to search for and characterize embedded protoplanets while constraining the physical conditions of the disks.

OBSERVING DESCRIPTION

JWST Proposal 1179 (Created: Friday, November 3, 2023 at 10:00:11 AM Eastern Standard Time) - Overview

We will observe NIRCcam sub-array images (direct imaging) of SAO 206462, TW Hya, MWC 758, HL Tau, and PDS 70. Given the anticipated IR excess within the LW NIRCcam bands, there were no suitable PSF reference stars available that would allow sufficient color matching for optimal subtraction. Instead, each source will be observed in two rolls positions with an offset of ~ 10 degrees. Due to the narrow core of the direct imaging PSF, self-subtraction effects are minimized past $0.5''$. To increase efficiency of the program, MWC 758 and HL Tau observations have been linked as non-interruptible.

We will use NIRCcam in direct imaging mode, searching for potential protoplanets and extended thermal emission in F410M. Detailed simulations have shown that direct imaging observations can detect objects ~ 2 magnitudes fainter than similar coronagraphic observations assuming the same amount of allocated time. The shortwave filter F200W will be used to determine colors and provide clues as to whether any detected candidates are actual planets in formation, extended disk features, or background stars. Complementary images in narrow-band hydrogen filters, F187N (Pa-alpha) and F405N (Br-alpha) will allow us to search for line emission features, which could be indicative of accretion onto the protoplanets.

We have chosen the medium band filter, as opposed to F444W to avoid full saturation of the PSF while maximizing emission from potential exoplanets. In addition, observations are mostly acquired in SUB160P for the more favorable frame times. However, this small subarray limits the effective FoV, ranging anywhere between $1.5''$ to $8''$, depending on the wavelength channel and source position. Because the majority of the sources are beyond 100pc , the physical scales we are interested in probing will still fit within the observed window.

Given the brightness of these sources, we expect to partially saturate the core of the PSF in all bands. While latents are a concern, they have been shown to be relatively well-behaved in the NIRCcam flight detectors. In addition, the relatively short integration times and relatively long dither times prevent significant latent emission from building up and sticking around to harass subsequent integrations and exposures.

Update: For TW Hya, we have switched to use coronagraphic mode in order to search for planets in the face-on disk. ALMA observations suggest the formation of orbital gaps at locations that are far exterior to the coronagraphs' inner working angle. The use of mask and Lyot stop attenuation will suppress the stellar flux and remove concerns from saturation that lead to charge migration that complicate the data analysis.

