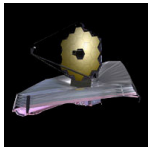

4451 - NIRCam Dual Channel Coronagraphy: Inner Working Angle & Contrast Optimization

Cycle: 2, Proposal Category: CAL/NIRCAM

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
MASKLWB - NARROW				
	1	51 Eri - NIRCam - MASKLWB - NARROW	NIRCam Coronagraphic Imaging	(1) 51-Eri
	2	Ref star - NIRCam - MASKLWB - NARROW	NIRCam Coronagraphic Imaging	(2) HD30562
MASKLWB				
	3	51 Eri - NIRCam - MASKLWB	NIRCam Coronagraphic Imaging	(1) 51-Eri
	4	Ref star - NIRCam - MASKLWB	NIRCam Coronagraphic Imaging	(2) HD30562

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
MASKSWB - NARROW				
	5	51 Eri - NIRCam - MASKSWB - NARROW	NIRCam Coronagraphic Imaging	(1) 51-Eri
	6	Ref star - NIRCam - MASKSWB - NARROW	NIRCam Coronagraphic Imaging	(2) HD30562
MASKSWB				
	7	51 Eri - NIRCam - MASKSWB	NIRCam Coronagraphic Imaging	(1) 51-Eri
	8	Ref star - NIRCam - MASKSWB	NIRCam Coronagraphic Imaging	(2) HD30562
MASK210R				
	9	51 Eri - NIRCam - MASK210R	NIRCam Coronagraphic Imaging	(1) 51-Eri
	10	Ref star - NIRCam - MASK210R	NIRCam Coronagraphic Imaging	(2) HD30562
CLEAR				
	11	51 Eri - NIRCam - CLEAR	NIRCam Imaging	(1) 51-Eri
	12	Ref star - NIRCam - CLEAR	NIRCam Imaging	(2) HD30562

ABSTRACT

This program aims at determining the best strategies to use for most high contrast science cases where NIRCam coronagraphy is considered. The primary goals are to provide the community with: (1) advice on observation strategies, e.g., when (not) to use the bar, when to use the small round mask, etc., and (2) information about NIRCam Coronagraph performance.

The measurements will also feed a public and documented PSF library and will be complementary to the GTO 1412: "Characterizing 51 Eridani Exoplanetary System". The 51 Eri b exoplanet is ideal for this calibration program because it very challenging both in flux and angular separation. This program should be carried out once all target acquisitions are optimized (TA centroiding algorithm, small angle manoeuver repeatability). Having the dual SW/LW coronagraphy will also provide insight about the data collected on the non-optimized channel. We will use results from this program to refine and calibrate our simulation tools (pyNRC and PanCAKE). The ultimate goal is to build an interactive tool similar to JIST for NIRCam Coronagraphs (which can then be expanded to MIRI Coronagraphs).

This calibration program may change in response to system developments and the final Cycle 2 science program.

OBSERVING DESCRIPTION

METHOD:

Testing the small Inner Working Angle (IWA) setups against each other and in the fairest manner

GTO 1412 made use of the MASKLWB mask at the fiducial pointing override position “NARROW”.

Since it is a lot of setups and we want to mitigate the total time, we will NOT use roll subtraction and we will choose readouts that yield ~800s on source for 51 Eri and ~800-900s on source total for the reference star with small grid dithers (SGD, 60 to 100s per position depending on the number from 5 to 9).
Also, it has been demonstrated that sensitivity at small IWA (typically < 1”) does not improve much with exposure time (Fig. 1) and so we can make this program very efficient, spending about only ~800-900s per filter.
- We will do 9-pt SGD for the round masks and 5-pt for the bar mask, the max possible as RDI with SGD proved to be the winning strategy for the best contrast and detection limits at small IWA (Girard et al. 2022 and Carter et al. 2023 in prep).

- We will do 3 filters each time (LW and SW):
o SW wavelength: best IWA, F250M paired with F182M
o Nominal wavelength: TA, done often (PID 1441 commissioning), F210M and F335M paired with F210M
o Large wavelength: best for detectability of exoplanets but least adapted to small mask and biggest lambda/D, 480M, paired with 200W). F444W is the best for detectability but yields saturation on the PSF side lobes and core

Note: we are NOT using ALL masks. We are not using MASK430R which is not a small IWA setup and not using MASK335R because it has already be characterized (though not with the SW channel).

