



# 1194 - Characterization of the HR 8799 planetary system and planet search

Cycle: 1, Proposal Category: GTO

## INVESTIGATORS

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Dr. Chris Stark (CoI)	NASA Goddard Space Flight Center
Dr. Charles-Philippe Lajoie (CoI)	Space Telescope Science Institute
Dr. Matt Mountain (CoI)	Space Telescope Science Institute

## OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
HR 8799 bcde				
	1	HR 8799 - NIRCcam - Roll 1 - MASK335R	NIRCcam Coronagraphic Imaging	(1) HR8799
	2	HR 8799 bcde - NIRCcam - Roll 1 - MASKLWB	NIRCcam Coronagraphic Imaging	(1) HR8799
	3	Ref star - NIRCcam - MASK335R	NIRCcam Coronagraphic Imaging	(2) HD220657

JWST Proposal 1194 (Created: Friday, October 6, 2023 at 4:00:14 PM Eastern Standard Time) - Overview

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
	4	Ref star - NIRCcam - M ASKLWB	NIRCcam Coronagraphic Imaging	(2) HD220657
	5	HR 8799 bcde - NIRCcam - Roll 2 - MASKLWB	NIRCcam Coronagraphic Imaging	(1) HR8799
	6	HR 8799 - NIRCcam - Roll 2 - MASK335R	NIRCcam Coronagraphic Imaging	(1) HR8799
	7	HR8799 1065C	MIRI Coronagraphic Imaging	(1) HR8799
	8	HR8799 1140C	MIRI Coronagraphic Imaging	(1) HR8799
	9	HR8799 1550C	MIRI Coronagraphic Imaging	(1) HR8799
	11	1550C - Target Bkg	MIRI Coronagraphic Imaging	(4) HR8799-BACKGROUND
	12	1140C - Target Bkg	MIRI Coronagraphic Imaging	(4) HR8799-BACKGROUND
	13	1065C - Target Bkg	MIRI Coronagraphic Imaging	(4) HR8799-BACKGROUND
	14	REF 1065C	MIRI Coronagraphic Imaging	(3) HD-218261
	15	REF 1140C	MIRI Coronagraphic Imaging	(3) HD-218261
	16	REF 1550C	MIRI Coronagraphic Imaging	(3) HD-218261
	18	1550C - REF Bkg	MIRI Coronagraphic Imaging	(5) HD-218261-BACKGROUND
	19	1140C - REF Bkg	MIRI Coronagraphic Imaging	(5) HD-218261-BACKGROUND
	20	1065C - REF Bkg	MIRI Coronagraphic Imaging	(5) HD-218261-BACKGROUND
	17	REF 2100W	MIRI Imaging	(7) HD-218261-NOBGD
	10	HR8799 2100W	MIRI Imaging	(6) HR8799-NOBGD

## ABSTRACT

A joint team of NIRCcam, European MIRI, and Telescope Team GTO scientists will execute a series of coronagraphic measurements using NIRCcam and MIRI. The goals of the program are two-fold.

First, to search for previously unknown planets using NIRCcam in the F356W2 and F444W filters with the round 430 mask being used for both filters.

This program will achieve a sensitivity to masses less than 1 MJup at F444W and will use F356W to reject background stars and galaxies.

The second goal of the program is the physical characterization of the known planets, HR8789bcde, using NIRCcam and MIRI multi-filter photometry. The Telescope Team will exercise an engineering mode of the telescope to aggressively push the Inner Working Angle and detect HR8799e while also measuring the three more widely separated planets. Six medium-band filters will be used in conjunction with the long wavelength bar. The NIRCcam observations will use two roll angles ( $\pm 5$  deg) and a reference star to assist with suppression of residuals in the coronagraphic image. The MIRI team will observe the system using the three filters of the MIRI 4 Quadrant Phase mask (4QPM) coronagraph.

## **OBSERVING DESCRIPTION**

### **SUMMARY AND OVERALL OBSERVING STRATEGY**

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This program will observe HR8799 using two of the NIRCcam coronagraphs in eight filters: MASKLWB to image the known planetary companions HR8799bcde with F250M, F300M, F335M, F410M, F430M, and F460M; and MASK430R to image the region HR8799 to look for additional faint companions further from the star in deep F356W2 and F444W observations. We will use the narrow end of the LWB coronagraph to minimize the Inner Working Angle. To achieve the best possible contrast, we will make use of Small Grid Dither technique and KLIP algorithm to build an optimal PSF reference for subtraction from each integration in our observations. We follow the recommended coronagraphic practices of observing the science target in 2 rolls and observing a nearby PSF reference star in an un-interruptible sequence.

In addition to the intrinsic scientific value of characterizing HR8799, a strong secondary goal of this program is assessing coronagraphic performance and observing strategies for close-in companions. We therefore are using an engineering mode aperture to position the star at the narrow end of the bar coronagraph. (Specifically, the "SIAF Fiducial Point Override" SR to use the NRCA5\_MASKLWB\_NARROW aperture point.) We recognize this is in some sense an unsupported mode, but are using our joint position as GTO observers and STScI staff scientist to in effect demonstrate and calibrate this new mode, hopefully to allow it to be offered generally in future cycles (in a similar way to how the HST STIS BAR5 position was commissioned.)

#### Ordering Of Observations

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All observations are grouped by a "Sequence Observations, Non-Interruptible" special requirement (aka "Seq Non-Int SR") to ensure the PSF calibrator is observed close in time to the science target.