Proposal 1179 - Targets - YSO Imaging

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	SAO-206462	RA: 15 15 48.4459 (228.9518579d) Dec: -37 09 16.03 (-37.15445d) Equinox: J2000	Proper Motion RA: -19.114 mas/yr Proper Motion Dec: -23.140 mas/yr Parallax: 0.0073655" Epoch of Position: 2000	
<p><i>Comments: Protoplanet predicted at $r \sim 0.6''$, $PA=10$ (Dong et al. 2015)</i> <i>sptype = F8V</i> <i>K, W1, W2 = (5.8, 5.0, 4.0)</i> <i>dist = 135 pc</i> <i>Category=Star</i> <i>Description=[Circumstellar disks, Exoplanet Systems, Young stellar objects]</i></p>				
(2)	TW-HYA	RA: 11 01 51.9054 (165.4662725d) Dec: -34 42 17.03 (-34.70473d) Equinox: J2000	Proper Motion RA: -68.389 mas/yr Proper Motion Dec: -14.016 mas/yr Parallax: 0.0166428" Epoch of Position: 2000	
<p><i>Comments: Transition disk, ALMA observations show rings, gaps</i> <i>sptype = K6Ve</i> <i>K, W1, W2 = (7.3, 7.0, 6.9)</i> <i>dist = 60 pc</i> <i>Category=Star</i> <i>Description=[Circumstellar disks, T Tauri stars, Young stellar objects]</i></p>				
(3)	MWC-758	RA: 05 30 27.5287 (82.6147029d) Dec: +25 19 57.08 (25.33252d) Equinox: J2000	Proper Motion RA: 3.586 mas/yr Proper Motion Dec: -26.751 mas/yr Parallax: 0.0062405" Epoch of Position: 2000	
<p><i>Comments: Protoplanet predicted at $r \sim 0.7''$, $PA=10$ (Dong et al. 2015); also NIRISS NRM target</i> <i>sptype = A8V/F0V</i> <i>K, W1, W2 = (5.8, 4.6, 3.5)</i> <i>dist = 160 pc</i> <i>Category=Star</i> <i>Description=[Circumstellar disks, Herbig Ae/Be stars, Protoplanetary disks, Young stellar objects]</i></p>				
(4)	HL-TAU	RA: 04 31 38.4370 (67.9101542d) Dec: +18 13 57.65 (18.23268d) Equinox: J2000	Proper Motion RA: 8.0 mas/yr Proper Motion Dec: -21.8 mas/yr Parallax: 0.006791" Epoch of Position: 2000	
<p><i>Comments: sptype = K5</i> <i>K, W1, W2 = (7.4, 5.2, 3.3)</i> <i>dist = 147 pc</i> <i>Coordinates have not yet been updated from Gaia</i> <i>Parallax is from VLBA (https://arxiv.org/pdf/1805.09357.pdf)</i> <i>Category=Star</i> <i>Description=[Circumstellar disks, Protoplanetary disks, T Tauri stars, Young stellar objects]</i></p>				
(5)	PDS-70	RA: 14 08 10.1545 (212.0423104d) Dec: -41 23 52.58 (-41.39794d) Equinox: J2000	Proper Motion RA: -29.661 mas/yr Proper Motion Dec: -23.823 mas/yr Parallax: 0.0088159" Epoch of Position: 2000	
<p><i>Comments: Protoplanets detected at $r_{th_arr} = [(0.18,150), (0.25,280)]$ # sep (asec), PA</i> <i>sptype = K7IVe</i> <i>K, W1, W2 = (8.8, 8.0, 7.7)</i> <i>dist = 113 pc</i> <i>Category=Star</i> <i>Description=[Circumstellar disks, Exoplanet Systems, Protoplanetary disks, T Tauri stars, Young stellar objects]</i></p>				

Fixed Targets

Proposal 1179 - Observation 2 - YSO Imaging

Fri Nov 03 15:00:11 GMT 2023

Observation	<p>Proposal 1179, Observation 2: SAO-206462-R1_SUB160</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Imaging</p>									
Diagnostics	<p>(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(SAO-206462-R1_SUB160 (Obs 2)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(1)	SAO-206462	RA: 15 15 48.4459 (228.9518579d) Dec: -37 09 16.03 (-37.15445d) Equinox: J2000		Proper Motion RA: -19.114 mas/yr Proper Motion Dec: -23.140 mas/yr Parallax: 0.0073655" Epoch of Position: 2000					
	<p><i>Comments: Protoplanet predicted at r~0.6", PA=10 (Dong et al. 2015)</i></p> <p><i>sptype = F8V</i></p> <p><i>K, W1, W2 = (5.8, 5.0, 4.0)</i></p> <p><i>dist = 135 pc</i></p> <p><i>Category=Star</i></p> <p><i>Description=[Circumstellar disks, Exoplanet Systems, Young stellar objects]</i></p>									
Template	Module		Subarray			Target Placement				
	B		SUB160P			Module Gap				
Dithers	#	Primary Dither Type		Primary Dithers	Subpixel Dither Type		Dither Size	Subpixel Positions		
	1	SUBARRAY_DITHER		4	STANDARD			1		
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
	1	F187N	F405N+F444W	RAPID	10	120	480	4	1473.677	
	2	F200W	F410M	RAPID	10	120	480	4	1473.677	
Special Requirements	<p>Sequence Observations 2, 3, Non-interruptible</p> <p>Aperture PA Offset 3 from 2 by 10 to 15 Degrees (Same offsets in V3)</p>									

