



4558 - Establishing the Formation of AF Lep b with NIRCam: The Lowest-Mass Imaged Exoplanet with a Dynamical Mass

Cycle: 2, Proposal Category: DD

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OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
AF Lep Sequence				
	1	AF Lep coron (roll angle 1)	NIRCam Coronagraphic Imaging	(1) AF_Lep
	2	AF Lep coron (roll angle 2)	NIRCam Coronagraphic Imaging	(1) AF_Lep
	3	PSF calibrator for AF Lep	NIRCam Coronagraphic Imaging	(2) HD_33093
AF Lep Sequence-WOPR copy				
	4	AF Lep coron (roll angle 1)-WOPR copy	NIRCam Coronagraphic Imaging	(1) AF_Lep
	5	AF Lep coron (roll angle 2)-WOPR copy	NIRCam Coronagraphic Imaging	(1) AF_Lep
	6	PSF calibrator for AF Lep-WOPR copy	NIRCam Coronagraphic Imaging	(2) HD_33093
AF Lep Sequence-WOPR copy 2				
	7	AF Lep coron (roll angle 1)-WOPR copy	NIRCam Coronagraphic Imaging	(1) AF_Lep
	8	AF Lep coron (roll angle 2)-WOPR copy	NIRCam Coronagraphic Imaging	(1) AF_Lep
	9	PSF calibrator for AF Lep-WOPR copy	NIRCam Coronagraphic Imaging	(2) HD_33093

ABSTRACT

AF Lep b is a recently discovered young (24 Myr) giant planet with a dynamical mass of 3 Jupiter masses and semi-major axis of 8 au. Among about two-dozen imaged planets, AF Lep b is the lowest mass planet with a dynamical mass measurement and the closest analog to Jupiter. There are early signs that the dynamical mass is discrepant with predictions from evolutionary models, which may be caused by delayed formation in a disk and would make the planet younger than its host star. Confirming this discrepancy requires an accurate bolometric luminosity from photometry at thermal wavelengths (3-5 micron). Here we propose JWST/NIRCam imaging during a narrow window of observability in Cycle 2 to empirically constrain the key molecular absorbers (e.g., CH₄, CO) and overall shape of AF Lep b’s 3-5 micron emission. This will establish the bolometric luminosity of this planet and determine whether its metallicity and C/O ratios are enhanced relative to the host star. By precisely constraining its bolometric luminosity, this program will determine if there is robust evidence of a delayed formation for AF Lep b – the first such measurement for any

exoplanet. Orbit fits of AF Lep b indicate that by Cycle 3, there is a high likelihood that the planet will have moved too close to its host star to be successfully recovered. Director's Discretionary Time is therefore required for this program to successfully observe this system within a narrow upcoming visibility window. This may be our only opportunity to obtain JWST imaging of this exciting planet during the JWST mission lifetime.

OBSERVING DESCRIPTION

The goal of this proposal is to image the recently discovered 3 Jupiter mass giant planet AF Lep b during a narrow window of observability (Sep. 7, 2023 - Nov. 11, 2023) with JWST/NIRCam. Orbit fits indicate that this planet is moving closer to its host star. While it is observable in Cycle 2, there is a high likelihood that this planet will be too close to its host star by Cycle 3 to be successfully recovered with JWST. To maximize our chances of imaging AF Lep b, these observations should be carried out as soon as possible in Cycle 2. To this end, we have added a scheduling requirement that these observations are carried out before November 12, 2023. To sample the planet's 3-5 micron emission, we will observe in F444W and F356W, with simultaneous observations in F200W. Imaging will be taken of AF Lep b at two roll angles separated by ~10 degrees, followed by a nearby PSF calibrator with a similar spectral type to our science target. These observations are scheduled as a non-interruptible sequence to mitigate wavefront drift and thermal changes.

Proposal 4558 - Targets - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dynamic...