Within that we order the observations to maximize efficiency by minimizing slews: We first obtain the observations in both coronagraphs at PA roll 1, then all observations for the PSF star, then all science observations in roll 2. By placing the PSF star in the middle and carefully selecting the order in which the MASK430R and MASKLWB observations are obtained we have tried to reduce the time delta between science observations and the PSF reference while still maintaining good efficiency by not adding more slews.

Choice of PSF star

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We searched SIMBAD for stars of equal or greater brightness within 10 degrees of the science target. We also chose to prioritize the W1-W2 color of the PSF star in order to minimize systematics in the deep search component of this program.

Given those criteria our chosen PSF calibrator is *\*ups Peg (HD 220657)*, which is an F-type star similar to the target, with a reasonable delta H-K and delta W1-W2. The PSF star is 2 mag brighter than the target which permits a shorter observing while maintaining roughly similar peak pixel intensity compared to the target.

NOTE ON RESTRICTED FUNCTIONALITY

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As explained above this program uses the Restricted special requirement "Fiducial Point Override" to place the targets at a different location along the coronagraph bar than is nominal. After discussions with NIRCcam support scientists and others here at STScI we believe this should "work as is" using the existing functionality that's already in PPS and other systems. We will gladly work with the PC and others to review things and address any issues that may arise. In particular we will want to carefully review the visit files before execution to double-check positioning of the target stars will be as desired. Thanks much.

Absolute PA and PA Offset Special Requirements, and Implied Time Constraints

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We used the Coronagraphic Target Visibility Tool to plan the PA special requirements.

The scheduling window is fairly narrowly constrained because the inner-most companion is at very small angular separation and in order to make this observation feasible at all we must orient that as close as possible to perpendicular to the MASKLWB occulting bar.

We have set up the program to use that scheduling opportunity. With the selected PA range tolerances the scheduling window is ~10 days wide.

In particular we:

- Set "Same PA as" SRs linking the 2 science observations at each roll angle. This is to ensure consistent positioning of the target in both NIRCcam datasets. It also increases observational efficiency slightly by avoiding rolls between those visits.
- Set an absolute "Aperture PA Range" SR to the range 85.1-99.1 deg for Observations 2 and 5, which positions the companion at the farthest separation from the coronagraph.
- Set the "Aperture PA offset" SR between the two observations in each filter to the range -7 to -14 deg, which is near the maximum available roll. The sign - is here because we would prefer to be as close as possible to the maximum possible angle 99.1 deg, which is the angle for which HR8799e is at the farthest separation from the coronagraph.

If for scheduling reasons it proves necessary to loosen constraints, we can work with our PC to adjust the Special Requirements and evaluate tradeoffs against reduced science performance by partially blocking the companion.

## EXPOSURE TIMES

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Characterization with NIRCcam:

SNRs for HR8799b were calculated using the best fit model of this object from the Rajan (2015) paper and the release candidate version of the ETC (as of Nov 2017), since the public version was not working well for coronagraph. We found the following correspondence between exposure time and SNR for the outermost planet.

F460M  $T_{exp} = 897.99$  SNR = 15.13  
F430M  $T_{exp} = 1346.99$  SNR = 11.65  
F410M  $T_{exp} = 673.50$  SNR = 24.23  
F335M  $T_{exp} = 1346.99$  SNR = 25.64  
F300M  $T_{exp} = 1363.03$  SNR = 7.64  
F250M  $T_{exp} = 1352.34$  SNR = 3.53

The workbook in this version is 11014. We then used the Nov 2017 public version of the ETC to choose the exposure parameters that would prevent

saturation (workbook 10865). We found that the readout pattern BRIGHT2 with the NGROUPS adjusted to ensure no saturated pixels, and chose Nints to match these exposure times.

Because the reference star is two magnitudes brighter than HR8799 we reduced to Ngroup =4 in order to have ~similar photon noise level on speckles (should be Ngroups = 3 but we avoided odd number). We checked that none of the integrations were saturated. Since we have 5 Small Grid Dithers we then chose Nint=24 for each dither to keep the total integration time on the reference star similar to the one on a single roll.

The current version of the ETC does not support Small Grid Dithers simulations. We carried out this work with the pandeia coronagraphy python package. We found that since HR8799 c d e are brighter than HR8799 b, expected SNR is >10 for the longer wavelenths and ~3-4 for the two shorter wavelengths.

Given large uncertainties on coronagraph performances and on the current version of the ETC, we might revisit the exposure parameters at a latter time.

Deep search with NIRCcam:

For deep imaging our observing plan is to observe HR8799 at two roll angles in F444W and in F356W to a depth adequate to veto red stars or extragalactic objects (a factor of two lower integration time in F356W than at F444W). The exposure time was chosen to search planets down to Saturn masses at 4" assuming a 10 nm wavefront drift using the extension of COND03 models (Baraffe et al. 2003) for planetary masses down to Saturn mass (Beichman et al. 2010). At this separation, we should be able to detect a 0.3 Mjup planet with a SNR of about 5. We chose the exposure time ratio target/reference star to be  $\sqrt{\text{flux target}/\text{flux reference}} \Rightarrow 2.75$ , to obtain the same SNR of the PSF for both targets. We will use the 5-POINT dither pattern to increase the contrast gain at close separation but chose not to increase the SNR of the PSF in order to maximize the time spent on the target. However, we made sure to keep a similar SNR per frame for both targets by carefully choosing the detector readout modes, number of groups and integrations.

Astrometric Confirmation Images

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We choose to take these with NGROUPS=4, NINT=1, to get about 60 s integration time. But the ETC doesn't support calculations in this mode so

this isn't based on anything rigorous. We may adjust this later.