Proposal 1179 - Observation 3 - YSO Imaging

Fri Nov 03 15:00:11 GMT 2023

Observation	<p>Proposal 1179, Observation 3: SAO-206462-R2_SUB160</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Imaging</p>									
Diagnostics	<p>(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(SAO-206462-R2_SUB160 (Obs 3)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(1)	SAO-206462	RA: 15 15 48.4459 (228.9518579d) Dec: -37 09 16.03 (-37.15445d) Equinox: J2000		Proper Motion RA: -19.114 mas/yr Proper Motion Dec: -23.140 mas/yr Parallax: 0.0073655" Epoch of Position: 2000					
	<p><i>Comments: Protoplanet predicted at r~0.6", PA=10 (Dong et al. 2015)</i></p> <p><i>sptype = F8V</i></p> <p><i>K, W1, W2 = (5.8, 5.0, 4.0)</i></p> <p><i>dist = 135 pc</i></p> <p><i>Category=Star</i></p> <p><i>Description=[Circumstellar disks, Exoplanet Systems, Young stellar objects]</i></p>									
Template	Module		Subarray			Target Placement				
	B		SUB160P			Module Gap				
Dithers	#	Primary Dither Type		Primary Dithers	Subpixel Dither Type		Dither Size	Subpixel Positions		
	1	SUBARRAY_DITHER		4	STANDARD			1		
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
	1	F187N	F405N+F444W	RAPID	10	120	480	4	1473.677	
	2	F200W	F410M	RAPID	10	120	480	4	1473.677	
Special Requirements	<p>Sequence Observations 2, 3, Non-interruptible</p> <p>Aperture PA Offset 3 from 2 by 10 to 15 Degrees (Same offsets in V3)</p>									

Proposal 1179 - Observation 5 - YSO Imaging

Fri Nov 03 15:00:11 GMT 2023

Observation	<p>Proposal 1179, Observation 5: TW-HYA-R1_M335R</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p>									
Diagnostics	<p>(TW-HYA-R1_M335R (Obs 5)) Warning (Form): By checking 'Additional justification', this observation is identified as part of a self reference survey. Remember to provide justification for this in the technical description text of your PDF attachment.</p> <p>(TW-HYA-R1_M335R (Obs 5)) Warning (Form): The NO PARALLEL ATTACHMENTS requirement is expected for NIRCcam Coronagraphic Imaging.</p> <p>(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(TW-HYA-R1_M335R (Obs 5)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections			Miscellaneous			
	(2)	TW-HYA	RA: 11 01 51.9054 (165.4662725d) Dec: -34 42 17.03 (-34.70473d) Equinox: J2000	Proper Motion RA: -68.389 mas/yr Proper Motion Dec: -14.016 mas/yr Parallax: 0.0166428" Epoch of Position: 2000						
	<p><i>Comments: Transition disk, ALMA observations show rings, gaps</i></p> <p><i>sptype = K6Ve</i></p> <p><i>K, W1, W2 = (7.3, 7.0, 6.9)</i></p> <p><i>dist = 60 pc</i></p> <p><i>Category=Star</i></p> <p><i>Description=/Circumstellar disks, T Tauri stars, Young stellar objects]</i></p>									
Acquisition	#	Target	Filter	Target Brightness	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	SAME	F335M	FAINT	RAPID	5	1	1	0.304	152156
Template	Module		Coronagraphic Mask		Obtain Astrometric Confirmation Images?		Subarray		Dither Pattern	
	A		MASK335R		true		SUB320A335R		NONE	
Confirmation	#	Conf. Readout Pattern		Conf. Groups/Int	Conf. Integrations/Exp		Conf. Total Integrations	Conf. Total Exposure Time	Conf. Total Dithers	
	1	RAPID		5	3		3	182.525	1	
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	F187N	F356W	MEDIUM8	10	16	1	16	1693.687	
	2	F200W	F444W	MEDIUM8	10	16	1	16	1693.687	