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	AF_Lep	RA: 05 27 4.7633 (81.7698471d) Dec: -11 54 3.47 (-11.90096d) Equinox: J2000	Proper Motion RA: 16.915 mas/yr Proper Motion Dec: -49.318 mas/yr Epoch of Position: 2000	
<i>Comments:</i> <i>Category=Star</i> <i>Description=[F stars]</i>					
(2)	HD_33093	RA: 05 07 24.9632 (76.8540133d) Dec: -12 29 28.57 (-12.49127d) Equinox: J2000	Proper Motion RA: 135.782 mas/yr Proper Motion Dec: -107.306 mas/yr Epoch of Position: 2000		
<i>Comments:</i> <i>Category=Star</i> <i>Description=[G stars]</i>					

Proposal 4558 - Observation 1 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

Wed Apr 23 19:00:19 GMT 2025

Observation	<p>Proposal 4558, Observation 1: AF Lep coron (roll angle 1)</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p>									
Diagnostics	<p>(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(AF Lep coron (roll angle 1) (Obs 1)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(1)	AF_Lep	RA: 05 27 4.7633 (81.7698471d) Dec: -11 54 3.47 (-11.90096d) Equinox: J2000		Proper Motion RA: 16.915 mas/yr Proper Motion Dec: -49.318 mas/yr Epoch of Position: 2000					
	<p><i>Comments:</i> <i>Category=Star</i> <i>Description=[F stars]</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	BRIGHT (ND Square)	SHALLOW4	17	1	1	4.266	161120
Template	Module		Occulting 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		4	1	1	42.947	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	F200W	F444W	SHALLOW4	5	35	1	35	936.127	161120
	2	F200W	F356W	SHALLOW4	5	35	1	35	936.127	161120

Proposal 4558 - Observation 1 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

PSF References	PSF calibrator for AF Lep (Obs 3) (PSF Reference; Filters [F200W/F356W, F200W/F444W]) Additional Justification: false
Special Requirements	Before Date 12-NOV-2023:00:00:00 Offset -0.01 arcsec, 0.006 arcsec No Parallel Attachments Sequence Observations 1, 2, 3, Non-interruptible Aperture PA Offset 2 from 1 by 10 to 14 Degrees (Same offsets in V3)

Proposal 4558 - Observation 2 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

Wed Apr 23 19:00:19 GMT 2025

Observation	<p>Proposal 4558, Observation 2: AF Lep coron (roll angle 2)</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p>									
Diagnostics	<p>(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(AF Lep coron (roll angle 2) (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)	AF_Lep	RA: 05 27 4.7633 (81.7698471d) Dec: -11 54 3.47 (-11.90096d) Equinox: J2000		Proper Motion RA: 16.915 mas/yr Proper Motion Dec: -49.318 mas/yr Epoch of Position: 2000					
	<p><i>Comments:</i> Category=Star Description=[F stars]</p>									
Acquisition	#	Target	Filter	Target Brightness	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	SAME	F335M	BRIGHT (ND Square)	SHALLOW4	17	1	1	4.266	161120
Template	Module		Occulting 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		4	1		1	42.947	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	F200W	F444W	SHALLOW4	5	35	1	35	936.127	161120
	2	F200W	F356W	SHALLOW4	5	35	1	35	936.127	161120

Proposal 4558 - Observation 2 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

PSF References	PSF calibrator for AF Lep (Obs 3) (PSF Reference; Filters [F200W/F356W, F200W/F444W]) Additional Justification: false
Special Requirements	Before Date 12-NOV-2023:00:00:00 Offset -0.01 arcsec, 0.006 arcsec No Parallel Attachments Sequence Observations 1, 2, 3, Non-interruptible Aperture PA Offset 2 from 1 by 10 to 14 Degrees (Same offsets in V3)

Proposal 4558 - Observation 3 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