## TARGET ACQUISITION

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ETC calculations (using the release candidate ETC for 1.2 in late Nov 2017) show that for HR 8799, we want a BRIGHT mode TA (using F335M+ND square). For HR 8799, using pattern=SHALLOW2, NGROUPS=65 (TA exp time = 16 s) the ETC predicts SNR~127 and does not give any warnings of saturation. The PSF star is 2 mag brighter, so we change to pattern=RAPID and NGROUPS=33 for a predicted SNR~130 (exp time = 1.7 s).

## NOTE ON GTO TIME ACCOUNTING

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Observations 1, 3, and 6 (the MASK430R observations) should be charged to the NIRCcam GTO team.

Observations 2, 4, and 5 (the MASKLWB observations) should be charged to the Telescope Scientist GTO team.

Observations 7, 8, 9, 10, 11, 12, 13 and 14 (MIRI observations) should be charged to the MIRI-EU GTO team.

The time for slews between observations 2&3, 4&5 and 6&7 should be split evenly between the three teams.

# Proposal 1194 - Targets - Characterization of the HR 8799 planetary system and planet search

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HR8799	RA: 23 07 28.7155 (346.8696479d) Dec: +21 08 3.30 (21.13425d) Equinox: J2000	Proper Motion RA: 108.551 mas/yr Proper Motion Dec: -49.639 mas/yr Parallax: 0.02476" Epoch of Position: 2000	
<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Simbad coordinates corrected from RA: 23 07 28.7151 DEC: +21 08 3.31 to RA: 23 07 28.7155 &amp; DEC: +21 08 03.305</i>  <a href="http://simbad.u-strasbg.fr/simbad/sim-id?Ident=HR+8799">http://simbad.u-strasbg.fr/simbad/sim-id?Ident=HR+8799</a></p> <p><i>Teff ~ 7430 K</i>  <i>F0+VkA5mA5 type star</i>  <i>Kmag=5.24</i>  <i>Category=Star</i>  <i>Description=[Exoplanet Systems]</i>  <i>Extended=NO</i></p>				
(2)	HD220657	RA: 23 25 22.7835 (351.3449313d) Dec: +23 24 14.76 (23.40410d) Equinox: J2000	Proper Motion RA: 192.19 mas/yr Proper Motion Dec: 36.12 mas/yr Parallax: 0.01914" Epoch of Position: 2000	
<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>This is a PSF calibrator. It is very bright.</i></p> <p><i>Teff ~ 5888 K</i>  <i>F8III type star</i>  <i>Kmag=3.04</i></p> <p><i>Comparing this to the science target HR 8799 we have:</i>  <i>Delta K = 2.2</i>  <i>Delta H-K = -0.015</i>  <i>Delta W1-W2 = -0.074</i>  <i>Category=Calibration</i>  <i>Description=[Coronagraphic]</i>  <i>Extended=NO</i></p>				
(3)	HD-218261	RA: 23 06 31.8854 (346.6328558d) Dec: +19 54 39.07 (19.91085d) Equinox: J2000	Proper Motion RA: 286.964 mas/yr Proper Motion Dec: 5.062 mas/yr Parallax: 0.03434" Epoch of Position: 2000	
<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Teff ~ 6122 K</i>  <i>F6V type star</i>  <i>Kmag=5.14</i>  <i>Category=Star</i>  <i>Description=[F stars]</i>  <i>Extended=NO</i></p>				
(4)	HR8799-BACKGROUND	RA: 23 07 38.7155 (346.9113146d) Dec: +21 08 50.30 (21.14731d) Equinox: J2000		
<p><i>Comments:</i>  <i>Category=Calibration</i>  <i>Description=[Telescope/sky background]</i></p>				

Fixed Targets



## Proposal 1194 - Targets - Characterization of the HR 8799 planetary system and planet search

(5) HD-218261-BACKGROUND	RA: 23 06 41.8854 (346.6745225d) Dec: +19 55 30.07 (19.92502d) Equinox: J2000	
<p><i>Comments:</i>  <i>Category=Calibration</i>  <i>Description=[Telescope/sky background]</i></p>		
(6) HR8799-NOBGD	RA: 23 07 28.7155 (346.8696479d) Dec: +21 08 3.30 (21.13425d) Equinox: J2000	Proper Motion RA: 108.551 mas/yr Proper Motion Dec: -49.639 mas/yr Parallax: 0.02476" Epoch of Position: 2000
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Proposal 1194 - Observation 1 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:14 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 1: HR 8799 - NIRCcam - Roll 1 - MASK335R</b></p> <p><b>Diagnostic Status: Error</b></p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p> <p>Background Observations:[]</p>																																								
	<p>(HR 8799 - NIRCcam - Roll 1 - MASK335R (Obs 1)) Error (Form): Short Filter is a required field.</p> <p>(HR 8799 - NIRCcam - Roll 1 - MASK335R (Obs 1)) Error (Form): Short Filter is a required field.</p> <p>(HR 8799 - NIRCcam - Roll 1 - MASK335R (Obs 1)) Warning (Form): Target requiring background exposure selected for template that doesn't require background exposure</p> <p>(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(HR 8799 - NIRCcam - Roll 1 - MASK335R (Obs 1)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>																																								
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1	RAPID	4	1	1	42.947	1																																			

Proposal 1194 - Observation 1 - Characterization of the HR 8799 planetary system and planet search

Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1		F356W	BRIGHT2	8	25	1	25	454.854	40833.6
	2		F444W	SHALLOW4	5	35	1	35	936.127	40833.7
PSF References	Ref star - NIRCcam - MASK335R (Obs 3) (PSF Reference; Filters [null/F356W, null/F444W]) Additional Justification: false									
Special Requirements	No Parallel Attachments Sequence Observations 1, 3, 6, Non-interruptible Aperture PA Offset 1 from 6 by 7 to 14 Degrees (Same offsets in V3)									