TARGET(s):

Beside measuring a contrast curve, we want to test the “usability” of the mode. Indeed, PSF subtraction residuals in the speckle limited regime can be messy and the contrast measurement alone does not reflect entirely the ability of a given data set to recover a faint companion. There is often a

degree of ambiguity, especially in zones where the transmission is heavily reduced by the edge of the coronagraphic mask as to whether a brighter blob is a real point source, a speckle, an unfiltered bad pixel enhanced by the post-processing algorithm, etc. The unocculted coronagraphic PSF itself has a shape with side lobes which are different between round and bar configurations. Though the bar masks are design to operate down to 4 lambda/D and the round mask down to 6 lambda/D, we, so far, have found the data from the round mask “cleaner” and easier to interpret. Of course, the amount of bar data has been limited and rather sub-optimal due to target acquisition errors that we think will be fixed before undertaking this program.

The best option for a known companion at very high contrast and small separation is:

51 Eri: Kmag~4.5. Planet b at ~0.31” with Kmag~18, extremely challenging + Reference Star HD30562 Kmag~4.3. Same target as GTO 1412 (done in MASKLWB NARROW only with LW filters: F335M, F410M, F430M, F460M)
Macintosh et al. 2014, Rajan et al. 2017
Good: Challenging Separation, adequate PA (scheduling, orientation).
So so: Super challenging contrast (might only be detected in a couple LW filters).
It’s a science target (data will be public and redundant but might need coordination with PI Perrin, at STScI). The analysis of this program will not be published or made available to the community before the GTO program has published their data.

Other, not ideal backup options:

HD206893: Kmag~5.6 (F star). Brown Dwarf B at ~0.3” with Kmag~15, (9-10 mag at 2µm 7-8 mag at 4µm), easy+ Reference Star HD205827 Kmag~5.4 (K star). Same target as Cycle 1 GO/CAL 1843 (NIRISS AMI, F480M in common).
Milli et al. 2016, Delorme et al. 2017, (has an inner planet but not detectable with NIRCam/Coronagraphy < 0.1”)
Good: Challenging Separation
So so: Easy contrast
Bad: Position Angle not adequate for the bar (always ~aligned/behind)=> not good for a fair comparison Round/Bar. It’s a science target (data will be public and redundant but might need coordination with NIRISS/AMI PI Kammer/PID 1843, at STScI).

Separations and PAs can be checked for given observing dates at
http://whereistheplanet.com

HD114174: Kmag~5.2 (G star). White Dwarf B at ~0.45-0.49” with Kmag~15.5, (~10 mag at ~3μm), easy+ Reference Star HD 111733 K~5.1 (G star). Same target as Commissioning NRC-31 1441 (MASK335R and MASKLWB, F335M only the latter common).
Crepp et al. 2014, Gratton et al. 2021
Good: Not a science target, easy to schedule, already done in Commissioning.
Bad: Separation (~0.5”) slightly too large to test smallest IWA.

As for now the APT program is designed with 51 Eri but we can easily change it to HD206893 (less challenging though not a great target for the bars are the companion is almost behind it) or HD114174.

Testing the small IWA setups against each other and in the fairest manner

GTO 1412 made use of the MASKLWB mask at the fiducial pointing override position “NARROW” which is the narrowest end of the LW bar mask. The idea was to access the smallest IWA possible, yet make use of the LW advantage for young, luminous, giant exoplanet detectability.

We hence want to test other coronagraphic setups with similar IWA capability on the same system to answer questions that arose in the community already at the Cycle 2 deadline and will arise again in subsequent cycles.

The end goal is to have complete, “extrapolatable” contrast lookup tables for all masks, filters, field positions around the mask, TA errors, saturation levels. It would take too long to acquire all the data on-sky but if we “align” our simulation tools (surely pyNRC, maybe PanCAKE) to on-sky observations (in terms of PSF shape and photometry), we can simulate everything and even have the capacity of implementing a tool like JIST but for coronagraphy (not existent).