Wed Apr 23 19:00:19 GMT 2025

Observation	Proposal 4558, Observation 3: PSF calibrator for AF Lep Diagnostic Status: Warning Observing Template: NIRCcam Coronagraphic Imaging									
	(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_33093	RA: 05 07 24.9632 (76.8540133d) Dec: -12 29 28.57 (-12.49127d) Equinox: J2000		Proper Motion RA: 135.782 mas/yr Proper Motion Dec: -107.306 mas/yr Epoch of Position: 2000					
Comments: Category=Star Description=[G stars]										
Acquisition	#	Target	Filter	Target Brightness	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	SAME	F335M	BRIGHT (ND Square)	SHALLOW4	17	1	1	4.266	161120
Template	Module		Occulting Mask		Obtain Astrometric Confirmation Images?		Subarray		Dither Pattern	
	A		MASK335R		true		SUB320A335R		9-POINT-CIRCLE	
Confirmation	#	Conf. Readout Pattern		Conf. Groups/Int	Conf. Integrations/Exp		Conf. Total Integrations	Conf. Total Exposure Time	Conf. Total Dithers	
	1	RAPID		4	1		1	42.947	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	F200W	F444W	SHALLOW4	5	14	9	126	3370.056	161120
	2	F200W	F356W	SHALLOW4	5	13	9	117	3129.338	161120

Proposal 4558 - Observation 3 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

PSF References	PSF Reference: true
Special Requirements	Before Date 12-NOV-2023:00:00:00 Offset -0.01 arcsec, 0.006 arcsec No Parallel Attachments Sequence Observations 1, 2, 3, Non-interruptible

Proposal 4558 - Observation 4 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

Wed Apr 23 19:00:19 GMT 2025

Observation	<p>Proposal 4558, Observation 4: AF Lep coron (roll angle 1)-WOPR copy</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p>									
Diagnostics	<p>(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(AF Lep coron (roll angle 1)-WOPR copy (Obs 4)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(1)	AF_Lep	RA: 05 27 4.7633 (81.7698471d) Dec: -11 54 3.47 (-11.90096d) Equinox: J2000		Proper Motion RA: 16.915 mas/yr Proper Motion Dec: -49.318 mas/yr Epoch of Position: 2000					
	<p><i>Comments:</i> <i>Category=Star</i> <i>Description=[F stars]</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	BRIGHT (ND Square)	SHALLOW4	17	1	1	4.266	161120
Template	Module		Occulting 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		4	1		1	42.947	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	F200W	F444W	SHALLOW4	5	35	1	35	936.127	161120
	2	F200W	F356W	SHALLOW4	5	35	1	35	936.127	161120

Proposal 4558 - Observation 4 - Establishing the Formation of AF Lep b with NIRCam: The Lowest-Mass Imaged Exoplanet with a Dy...

PSF References	PSF calibrator for AF Lep-WOPR copy (Obs 6) (PSF Reference; Filters [F200W/F356W, F200W/F444W]) Additional Justification: false
Special Requirements	Before Date 12-NOV-2023:00:00:00 Offset -0.01 arcsec, 0.006 arcsec No Parallel Attachments Sequence Observations 4, 5, 6, Non-interruptible Aperture PA Offset 5 from 4 by 10 to 14 Degrees (Same offsets in V3)

Proposal 4558 - Observation 5 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

Wed Apr 23 19:00:19 GMT 2025

Observation	<p>Proposal 4558, Observation 5: AF Lep coron (roll angle 2)-WOPR copy</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p>									
Diagnostics	<p>(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(AF Lep coron (roll angle 2)-WOPR copy (Obs 5)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(1)	AF_Lep	RA: 05 27 4.7633 (81.7698471d) Dec: -11 54 3.47 (-11.90096d) Equinox: J2000		Proper Motion RA: 16.915 mas/yr Proper Motion Dec: -49.318 mas/yr Epoch of Position: 2000					
	<i>Comments:</i> Category=Star Description=[F stars]									
Acquisition	#	Target	Filter	Target Brightness	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	SAME	F335M	BRIGHT (ND Square)	SHALLOW4	17	1	1	4.266	161120
Template	Module		Occulting 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		4	1		1	42.947	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	F200W	F444W	SHALLOW4	5	35	1	35	936.127	161120
	2	F200W	F356W	SHALLOW4	5	35	1	35	936.127	161120

Proposal 4558 - Observation 5 - Establishing the Formation of AF Lep b with NIRCam: The Lowest-Mass Imaged Exoplanet with a Dy...