Proposal 1194 - Observation 2 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:14 GMT 2023

<b>Observation</b>	<b>Proposal 1194, Observation 2: HR 8799 bcde - NIRCcam - Roll 1 - MASKLWB</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRCcam Coronagraphic Imaging Background Observations:[]																													
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Proposal 1194 - Observation 2 - Characterization of the HR 8799 planetary system and planet search

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	F250M	BRIGHT2	5	115	1	115	1347.0	
2		F200W	F300M	BRIGHT2	8	75	1	75	1356.81	
3		F182M	F335M	BRIGHT2	10	60	1	60	1340.558	
4		F182M	F410M	BRIGHT2	10	30	1	30	670.279	
5		F210M	F430M	BRIGHT2	10	60	1	60	1340.558	
6		F210M	F460M	BRIGHT2	10	40	1	40	893.706	
PSF References	Ref star - NIRCcam - MASKLWB (Obs 4) (PSF Reference; Filters [F200W/F250M, F200W/F300M, F182M/F335M, F182M/F410M, F210M/F430M, F210M/F460M]) HR 8799 bcde - NIRCcam - Roll 2 - MASKLWB (Obs 5) (Filters [F200W/F250M, F200W/F300M, F182M/F335M, F182M/F410M, F210M/F430M, F210M/F460M]) Additional Justification: false									
Special Requirements	Aperture PA Range 85.1 to 99.1 Degrees (V3 84.56789991 to 98.56789991) Offset 0.0 arcsec, -0.015 arcsec No Parallel Attachments Fiducial Point Override NRCA5_MASKLWB_NARROW Sequence Observations 2, 4, 5, Non-interruptible Aperture PA Offset 2 from 5 by 7 to 14 Degrees (Same offsets in V3)									

Proposal 1194 - Observation 3 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:14 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 3: Ref star - NIRCam - MASK335R</b></p> <p><b>Diagnostic Status: Error</b></p> <p>Observing Template: NIRCam Coronagraphic Imaging</p>																																							
<b>Diagnostics</b>	<p>(Ref star - NIRCam - MASK335R (Obs 3)) Error (Form): Short Filter is a required field.</p> <p>(Ref star - NIRCam - MASK335R (Obs 3)) Error (Form): Short Filter is a required field.</p> <p>(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>																																							
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Proposal 1194 - Observation 3 - Characterization of the HR 8799 planetary system and planet search

<b>PSF References</b>	PSF Reference: true
<b>Special Requirements</b>	No Parallel Attachments Sequence Observations 1, 3, 6, Non-interruptible

Proposal 1194 - Observation 4 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:14 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 4: Ref star - NIRCcam - MASKLWB</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p>																																																																															
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Proposal 1194 - Observation 4 - Characterization of the HR 8799 planetary system and planet search

<b>PSF References</b>	PSF Reference: true
<b>Special Requirements</b>	Offset 0.0 arcsec, -0.015 arcsec No Parallel Attachments Fiducial Point Override NRCA5_MASKLWB_NARROW  Sequence Observations 2, 4, 5, Non-interruptible

Proposal 1194 - Observation 5 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:14 GMT 2023

<b>Observation</b>	<b>Proposal 1194, Observation 5: HR 8799 bcde - NIRCam - Roll 2 - MASKLWB</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRCam Coronagraphic Imaging Background Observations:[]																													
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Proposal 1194 - Observation 5 - Characterization of the HR 8799 planetary system and planet search

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	F250M	BRIGHT2	5	115	1	115	1347.0	
	2	F200W	F300M	BRIGHT2	8	75	1	75	1356.81	
	3	F182M	F335M	BRIGHT2	10	60	1	60	1340.558	
	4	F182M	F410M	BRIGHT2	10	30	1	30	670.279	
	5	F210M	F430M	BRIGHT2	10	60	1	60	1340.558	
	6	F210M	F460M	BRIGHT2	10	40	1	40	893.706	
PSF References	Ref star - NIRCcam - MASKLWB (Obs 4) (PSF Reference; Filters [F200W/F250M, F200W/F300M, F182M/F335M, F182M/F410M, F210M/F430M, F210M/F460M]) Additional Justification: false									
Special Requirements	Aperture PA Range 85.1 to 99.1 Degrees (V3 84.56789991 to 98.56789991) Offset 0.0 arcsec, -0.015 arcsec No Parallel Attachments Fiducial Point Override NRCA5_MASKLWB_NARROW  Sequence Observations 2, 4, 5, Non-interruptible Aperture PA Offset 2 from 5 by 7 to 14 Degrees (Same offsets in V3)									

Proposal 1194 - Observation 6 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<b>Proposal 1194, Observation 6: HR 8799 - NIRCcam - Roll 2 - MASK335R</b> <b>Diagnostic Status: Error</b> Observing Template: NIRCcam Coronagraphic Imaging Background Observations:[]																													
	(HR 8799 - NIRCcam - Roll 2 - MASK335R (Obs 6)) Error (Form): Short Filter is a required field. (HR 8799 - NIRCcam - Roll 2 - MASK335R (Obs 6)) Error (Form): Short Filter is a required field. (HR 8799 - NIRCcam - Roll 2 - MASK335R (Obs 6)) Warning (Form): Target requiring background exposure selected for template that doesn't require background exposure (Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. (HR 8799 - NIRCcam - Roll 2 - MASK335R (Obs 6)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.																													
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Proposal 1194 - Observation 6 - Characterization of the HR 8799 planetary system and planet search

Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1		F356W	BRIGHT2	8	25	1	25	454.854	40833.6
	2		F444W	SHALLOW4	5	35	1	35	936.127	40833.7
PSF References	Ref star - NIRCcam - MASK335R (Obs 3) (PSF Reference; Filters [null/F356W, null/F444W]) HR 8799 - NIRCcam - Roll 1 - MASK335R (Obs 1) (Filters [null/F356W, null/F444W]) Additional Justification: false									
Special Requirements	No Parallel Attachments Sequence Observations 1, 3, 6, Non-interruptible Aperture PA Offset 1 from 6 by 7 to 14 Degrees (Same offsets in V3)									

Proposal 1194 - Observation 7 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 7: HR8799 1065C</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: MIRI Coronagraphic Imaging</p> <p>Background Observations:[1065C - Target Bkg (Obs 13)]</p>																																															
	<p>(HR8799 1065C (Obs 7)) Warning (Form): Science observations should be linked to at least one other compatible science observation by an Aperture PA Offset of 1-14 degrees</p> <p>(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>																																															
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Proposal 1194 - Observation 7 - Characterization of the HR 8799 planetary system and planet search

PSF References	REF 1065C (Obs 14) (PSF Reference; Filters [F1065C]) Additional Justification: false
Special Requirements	Aperture PA Range 95 to 105 Degrees (V3 90.16455103 to 100.16455103) Offset 0.204 arcsec, 0.19 arcsec No Parallel Attachments  Sequence Observations 7, 10, 13, 14, 17, 20, Non-interruptible

Proposal 1194 - Observation 8 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<b>Proposal 1194, Observation 8: HR8799 1140C</b> <b>Diagnostic Status: Warning</b> Observing Template: MIRI Coronagraphic Imaging Background Observations:[HR8799 1550C (Obs 9), 1550C - Target Bkg (Obs 11), 1140C - Target Bkg (Obs 12)]																																															
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<b>Spectral Elements</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Coron Mask/Filter</th> <th>Subarray</th> <th>Mask</th> <th>Filter</th> <th>Readout Pattern</th> <th>Groups/Int</th> <th>Integrations/Exp</th> <th>Exposures/Dith</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>4QPM/F1140C</td> <td>MASK1140</td> <td>4QPM</td> <td>F1140C</td> <td>FASTR1</td> <td>500</td> <td>9</td> <td>1</td> <td>1</td> <td>9</td> <td>1080.477</td> <td>12727</td> </tr> </tbody> </table>													#	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/F1140C	MASK1140	4QPM	F1140C	FASTR1	500	9	1	1	9	1080.477	12727									
	#	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/F1140C	MASK1140	4QPM	F1140C	FASTR1	500	9	1	1	9	1080.477	12727																																				



# Proposal 1194 - Observation 8 - Characterization of the HR 8799 planetary system and planet search

<b>PSF References</b>	REF 1140C (Obs 15) (PSF Reference; Filters [F1140C]) Additional Justification: false
<b>Special Requirements</b>	Aperture PA Range 95 to 105 Degrees (V3 90.16455103 to 100.16455103) Offset 0.2185 arcsec, 0.1273 arcsec No Parallel Attachments  Sequence Observations 8, 9, 11, 12, 15, 16, 18, 19, Non-interruptible

Proposal 1194 - Observation 9 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 9: HR8799 1550C</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: MIRI Coronagraphic Imaging</p> <p>Background Observations:[HR8799 1140C (Obs 8), 1550C - Target Bkg (Obs 11), 1140C - Target Bkg (Obs 12)]</p>																																															
	<p>(HR8799 1550C (Obs 9)) Warning (Form): Science observations should be linked to at least one other compatible science observation by an Aperture PA Offset of 1-14 degrees</p> <p>(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>																																															
<b>Diagnosics</b>																																																
<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th colspan="4">Targ. Coord. Corrections</th> <th colspan="4">Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>HR8799</td> <td>RA: 23 07 28.7155 (346.8696479d) Dec: +21 08 3.30 (21.13425d) Equinox: J2000</td> <td colspan="4">Proper Motion RA: 108.551 mas/yr Proper Motion Dec: -49.639 mas/yr Parallax: 0.02476" Epoch of Position: 2000</td> <td colspan="4"></td> </tr> <tr> <td colspan="13"> <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Simbad coordinates corrected from RA: 23 07 28.7151 DEC: +21 08 3.31 to RA: 23 07 28.7155 &amp; DEC: +21 08 03.305</i></p> <p><i><a href="http://simbad.u-strasbg.fr/simbad/sim-id?Ident=HR+8799">http://simbad.u-strasbg.fr/simbad/sim-id?Ident=HR+8799</a></i></p> <p><i>Teff ~ 7430 K</i></p> <p><i>F0+VkA5mA5 type star</i></p> <p><i>Kmag=5.24</i></p> <p><i>Category=Star</i></p> <p><i>Description=[Exoplanet Systems]</i></p> <p><i>Extended=NO</i></p> </td> </tr> </tbody> </table>													#	Name	Target Coordinates	Targ. Coord. Corrections				Miscellaneous				(1)	HR8799	RA: 23 07 28.7155 (346.8696479d) Dec: +21 08 3.30 (21.13425d) Equinox: J2000	Proper Motion RA: 108.551 mas/yr Proper Motion Dec: -49.639 mas/yr Parallax: 0.02476" Epoch of Position: 2000								<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Simbad coordinates corrected from RA: 23 07 28.7151 DEC: +21 08 3.31 to RA: 23 07 28.7155 &amp; DEC: +21 08 03.305</i></p> <p><i><a href="http://simbad.u-strasbg.fr/simbad/sim-id?Ident=HR+8799">http://simbad.u-strasbg.fr/simbad/sim-id?Ident=HR+8799</a></i></p> <p><i>Teff ~ 7430 K</i></p> <p><i>F0+VkA5mA5 type star</i></p> <p><i>Kmag=5.24</i></p> <p><i>Category=Star</i></p> <p><i>Description=[Exoplanet Systems]</i></p> <p><i>Extended=NO</i></p>												
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	#	Target	Filter	Quadrant	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID																																						
1	SAME	FND	1	FAST	44	1	1	10.546	12727																																							
<b>Template</b>	<p><b>Repeat observation</b></p> <p>NO</p>																																															
<b>Dithers</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Dither Type</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>NONE</td> </tr> </tbody> </table>													#	Dither Type	1	NONE																															
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	#	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/F1550C	MASK1550	4QPM	F1550C	FASTR1	500	36	1	1	36	4322.629	12727																																				