Finally we also want to test those small IWA coronagraphic configuration against:
- CLEAR imaging with the SUB64P mode (4 NB filters with good Nyquist sampling) and marginal saturation in the center (5 to 10 pixels)
- NIRISS AMI (Cycle 1 CAL PID 1843)

Keep building a legacy PSF reference library

We are still at the early stages of science operations with JWST. There were not so many NIRCam Coronagraphy approved programs in ERS/GTO/Cycle 1 and most of them used the same modes:

1. MASK335R and LW filters
2. MASK430R (only 1 program)
3. MASKLWB: 3 programs with sub-optimal data
4. MASK210R: 1 or 2 programs (to be verified)
5. CLEAR: we also want to test a non-coronagraphic setup

In cycle 2 the target acquisition (TA) repeatability and error should be improved (current activities to modify the centroiding algorithm parameter AND to determine the global bias error for each mask).
It will be a good time to produce PSFs in all settings and populate a legacy PSF reference library that can be used when the TA failed on the reference star or as complement to get better reference differential imaging (RDI) which is the post-processing technique of choice in the official (Coron3) and community (e.g. spaceKLIP) level3 pipelines.

Note: Special Requirement offsets for optimal TA accuracies will be updated in June, once the analysis of Prog 1482 is 100% complete.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	51-Eri	RA: 04 37 36.1782 (69.4007425d) Dec: -02 28 25.77 (-2.47382d) Equinox: J2000	Proper Motion RA: 0.002939339332594827 sec of time/yr Proper Motion Dec: -0.06402799995157693 arcsec/yr Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *K~4.5* *Category=Star* *Description=[F stars]*				
(2)	HD30562	RA: 04 48 36.7084 (72.1529517d) Dec: -05 40 30.41 (-5.67511d) Equinox: J2000	Proper Motion RA: 0.02086265595178922 sec of time/yr Proper Motion Dec: -0.2488340000354583 arcsec/yr Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *K~4.3* *Category=Star* *Description=[G stars]*				

Observation

Proposal 4451, Observation 1: 51 Eri - NIRCam - MASKLWB - NARROW Thu Sep 07 21:00:59 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Coronagraphic Imaging

Diagnostics

(51 Eri - NIRCam - MASKLWB - NARROW (Obs 1)) Warning (Form): The selected fiducial point is not a standard option for the instrument.

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

(Visit 1:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	51-Eri	RA: 04 37 36.1782 (69.4007425d) Dec: -02 28 25.77 (-2.47382d) Equinox: J2000	Proper Motion RA: 0.002939339332594827 sec of time/yr Proper Motion Dec: -0.06402799995157693 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.5
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	1 51-Eri	F335M	BRIGHT (ND Square)	BRIGHT2	65	1	1	6.574	40834.5

Template

Module	Coronagraphic Mask	Obtain Astrometric Confirmation Images?	Subarray	Dither Pattern
A	MASKLWB	true	SUB400X256ALWB	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	F210M	F335M	BRIGHT2	10	40	1	40	893.706	
2	F182M	F250M	BRIGHT2	10	40	1	40	893.706	
3	F200W	F480M	BRIGHT2	8	50	1	50	904.54	

PSF References	Ref star - NIRCam - MASKLWB - NARROW (Obs 2) (PSF Reference; Filters [F200W/F480M, F182M/F250M, F210M/F335M]) Additional Justification: false
Special Requirements	Aperture PA Range 273 to 294 Degrees (V3 272.46789991 to 293.46789991) Offset 0.0 arcsec, -0.03 arcsec No Parallel Attachments Fiducial Point Override NRCA5_MASKLWB_NARROW Sequence Observations 1, 2, Non-interruptible

Observation

Proposal 4451, Observation 2: Ref star - NIRCam - MASKLWB - NARROW Thu Sep 07 21:00:59 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Coronagraphic Imaging

Diagnostics

(Ref star - NIRCam - MASKLWB - NARROW (Obs 2)) Warning (Form): The selected fiducial point is not a standard option for the instrument.

(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)	HD30562	RA: 04 48 36.7084 (72.1529517d) Dec: -05 40 30.41 (-5.67511d) Equinox: J2000	Proper Motion RA: 0.02086265595178922 sec of time/yr Proper Motion Dec: -0.2488340000354583 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.3
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	2 HD30562	F335M	BRIGHT (ND Square)	BRIGHT2	65	1	1	6.574	40834.11

Template

Module	Coronagraphic Mask	Obtain Astrometric Confirmation Images?	Subarray	Dither Pattern
A	MASKLWB	true	SUB400X256ALWB	5-POINT-BAR

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	F210M	F335M	BRIGHT2	10	8	5	40	893.706	
2	F182M	F250M	BRIGHT2	10	8	5	40	893.706	
3	F200W	F480M	BRIGHT2	8	9	5	45	814.086	