PSF References	PSF calibrator for AF Lep-WOPR copy (Obs 6) (PSF Reference; Filters [F200W/F356W, F200W/F444W]) Additional Justification: false
Special Requirements	Before Date 12-NOV-2023:00:00:00 Offset -0.01 arcsec, 0.006 arcsec No Parallel Attachments Sequence Observations 4, 5, 6, Non-interruptible Aperture PA Offset 5 from 4 by 10 to 14 Degrees (Same offsets in V3)

Proposal 4558 - Observation 6 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

Wed Apr 23 19:00:19 GMT 2025

Observation	Proposal 4558, Observation 6: PSF calibrator for AF Lep-WOPR copy Diagnostic Status: Warning Observing Template: NIRCcam Coronagraphic Imaging									
	(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(2)	HD_33093	RA: 05 07 24.9632 (76.8540133d) Dec: -12 29 28.57 (-12.49127d) Equinox: J2000		Proper Motion RA: 135.782 mas/yr Proper Motion Dec: -107.306 mas/yr Epoch of Position: 2000					
Comments: Category=Star Description=[G stars]										
Acquisition	#	Target	Filter	Target Brightness	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	SAME	F335M	BRIGHT (ND Square)	SHALLOW4	17	1	1	4.266	161120
Template	Module		Occulting Mask		Obtain Astrometric Confirmation Images?		Subarray		Dither Pattern	
	A		MASK335R		true		SUB320A335R		9-POINT-CIRCLE	
Confirmation	#	Conf. Readout Pattern		Conf. Groups/Int	Conf. Integrations/Exp	Conf. Total Integrations	Conf. Total Exposure Time	Conf. Total Dithers		
	1	RAPID		4	1	1	42.947	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	F200W	F444W	SHALLOW4	5	14	9	126	3370.056	161120
	2	F200W	F356W	SHALLOW4	5	13	9	117	3129.338	161120

Proposal 4558 - Observation 6 - Establishing the Formation of AF Lep b with NIRCam: The Lowest-Mass Imaged Exoplanet with a Dy...

PSF References	PSF Reference: true
Special Requirements	Before Date 12-NOV-2023:00:00:00 Offset -0.01 arcsec, 0.006 arcsec No Parallel Attachments Sequence Observations 4, 5, 6, Non-interruptible

Proposal 4558 - Observation 7 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

Wed Apr 23 19:00:19 GMT 2025

Observation	<p>Proposal 4558, Observation 7: AF Lep coron (roll angle 1)-WOPR copy</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p>									
Diagnostics	<p>(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(AF Lep coron (roll angle 1)-WOPR copy (Obs 7)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(1)	AF_Lep	RA: 05 27 4.7633 (81.7698471d) Dec: -11 54 3.47 (-11.90096d) Equinox: J2000		Proper Motion RA: 16.915 mas/yr Proper Motion Dec: -49.318 mas/yr Epoch of Position: 2000					
	<p><i>Comments:</i> Category=Star Description=[F stars]</p>									
Acquisition	#	Target	Filter	Target Brightness	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	SAME	F335M	BRIGHT (ND Square)	SHALLOW4	65	1	1	16.305	161120
Template	Module		Occulting 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	4	1	1	42.947	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	F200W	F444W	SHALLOW4	5	35	1	35	936.127	161120
	2	F200W	F356W	SHALLOW4	5	35	1	35	936.127	161120

Proposal 4558 - Observation 7 - Establishing the Formation of AF Lep b with NIRCam: The Lowest-Mass Imaged Exoplanet with a Dy...