Proposal 1194 - Observation 9 - Characterization of the HR 8799 planetary system and planet search

PSF References	REF 1550C (Obs 16) (PSF Reference; Filters [F1550C]) Additional Justification: false
Special Requirements	Aperture PA Range 95 to 105 Degrees (V3 90.16455103 to 100.16455103) Offset 0.226 arcsec, 0.156 arcsec No Parallel Attachments  Sequence Observations 8, 9, 11, 12, 15, 16, 18, 19, Non-interruptible

Proposal 1194 - Observation 11 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 11: 1550C - Target Bkg</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: MIRI Coronagraphic Imaging</p> <p>Background Observation For: [HR8799 1140C (Obs 8), HR8799 1550C (Obs 9)]</p>												
<b>Diagnostics</b>	(Visit 11:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Fixed Targets</b>	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous			
	(4)	HR8799-BACKGROUND	RA: 23 07 38.7155 (346.9113146d) Dec: +21 08 50.30 (21.14731d) Equinox: J2000										
	<p><i>Comments:</i>  <i>Category=Calibration</i>  <i>Description=[Telescope/sky background]</i></p>												
<b>Acquisition</b>	#											Target	
	1											NONE	
<b>Template</b>	AcqFilter	Repeat observation					Background Quadrant						
		YES					1						
<b>Dithers</b>	#											Dither Type	
	1											BACKGROUND	
<b>Spectral Elements</b>	#	Coron Mask/Filter	Subarray	Mask	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	4QPM/F1550C	MASK1550	4QPM	F1550C	FASTR1	500	36	1	2	72	8645.258	
<b>PSF References</b>	Additional Justification: false												

Proposal 1194 - Observation 11 - Characterization of the HR 8799 planetary system and planet search

**Special Requirements**

No Parallel Attachments

Sequence Observations 8, 9, 11, 12, 15, 16, 18, 19, Non-interruptible

Proposal 1194 - Observation 12 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 12: 1140C - Target Bkg</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: MIRI Coronagraphic Imaging</p> <p>Background Observation For: [HR8799 1140C (Obs 8), HR8799 1550C (Obs 9)]</p>												
<b>Diagnostics</b>	(Visit 12:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Fixed Targets</b>	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous			
	(4)	HR8799-BACKGROUND	RA: 23 07 38.7155 (346.9113146d) Dec: +21 08 50.30 (21.14731d) Equinox: J2000										
	<p><i>Comments:</i>  <i>Category=Calibration</i>  <i>Description=[Telescope/sky background]</i></p>												
<b>Acquisition</b>	#											Target	
	1											NONE	
<b>Template</b>	AcqFilter	Repeat observation				Background Quadrant							
		YES				1							
<b>Dithers</b>	#											Dither Type	
	1											BACKGROUND	
<b>Spectral Elements</b>	#	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/F1140C	MASK1140	4QPM	F1140C	FASTR1	500	9	1	2	18	2160.955	
<b>PSF References</b>	Additional Justification: false												

Proposal 1194 - Observation 12 - Characterization of the HR 8799 planetary system and planet search

**Special Requirements**

No Parallel Attachments

Sequence Observations 8, 9, 11, 12, 15, 16, 18, 19, Non-interruptible

Proposal 1194 - Observation 13 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<b>Proposal 1194, Observation 13: 1065C - Target Bkg</b> <b>Diagnostic Status: Warning</b> Observing Template: MIRI Coronagraphic Imaging Background Observation For: [HR8799 1065C (Obs 7)]												
	(Visit 13:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Diagnosics</b>													
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>				<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(4)	HR8799-BACKGROUND	RA: 23 07 38.7155 (346.9113146d) Dec: +21 08 50.30 (21.14731d) Equinox: J2000										
<i>Comments:</i> Category=Calibration Description=[Telescope/sky background]													
<b>Acquisition</b>	<b>#</b>											<b>Target</b>	
	1											NONE	
<b>Template</b>	<b>AcqFilter</b>	<b>Repeat observation</b>				<b>Background Quadrant</b>							
		YES				1							
<b>Dithers</b>	<b>#</b>											<b>Dither Type</b>	
	1											BACKGROUND	
<b>Spectral Elements</b>	<b>#</b>	<b>Coron Mask/Filter</b>	<b>Subarray</b>	<b>Mask</b>	<b>Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/E xp</b>	<b>Exposures/Dit h</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	4QPM/F1065C	MASK1065	4QPM	F1065C	FASTR1	500	9	1	2	18	2160.955	
<b>PSF References</b>	Additional Justification: false												