PSF References	PSF Reference: true
Special Requirements	Offset 0.0 arcsec, -0.03 arcsec No Parallel Attachments Fiducial Point Override NRCA5_MASKLWB_NARROW Sequence Observations 1, 2, Non-interruptible

Observation

Proposal 4451, Observation 3: 51 Eri - NIRCam - MASKLWB Thu Sep 07 21:00:59 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Coronagraphic Imaging

Diagnostics

(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Visit 3:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	51-Eri	RA: 04 37 36.1782 (69.4007425d) Dec: -02 28 25.77 (-2.47382d) Equinox: J2000	Proper Motion RA: 0.002939339332594827 sec of time/yr Proper Motion Dec: -0.06402799995157693 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.5
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	1 51-Eri	F335M	BRIGHT (ND Square)	BRIGHT2	65	1	1	6.574	40834.5

Template

Module	Coronagraphic Mask	Obtain Astrometric Confirmation Images?	Subarray	Dither Pattern
A	MASKLWB	true	SUB400X256ALWB	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	F210M	F335M	BRIGHT2	10	40	1	40	893.706	
2	F182M	F250M	BRIGHT2	10	40	1	40	893.706	
3	F200W	F480M	BRIGHT2	8	50	1	50	904.54	

PSF References	Ref star - NIRCam - MASKLWB (Obs 4) (PSF Reference; Filters [F200W/F480M, F182M/F250M, F210M/F335M]) Additional Justification: false
Special Requirements	Aperture PA Range 273 to 294 Degrees (V3 272.49340382 to 293.49340382) Offset 0.0 arcsec, 0.045 arcsec No Parallel Attachments Sequence Observations 3, 4, Non-interruptible

Observation

Proposal 4451, Observation 4: Ref star - NIRCam - MASKLWB

Thu Sep 07 21:00:59 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Coronagraphic Imaging

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
(2)	HD30562	RA: 04 48 36.7084 (72.1529517d) Dec: -05 40 30.41 (-5.67511d) Equinox: J2000	Proper Motion RA: 0.02086265595178922 sec of time/yr Proper Motion Dec: -0.2488340000354583 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.3
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	2 HD30562	F335M	BRIGHT (ND Square)	BRIGHT2	65	1	1	6.574	40834.11

Template

Module	Coronagraphic Mask	Obtain Astrometric Confirmation Images?	Subarray	Dither Pattern
A	MASKLWB	true	SUB400X256ALWB	5-POINT-BAR

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	F210M	F335M	BRIGHT2	10	8	5	40	893.706	
2	F182M	F250M	BRIGHT2	10	8	5	40	893.706	
3	F200W	F480M	BRIGHT2	8	9	5	45	814.086	

PSF References	PSF Reference: true
Special Requirements	Offset 0.0 arcsec, 0.045 arcsec No Parallel Attachments Sequence Observations 3, 4, Non-interruptible

Observation

Proposal 4451, Observation 5: 51 Eri - NIRCam - MASKSWB - NARROW Thu Sep 07 21:00:59 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Coronagraphic Imaging

Diagnostics

(51 Eri - NIRCam - MASKSWB - NARROW (Obs 5)) Warning (Form): The selected fiducial point is not a standard option for the instrument.

(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Visit 5:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	51-Eri	RA: 04 37 36.1782 (69.4007425d) Dec: -02 28 25.77 (-2.47382d) Equinox: J2000	Proper Motion RA: 0.002939339332594827 sec of time/yr Proper Motion Dec: -0.06402799995157693 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.5
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	1 51-Eri	F210M	BRIGHT (ND Square)	BRIGHT2	33	1	1	12.199	40834.5

Template

Module	Coronagraphic Mask	Obtain Astrometric Confirmation Images?	Subarray	Dither Pattern
A	MASKSWB	true	SUB640ASWB	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	F210M	F335M	RAPID	8	23	1	23	866.94	
2	F182M	F250M	RAPID	10	19	1	19	875.23	
3	F200W	F480M	RAPID	5	35	1	35	879.743	

PSF References	Ref star - NIRCam - MASKSWB - NARROW (Obs 6) (PSF Reference; Filters [F200W/F480M, F182M/F250M, F210M/F335M]) Additional Justification: false
Special Requirements	Aperture PA Range 273 to 294 Degrees (V3 273.14254008 to 294.14254008) Offset 0.0 arcsec, -0.04 arcsec No Parallel Attachments Fiducial Point Override NRCA4_MASKSWB_NARROW Sequence Observations 5, 6, Non-interruptible

Observation

Proposal 4451, Observation 6: Ref star - NIRCam - MASKSWB - NARROW Thu Sep 07 21:00:59 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Coronagraphic Imaging

Diagnostics

(Ref star - NIRCam - MASKSWB - NARROW (Obs 6)) Warning (Form): The selected fiducial point is not a standard option for the instrument.