Proposal 1179 - Observation 5 - YSO Imaging

PSF References	TW-HYA-R2_M335R (Obs 8) (Filters [F200W/F444W, F187N/F356W]) Additional Justification: true
Special Requirements	Offset -0.006 arcsec, 0.002 arcsec Sequence Observations 5, 8, Non-interruptible Aperture PA Offset 8 from 5 by 10 to 14 Degrees (Same offsets in V3)

Proposal 1179 - Observation 8 - YSO Imaging

Fri Nov 03 15:00:11 GMT 2023

Observation	Proposal 1179, Observation 8: TW-HYA-R2_M335R Diagnostic Status: Warning Observing Template: NIRCcam Coronagraphic Imaging																																							
Diagnostics	(TW-HYA-R2_M335R (Obs 8)) Warning (Form): By checking 'Additional justification', this observation is identified as part of a self reference survey. Remember to provide justification for this in the technical description text of your PDF attachment. (TW-HYA-R2_M335R (Obs 8)) Warning (Form): The NO PARALLEL ATTACHMENTS requirement is expected for NIRCcam Coronagraphic Imaging. (Visit 8:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. (TW-HYA-R2_M335R (Obs 8)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.																																							
Fixed Targets	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(2)</td> <td>TW-HYA</td> <td>RA: 11 01 51.9054 (165.4662725d) Dec: -34 42 17.03 (-34.70473d) Equinox: J2000</td> <td>Proper Motion RA: -68.389 mas/yr Proper Motion Dec: -14.016 mas/yr Parallax: 0.0166428" Epoch of Position: 2000</td> <td></td> </tr> </tbody> </table> <p><i>Comments: Transition disk, ALMA observations show rings, gaps</i> <i>sptype = K6Ve</i> <i>K, W1, W2 = (7.3, 7.0, 6.9)</i> <i>dist = 60 pc</i> <i>Category=Star</i> <i>Description= Circumstellar disks, T Tauri stars, Young stellar objects </i></p>										#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous	(2)	TW-HYA	RA: 11 01 51.9054 (165.4662725d) Dec: -34 42 17.03 (-34.70473d) Equinox: J2000	Proper Motion RA: -68.389 mas/yr Proper Motion Dec: -14.016 mas/yr Parallax: 0.0166428" Epoch of Position: 2000																					
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1	SAME	F335M	FAINT	RAPID	5	1	1	0.304	152156																															
Template	<table border="1"> <thead> <tr> <th>Module</th> <th>Coronagraphic Mask</th> <th>Obtain Astrometric Images?</th> <th>Subarray</th> <th>Dither Pattern</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>MASK335R</td> <td>true</td> <td>SUB320A335R</td> <td>NONE</td> </tr> </tbody> </table>										Module	Coronagraphic Mask	Obtain Astrometric Images?	Subarray	Dither Pattern	A	MASK335R	true	SUB320A335R	NONE																				
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1	RAPID	5	3	3	182.525	1																																		
Spectral Elements	<table border="1"> <thead> <tr> <th>#</th> <th>Short Filter</th> <th>Long Filter</th> <th>Readout Pattern</th> <th>Groups/Int</th> <th>Integrations/Exp</th> <th>Total Dithers</th> <th>Total Integrations</th> <th>Total Exposure Time</th> <th>ETC Wkbk.Calc ID</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>F187N</td> <td>F356W</td> <td>MEDIUM8</td> <td>10</td> <td>16</td> <td>1</td> <td>16</td> <td>1693.687</td> <td></td> </tr> <tr> <td>2</td> <td>F200W</td> <td>F444W</td> <td>MEDIUM8</td> <td>10</td> <td>16</td> <td>1</td> <td>16</td> <td>1693.687</td> <td></td> </tr> </tbody> </table>										#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	1	F187N	F356W	MEDIUM8	10	16	1	16	1693.687		2	F200W	F444W	MEDIUM8	10	16	1	16	1693.687	
#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID																															
1	F187N	F356W	MEDIUM8	10	16	1	16	1693.687																																
2	F200W	F444W	MEDIUM8	10	16	1	16	1693.687																																