Proposal 1194 - Observation 13 - Characterization of the HR 8799 planetary system and planet search

**Special Requirements**

No Parallel Attachments

Sequence Observations 7, 10, 13, 14, 17, 20, Non-interruptible

Proposal 1194 - Observation 14 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 14: REF 1065C</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: MIRI Coronagraphic Imaging</p> <p>Background Observations:[1065C - REF Bkg (Obs 20)]</p>												
<b>Diagnostics</b>	(Visit 14:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Fixed Targets</b>	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous				
	(3)	HD-218261	RA: 23 06 31.8854 (346.6328558d) Dec: +19 54 39.07 (19.91085d) Equinox: J2000			Proper Motion RA: 286.964 mas/yr Proper Motion Dec: 5.062 mas/yr Parallax: 0.03434" Epoch of Position: 2000							
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>												
	<i>Teff ~ 6122 K</i> <i>F6V type star</i> <i>Kmag=5.14</i> <i>Category=Star</i> <i>Description=[F stars]</i> <i>Extended=NO</i>												
<b>Acquisition</b>	#	Target	Filter	Quadrant	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID			
	1	SAME	FND	1	FAST	44	1	1	10.546	12727			
<b>Template</b>	<p><b>Repeat observation</b></p> <p>NO</p>												
<b>Dithers</b>	#	<b>Dither Type</b>											
	1	9-POINT-SMALL-GRID											
<b>Spectral Elements</b>	#	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	2	1	9	18	2159.277	12727

Proposal 1194 - Observation 14 - Characterization of the HR 8799 planetary system and planet search

<b>PSF References</b>	PSF Reference: true
<b>Special Requirements</b>	Offset 0.204 arcsec, 0.19 arcsec No Parallel Attachments Sequence Observations 7, 10, 13, 14, 17, 20, Non-interruptible

Proposal 1194 - Observation 15 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 15: REF 1140C</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: MIRI Coronagraphic Imaging</p> <p>Background Observations:[REF 1550C (Obs 16), 1550C - REF Bkg (Obs 18), 1140C - REF Bkg (Obs 19)]</p>												
<b>Diagnostics</b>	(Visit 15:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>				
	(3)	HD-218261	RA: 23 06 31.8854 (346.6328558d) Dec: +19 54 39.07 (19.91085d) Equinox: J2000			Proper Motion RA: 286.964 mas/yr Proper Motion Dec: 5.062 mas/yr Parallax: 0.03434" Epoch of Position: 2000							
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>												
	<i>Teff ~ 6122 K</i> <i>F6V type star</i> <i>Kmag=5.14</i> <i>Category=Star</i> <i>Description=[F stars]</i> <i>Extended=NO</i>												
<b>Acquisition</b>	<b>#</b>	<b>Target</b>	<b>Filter</b>	<b>Quadrant</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>			
	1	SAME	FND	1	FAST	44	1	1	10.546	12727			
<b>Template</b>	<p><b>Repeat observation</b></p> <p>NO</p>												
<b>Dithers</b>	<b>#</b>	<b>Dither Type</b>											
	1	9-POINT-SMALL-GRID											
<b>Spectral Elements</b>	<b>#</b>	<b>Coron Mask/Filter</b>	<b>Subarray</b>	<b>Mask</b>	<b>Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Exposures/Dith</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	4QPM/F1140C	MASK1140	4QPM	F1140C	FASTR1	500	2	1	9	18	2159.277	12727

Proposal 1194 - Observation 15 - Characterization of the HR 8799 planetary system and planet search

<b>PSF References</b>	PSF Reference: true
<b>Special Requirements</b>	Offset 0.2185 arcsec, 0.1273 arcsec No Parallel Attachments Sequence Observations 8, 9, 11, 12, 15, 16, 18, 19, Non-interruptible

Proposal 1194 - Observation 16 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 16: REF 1550C</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: MIRI Coronagraphic Imaging</p> <p>Background Observations:[REF 1140C (Obs 15), 1550C - REF Bkg (Obs 18), 1140C - REF Bkg (Obs 19)]</p>												
<b>Diagnostics</b>	(Visit 16:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Fixed Targets</b>	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous				
	(3)	HD-218261	RA: 23 06 31.8854 (346.6328558d) Dec: +19 54 39.07 (19.91085d) Equinox: J2000			Proper Motion RA: 286.964 mas/yr Proper Motion Dec: 5.062 mas/yr Parallax: 0.03434" Epoch of Position: 2000							
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>												
	<i>Teff ~ 6122 K</i> <i>F6V type star</i> <i>Kmag=5.14</i> <i>Category=Star</i> <i>Description=[F stars]</i> <i>Extended=NO</i>												
<b>Acquisition</b>	#	Target	Filter	Quadrant	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID			
	1	SAME	FND	1	FAST	44	1	1	10.546	12727			
<b>Template</b>	<p><b>Repeat observation</b></p> <p>NO</p>												
<b>Dithers</b>	#	<b>Dither Type</b>											
	1	9-POINT-SMALL-GRID											
<b>Spectral Elements</b>	#	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/F1550C	MASK1550	4QPM	F1550C	FASTR1	500	2	1	9	18	2159.277	12727

Proposal 1194 - Observation 16 - Characterization of the HR 8799 planetary system and planet search

PSF References	PSF Reference: true
Special Requirements	Offset 0.226 arcsec, 0.156 arcsec No Parallel Attachments Sequence Observations 8, 9, 11, 12, 15, 16, 18, 19, Non-interruptible