(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)	HD30562	RA: 04 48 36.7084 (72.1529517d) Dec: -05 40 30.41 (-5.67511d) Equinox: J2000	Proper Motion RA: 0.02086265595178922 sec of time/yr Proper Motion Dec: -0.2488340000354583 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.3
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	2 HD30562	F210M	BRIGHT (ND Square)	BRIGHT2	33	1	1	12.199	40834.11

Template

Module	Coronagraphic Mask	Obtain Astrometric Confirmation Images?	Subarray	Dither Pattern
A	MASKSWB	true	SUB640ASWB	5-POINT-BAR

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	F210M	F335M	RAPID	7	5	5	25	837.68	
2	F182M	F250M	RAPID	10	4	5	20	921.294	
3	F200W	F480M	RAPID	5	7	5	35	879.743	

PSF References	PSF Reference: true
Special Requirements	Offset 0.0 arcsec, -0.04 arcsec No Parallel Attachments Fiducial Point Override NRCA4_MASKSWB_NARROW Sequence Observations 5, 6, Non-interruptible

Observation

Proposal 4451, Observation 7: 51 Eri - NIRCam - MASKSWB Thu Sep 07 21:01:00 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Coronagraphic Imaging

Diagnostics

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

(Visit 7:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	51-Eri	RA: 04 37 36.1782 (69.4007425d) Dec: -02 28 25.77 (-2.47382d) Equinox: J2000	Proper Motion RA: 0.002939339332594827 sec of time/yr Proper Motion Dec: -0.06402799995157693 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.5
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	1 51-Eri	F210M	BRIGHT (ND Square)	BRIGHT2	33	1	1	12.199	40834.5

Template

Module	Coronagraphic Mask	Obtain Astrometric Confirmation Images?	Subarray	Dither Pattern
A	MASKSWB	true	SUB640ASWB	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	F210M	F335M	RAPID	8	23	1	23	866.94	
2	F182M	F250M	RAPID	10	19	1	19	875.23	
3	F200W	F480M	RAPID	5	35	1	35	879.743	

PSF References	Ref star - NIRCam - MASKSWB (Obs 8) (PSF Reference; Filters [F200W/F480M, F182M/F250M, F210M/F335M]) Additional Justification: false
Special Requirements	Aperture PA Range 273 to 294 Degrees (V3 273.08750368 to 294.08750368) Offset 0.0 arcsec, -0.006 arcsec No Parallel Attachments Sequence Observations 7, 8, Non-interruptible

Observation

Proposal 4451, Observation 8: Ref star - NIRCam - MASKSWB Thu Sep 07 21:01:00 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Coronagraphic Imaging

Diagnostics

(Visit 8:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	HD30562	RA: 04 48 36.7084 (72.1529517d) Dec: -05 40 30.41 (-5.67511d) Equinox: J2000	Proper Motion RA: 0.02086265595178922 sec of time/yr Proper Motion Dec: -0.2488340000354583 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.3
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	2 HD30562	F210M	BRIGHT (ND Square)	BRIGHT2	33	1	1	12.199	40834.11

Template

Module	Coronagraphic Mask	Obtain Astrometric Confirmation Images?	Subarray	Dither Pattern
A	MASKSWB	true	SUB640ASWB	5-POINT-BAR

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	F210M	F335M	RAPID	7	5	5	25	837.68	
2	F182M	F250M	RAPID	10	4	5	20	921.294	
3	F200W	F480M	RAPID	5	7	5	35	879.743	

PSF References	PSF Reference: true
Special Requirements	Offset 0.0 arcsec, -0.006 arcsec No Parallel Attachments Sequence Observations 7, 8, Non-interruptible

Observation

Proposal 4451, Observation 9: 51 Eri - NIRCam - MASK210R Thu Sep 07 21:01:00 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Coronagraphic Imaging