Proposal 1179 - Observation 8 - YSO Imaging

PSF References	TW-HYA-R1_M335R (Obs 5) (Filters [F200W/F444W, F187N/F356W]) Additional Justification: true
Special Requirements	Offset -0.006 arcsec, 0.002 arcsec Sequence Observations 5, 8, Non-interruptible Aperture PA Offset 8 from 5 by 10 to 14 Degrees (Same offsets in V3)

Proposal 1179 - Observation 10 - YSO Imaging

Fri Nov 03 15:00:11 GMT 2023

Observation	Proposal 1179, Observation 10: MWC-758-R1_SUB160 Diagnostic Status: Warning Observing Template: NIRCcam Imaging									
Diagnostics	(Visit 10:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. (MWC-758-R1_SUB160 (Obs 10)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(3)	MWC-758	RA: 05 30 27.5287 (82.6147029d) Dec: +25 19 57.08 (25.33252d) Equinox: J2000		Proper Motion RA: 3.586 mas/yr Proper Motion Dec: -26.751 mas/yr Parallax: 0.0062405" Epoch of Position: 2000					
	<i>Comments: Protoplanet predicted at r~0.7", PA=10 (Dong et al. 2015); also NIRISS NRM target</i> <i>sptype = A8V/FOV</i> <i>K, W1, W2 = (5.8, 4.6, 3.5)</i> <i>dist = 160 pc</i> <i>Category=Star</i> <i>Description=[Circumstellar disks, Herbig Ae/Be stars, Protoplanetary disks, Young stellar objects]</i>									
Template	Module		Subarray			Target Placement				
	B		SUB160P			Module Gap				
Dithers	#	Primary Dither Type		Primary Dithers	Subpixel Dither Type		Dither Size	Subpixel Positions		
	1	SUBARRAY_DITHER		4	STANDARD			1		
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
	1	F187N	F405N+F444W	RAPID	10	120	480	4	1473.677	
	2	F200W	F410M	RAPID	10	120	480	4	1473.677	
Special Requirements	Group Observations 10, 11, 14, 15, Non-interruptible Aperture PA Offset 11 from 10 by 10 to 15 Degrees (Same offsets in V3)									

Proposal 1179 - Observation 11 - YSO Imaging

Fri Nov 03 15:00:11 GMT 2023

Observation	<p>Proposal 1179, Observation 11: MWC-758-R2_SUB160</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Imaging</p>									
Diagnostics	<p>(Visit 11:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(MWC-758-R2_SUB160 (Obs 11)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(3)	MWC-758	RA: 05 30 27.5287 (82.6147029d) Dec: +25 19 57.08 (25.33252d) Equinox: J2000		Proper Motion RA: 3.586 mas/yr Proper Motion Dec: -26.751 mas/yr Parallax: 0.0062405" Epoch of Position: 2000					
	<p><i>Comments: Protoplanet predicted at r~0.7", PA=10 (Dong et al. 2015); also NIRISS NRM target</i></p> <p><i>sptype = A8V/FOV</i></p> <p><i>K, W1, W2 = (5.8, 4.6, 3.5)</i></p> <p><i>dist = 160 pc</i></p> <p><i>Category=Star</i></p> <p><i>Description=[Circumstellar disks, Herbig Ae/Be stars, Protoplanetary disks, Young stellar objects]</i></p>									
Template	Module		Subarray				Target Placement			
	B		SUB160P				Module Gap			
Dithers	#	Primary Dither Type		Primary Dithers	Subpixel Dither Type		Dither Size	Subpixel Positions		
	1	SUBARRAY_DITHER		4	STANDARD			1		
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
	1	F187N	F405N+F444W	RAPID	10	120	480	4	1473.677	
	2	F200W	F410M	RAPID	10	120	480	4	1473.677	
Special Requirements	<p>Group Observations 10, 11, 14, 15, Non-interruptible</p> <p>Aperture PA Offset 11 from 10 by 10 to 15 Degrees (Same offsets in V3)</p>									