PSF References	PSF calibrator for AF Lep-WOPR copy (Obs 9) (PSF Reference; Filters [F200W/F356W, F200W/F444W]) Additional Justification: false
Special Requirements	Offset -0.01 arcsec, 0.006 arcsec No Parallel Attachments Sequence Observations 7, 8, 9, Non-interruptible Aperture PA Offset 8 from 7 by 10 to 14 Degrees (Same offsets in V3)

Proposal 4558 - Observation 8 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

Wed Apr 23 19:00:19 GMT 2025

Observation	<p>Proposal 4558, Observation 8: AF Lep coron (roll angle 2)-WOPR copy</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p>									
Diagnostics	<p>(Visit 8:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(AF Lep coron (roll angle 2)-WOPR copy (Obs 8)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(1)	AF_Lep	RA: 05 27 4.7633 (81.7698471d) Dec: -11 54 3.47 (-11.90096d) Equinox: J2000		Proper Motion RA: 16.915 mas/yr Proper Motion Dec: -49.318 mas/yr Epoch of Position: 2000					
	<p><i>Comments:</i> Category=Star Description=[F stars]</p>									
Acquisition	#	Target	Filter	Target Brightness	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	SAME	F335M	BRIGHT (ND Square)	SHALLOW4	65	1	1	16.305	161120
Template	Module		Occulting 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		4	1		1	42.947	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	F200W	F444W	SHALLOW4	5	35	1	35	936.127	161120
	2	F200W	F356W	SHALLOW4	5	35	1	35	936.127	161120

Proposal 4558 - Observation 8 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

PSF References	PSF calibrator for AF Lep-WOPR copy (Obs 9) (PSF Reference; Filters [F200W/F356W, F200W/F444W]) Additional Justification: false
Special Requirements	Offset -0.01 arcsec, 0.006 arcsec No Parallel Attachments Sequence Observations 7, 8, 9, Non-interruptible Aperture PA Offset 8 from 7 by 10 to 14 Degrees (Same offsets in V3)

Proposal 4558 - Observation 9 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

Wed Apr 23 19:00:19 GMT 2025

Observation	Proposal 4558, Observation 9: PSF calibrator for AF Lep-WOPR copy Diagnostic Status: Warning Observing Template: NIRCcam Coronagraphic Imaging									
	(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(2)	HD_33093	RA: 05 07 24.9632 (76.8540133d) Dec: -12 29 28.57 (-12.49127d) Equinox: J2000		Proper Motion RA: 135.782 mas/yr Proper Motion Dec: -107.306 mas/yr Epoch of Position: 2000					
Comments: Category=Star Description=[G stars]										
Acquisition	#	Target	Filter	Target Brightness	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	SAME	F335M	BRIGHT (ND Square)	SHALLOW4	65	1	1	16.305	161120
Template	Module		Occulting Mask		Obtain Astrometric Confirmation Images?		Subarray		Dither Pattern	
	A		MASK335R		true		SUB320A335R		9-POINT-CIRCLE	
Confirmation	#	Conf. Readout Pattern	Conf. Groups/Int	Conf. Integrations/Exp	Conf. Total Integrations	Conf. Total Exposure Time	Conf. Total Dithers			
	1	RAPID	4	1	1	42.947	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	F200W	F444W	SHALLOW4	5	15	9	135	3610.775	161120
	2	F200W	F356W	SHALLOW4	5	15	9	135	3610.775	161120

Proposal 4558 - Observation 9 - Establishing the Formation of AF Lep b with NIRCcam: The Lowest-Mass Imaged Exoplanet with a Dy...

PSF References	PSF Reference: true
Special Requirements	Offset -0.01 arcsec, 0.006 arcsec No Parallel Attachments Sequence Observations 7, 8, 9, Non-interruptible