Diagnostics

(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	51-Eri	RA: 04 37 36.1782 (69.4007425d) Dec: -02 28 25.77 (-2.47382d) Equinox: J2000	Proper Motion RA: 0.002939339332594827 sec of time/yr Proper Motion Dec: -0.06402799995157693 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.5
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	1 51-Eri	F210M	BRIGHT (ND Square)	BRIGHT2	33	1	1	12.199	40834.5

Template

Module	Coronagraphic Mask	Obtain Astrometric Confirmation Images?	Subarray	Dither Pattern
A	MASK210R	true	SUB640A210R	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	F210M	F335M	RAPID	8	23	1	23	866.94	
2	F182M	F250M	RAPID	10	19	1	19	875.23	
3	F200W	F480M	RAPID	5	35	1	35	879.743	

PSF References	Ref star - NIRCam - MASK210R (Obs 10) (PSF Reference; Filters [F200W/F480M, F182M/F250M, F210M/F335M]) Additional Justification: false
Special Requirements	Offset 0.007 arcsec, -0.002 arcsec No Parallel Attachments Sequence Observations 9, 10, Non-interruptible

Observation

Proposal 4451, Observation 10: Ref star - NIRCam - MASK210R

Thu Sep 07 21:01:00 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Coronagraphic Imaging

Diagnostics

(Visit 10:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	HD30562	RA: 04 48 36.7084 (72.1529517d) Dec: -05 40 30.41 (-5.67511d) Equinox: J2000	Proper Motion RA: 0.02086265595178922 sec of time/yr Proper Motion Dec: -0.2488340000354583 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.3
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	2 HD30562	F210M	BRIGHT (ND Square)	BRIGHT2	33	1	1	12.199	40834.11

Template

Module	Coronagraphic Mask	Obtain Astrometric Confirmation Images?	Subarray	Dither Pattern
A	MASK210R	true	SUB640A210R	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	F210M	F335M	RAPID	7	3	9	27	904.694	
2	F182M	F250M	RAPID	10	2	9	18	829.165	
3	F200W	F480M	RAPID	5	4	9	36	904.879	

PSF References	PSF Reference: true
Special Requirements	Offset 0.007 arcsec, -0.002 arcsec No Parallel Attachments Sequence Observations 9, 10, Non-interruptible

Observation

Proposal 4451, Observation 11: 51 Eri - NIRCam - CLEAR

Thu Sep 07 21:01:00 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Diagnostics

(51 Eri - NIRCam - CLEAR (Obs 11)) Warning (Form): Pointing performance insufficient

(51 Eri - NIRCam - CLEAR (Obs 11)) Warning (Form): Pointing performance insufficient

(Visit 11:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	51-Eri	RA: 04 37 36.1782 (69.4007425d) Dec: -02 28 25.77 (-2.47382d) Equinox: J2000	Proper Motion RA: 0.002939339332594827 sec of time/yr Proper Motion Dec: -0.06402799995157693 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.5
Category=Star
Description=[F stars]

Template

Module	Subarray	Target Placement
B	SUB64P	Module Gap

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
1	SUBARRAY_DITHER	4	STANDARD		4

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	F323N+F322W2	RAPID	5	170	2720	16	825.574	
2	F212N	F405N+F444W	RAPID	5	170	2720	16	825.574	

Special Requirements

Sequence Observations 11, 12, Non-interruptible

Observation

Proposal 4451, Observation 12: Ref star - NIRCam - CLEAR

Thu Sep 07 21:01:00 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Diagnostics

(Ref star - NIRCam - CLEAR (Obs 12)) Warning (Form): Pointing performance insufficient

(Ref star - NIRCam - CLEAR (Obs 12)) Warning (Form): Pointing performance insufficient

(Visit 12:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	HD30562	RA: 04 48 36.7084 (72.1529517d) Dec: -05 40 30.41 (-5.67511d) Equinox: J2000	Proper Motion RA: 0.02086265595178922 sec of time/yr Proper Motion Dec: -0.2488340000354583 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

K~4.3
Category=Star
Description=[G stars]

Template

Module	Subarray	Target Placement
B	SUB64P	Module Gap

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
1	SUBARRAY_DITHER	4	STANDARD		4

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	F323N+F322W2	RAPID	5	180	2880	16	874.138	
2	F212N	F470N+F444W	RAPID	5	180	2880	16	874.138	

Special Requirements

Sequence Observations 11, 12, Non-interruptible