Proposal 1179 - Observation 14 - YSO Imaging

Fri Nov 03 15:00:11 GMT 2023

Observation	<p>Proposal 1179, Observation 14: HL-TAU-R1_SUB160</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Imaging</p>									
Diagnostics	<p>(Visit 14:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(HL-TAU-R1_SUB160 (Obs 14)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Miscellaneous			
	(4)	HL-TAU	RA: 04 31 38.4370 (67.9101542d) Dec: +18 13 57.65 (18.23268d) Equinox: J2000		Proper Motion RA: 8.0 mas/yr Proper Motion Dec: -21.8 mas/yr Parallax: 0.006791" Epoch of Position: 2000					
	<p><i>Comments: sptype = K5</i> <i>K, W1, W2 = (7.4, 5.2, 3.3)</i> <i>dist = 147 pc</i> <i>Coordinates have not yet been updated from Gaia</i> <i>Parallax is from VLBA (https://arxiv.org/pdf/1805.09357.pdf)</i> <i>Category=Star</i> <i>Description=[Circumstellar disks, Protoplanetary disks, T Tauri stars, Young stellar objects]</i></p>									
Template	Module		Subarray			Target Placement				
	B		SUB160P			Module Gap				
Dithers	#	Primary Dither Type		Primary Dithers	Subpixel Dither Type		Dither Size	Subpixel Positions		
	1	SUBARRAY_DITHER		4	STANDARD			1		
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
	1	F187N	F405N+F444W	RAPID	10	120	480	4	1473.677	
	2	F200W	F410M	RAPID	10	120	480	4	1473.677	

Proposal 1179 - Observation 14 - YSO Imaging

Special Requirements

Group Observations 10, 11, 14, 15, Non-interruptible
Aperture PA Offset 15 from 14 by 10 to 15 Degrees (Same offsets in V3)

Proposal 1179 - Observation 15 - YSO Imaging

Fri Nov 03 15:00:11 GMT 2023

Observation	<p>Proposal 1179, Observation 15: HL-TAU-R2_SUB160</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Imaging</p>									
Diagnostics	<p>(Visit 15:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(HL-TAU-R2_SUB160 (Obs 15)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Miscellaneous			
	(4)	HL-TAU	RA: 04 31 38.4370 (67.9101542d) Dec: +18 13 57.65 (18.23268d) Equinox: J2000		Proper Motion RA: 8.0 mas/yr Proper Motion Dec: -21.8 mas/yr Parallax: 0.006791" Epoch of Position: 2000					
	<p><i>Comments: sptype = K5</i> <i>K, W1, W2 = (7.4, 5.2, 3.3)</i> <i>dist = 147 pc</i> <i>Coordinates have not yet been updated from Gaia</i> <i>Parallax is from VLBA (https://arxiv.org/pdf/1805.09357.pdf)</i> <i>Category=Star</i> <i>Description=[Circumstellar disks, Protoplanetary disks, T Tauri stars, Young stellar objects]</i></p>									
Template	Module		Subarray			Target Placement				
	B		SUB160P			Module Gap				
Dithers	#	Primary Dither Type		Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions			
	1	SUBARRAY_DITHER		4	STANDARD		1			
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
	1	F187N	F405N+F444W	RAPID	10	120	480	4	1473.677	
	2	F200W	F410M	RAPID	10	120	480	4	1473.677	

Proposal 1179 - Observation 15 - YSO Imaging

Special Requirements

Group Observations 10, 11, 14, 15, Non-interruptible
Aperture PA Offset 15 from 14 by 10 to 15 Degrees (Same offsets in V3)

Proposal 1179 - Observation 18 - YSO Imaging

Fri Nov 03 15:00:11 GMT 2023

Observation	<p>Proposal 1179, Observation 18: PDS-70_R1_SUB160</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Imaging</p>									
Diagnostics	<p>(Visit 18:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(PDS-70_R1_SUB160 (Obs 18)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(5)	PDS-70	RA: 14 08 10.1545 (212.0423104d) Dec: -41 23 52.58 (-41.39794d) Equinox: J2000		Proper Motion RA: -29.661 mas/yr Proper Motion Dec: -23.823 mas/yr Parallax: 0.0088159" Epoch of Position: 2000					
	<p><i>Comments: Protoplanets detected at rth_arr = [(0.18,150), (0.25,280)] # sep (asec), PA</i></p> <p><i>sptype = K7IVe</i></p> <p><i>K, W1, W2 = (8.8, 8.0, 7.7)</i></p> <p><i>dist = 113 pc</i></p> <p><i>Category=Star</i></p> <p><i>Description=[Circumstellar disks, Exoplanet Systems, Protoplanetary disks, T Tauri stars, Young stellar objects]</i></p>									
Template	Module		Subarray			Target Placement				
	B		SUB160P			Module Gap				
Dithers	#	Primary Dither Type		Primary Dithers	Subpixel Dither Type		Dither Size	Subpixel Positions		
	1	SUBARRAY_DITHER		4	STANDARD			1		
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
	1	F187N	F405N+F444W	RAPID	10	120	480	4	1473.677	
	2	F200W	F410M	RAPID	10	120	480	4	1473.677	
Special Requirements	<p>Sequence Observations 18, 19, Non-interruptible</p> <p>Aperture PA Offset 19 from 18 by 10 to 14 Degrees (Same offsets in V3)</p>									

Proposal 1179 - Observation 19 - YSO Imaging

Fri Nov 03 15:00:11 GMT 2023

Observation	Proposal 1179, Observation 19: PDS-70-R2_SUB160 Diagnostic Status: Warning Observing Template: NIRCcam Imaging																																								
Diagnostics	(Visit 19:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. (PDS-70-R2_SUB160 (Obs 19)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.																																								
Fixed Targets	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th colspan="3">Targ. Coord. Corrections</th> <th colspan="4">Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(5)</td> <td>PDS-70</td> <td>RA: 14 08 10.1545 (212.0423104d) Dec: -41 23 52.58 (-41.39794d) Equinox: J2000</td> <td>Proper Motion RA: -29.661 mas/yr</td> <td>Proper Motion Dec: -23.823 mas/yr</td> <td>Parallax: 0.0088159"</td> <td>Epoch of Position: 2000</td> <td colspan="4"></td> </tr> <tr> <td colspan="10"> <i>Comments: Protoplanets detected at rth_arr = [(0.18,150), (0.25,280)] # sep (asec), PA sptype = K7IVe K, W1, W2 = (8.8, 8.0, 7.7) dist = 113 pc Category=Star Description=[Circumstellar disks, Exoplanet Systems, Protoplanetary disks, T Tauri stars, Young stellar objects]</i> </td> </tr> </tbody> </table>										#	Name	Target Coordinates	Targ. Coord. Corrections			Miscellaneous				(5)	PDS-70	RA: 14 08 10.1545 (212.0423104d) Dec: -41 23 52.58 (-41.39794d) Equinox: J2000	Proper Motion RA: -29.661 mas/yr	Proper Motion Dec: -23.823 mas/yr	Parallax: 0.0088159"	Epoch of Position: 2000					<i>Comments: Protoplanets detected at rth_arr = [(0.18,150), (0.25,280)] # sep (asec), PA sptype = K7IVe K, W1, W2 = (8.8, 8.0, 7.7) dist = 113 pc Category=Star Description=[Circumstellar disks, Exoplanet Systems, Protoplanetary disks, T Tauri stars, Young stellar objects]</i>									
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