Proposal 1194 - Observation 18 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<b>Proposal 1194, Observation 18: 1550C - REF Bkg</b> <b>Diagnostic Status: Warning</b> Observing Template: MIRI Coronagraphic Imaging Background Observation For: [REF 1140C (Obs 15), REF 1550C (Obs 16)]												
	(Visit 18:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Diagnosics</b>													
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>				<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(5)	HD-218261-BACKGROUND	RA: 23 06 41.8854 (346.6745225d) Dec: +19 55 30.07 (19.92502d) Equinox: J2000										
Comments: Category=Calibration Description=[Telescope/sky background]													
<b>Acquisition</b>	<b>#</b>											<b>Target</b>	
	1											NONE	
<b>Template</b>	<b>AcqFilter</b>	<b>Repeat observation</b>					<b>Background Quadrant</b>						
		YES					1						
<b>Dithers</b>	<b>#</b>											<b>Dither Type</b>	
	1											BACKGROUND	
<b>Spectral Elements</b>	<b>#</b>	<b>Coron Mask/Filter</b>	<b>Subarray</b>	<b>Mask</b>	<b>Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Exposures/Dith</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	4QPM/F1550C	MASK1550	4QPM	F1550C	FASTR1	500	2	1	2	4	479.839	
<b>PSF References</b>	Additional Justification: false												



Proposal 1194 - Observation 18 - Characterization of the HR 8799 planetary system and planet search

**Special Requirements**

No Parallel Attachments

Sequence Observations 8, 9, 11, 12, 15, 16, 18, 19, Non-interruptible

Proposal 1194 - Observation 19 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<b>Proposal 1194, Observation 19: 1140C - REF Bkg</b> <b>Diagnostic Status: Warning</b> Observing Template: MIRI Coronagraphic Imaging Background Observation For: [REF 1140C (Obs 15), REF 1550C (Obs 16)]												
	(Visit 19:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Diagnosics</b>													
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>				<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(5)	HD-218261-BACKGROUND	RA: 23 06 41.8854 (346.6745225d) Dec: +19 55 30.07 (19.92502d) Equinox: J2000										
<i>Comments:</i> Category=Calibration Description=[Telescope/sky background]													
<b>Acquisition</b>	<b>#</b>											<b>Target</b>	
	1											NONE	
<b>Template</b>	<b>AcqFilter</b>	<b>Repeat observation</b>					<b>Background Quadrant</b>						
		YES					1						
<b>Dithers</b>	<b>#</b>											<b>Dither Type</b>	
	1											BACKGROUND	
<b>Spectral Elements</b>	<b>#</b>	<b>Coron Mask/Filter</b>	<b>Subarray</b>	<b>Mask</b>	<b>Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Exposures/Dith</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	4QPM/F1140C	MASK1140	4QPM	F1140C	FASTR1	500	2	1	2	4	479.839	
<b>PSF References</b>	Additional Justification: false												

Proposal 1194 - Observation 19 - Characterization of the HR 8799 planetary system and planet search

**Special Requirements**

No Parallel Attachments

Sequence Observations 8, 9, 11, 12, 15, 16, 18, 19, Non-interruptible

Proposal 1194 - Observation 20 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 20: 1065C - REF Bkg</b>  <b>Diagnostic Status: Warning</b>                  Observing Template: MIRI Coronagraphic Imaging                  Background Observation For: [REF 1065C (Obs 14)]</p>												
<b>Diagnostics</b>	(Visit 20:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Fixed Targets</b>	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous			
	(5)	HD-218261-BACKGROUND	RA: 23 06 41.8854 (346.6745225d) Dec: +19 55 30.07 (19.92502d) Equinox: J2000										
	Comments: Category=Calibration Description=[Telescope/sky background]												
<b>Acquisition</b>	#											Target	
	1											NONE	
<b>Template</b>	AcqFilter	Repeat observation				Background Quadrant							
		YES				1							
<b>Dithers</b>	#											Dither Type	
	1											BACKGROUND	
<b>Spectral Elements</b>	#	Coron Mask/Filter	Subarray	Mask	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	4QPM/F1065C	MASK1065	4QPM	F1065C	FASTR1	500	2	1	2	4	479.839	
<b>PSF References</b>	Additional Justification: false												

Proposal 1194 - Observation 20 - Characterization of the HR 8799 planetary system and planet search

**Special Requirements**

No Parallel Attachments

Sequence Observations 7, 10, 13, 14, 17, 20, Non-interruptible

Proposal 1194 - Observation 17 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 17: REF 2100W</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: MIRI Imaging</p>										
<b>Diagnostics</b>	(Visit 17:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>		
	(7)	HD-218261-NOBGD	RA: 23 06 31.8854 (346.6328558d) Dec: +19 54 39.07 (19.91085d) Equinox: J2000			Proper Motion RA: 286.964 mas/yr Proper Motion Dec: 5.062 mas/yr Parallax: 0.03434" Epoch of Position: 2000					
	<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Teff ~ 6122 K</i>  <i>F6V type star</i>  <i>Kmag=5.14</i>  <i>Category=Star</i>  <i>Description=[F stars]</i>  <i>Extended=NO</i></p>										
<b>Template</b>	<p><b>Subarray</b></p> <p>SUB256</p>										
<b>Dithers</b>	<b>#</b>	<b>Dither Type</b>	<b>Starting Point</b>	<b>Number of Points</b>	<b>Points</b>	<b>Starting Set</b>	<b>Number of Sets</b>	<b>Optimized For</b>	<b>Direction</b>	<b>Pattern Size</b>	
	1	4-Point-Sets				1	1	POINT SOURCE	POSITIVE	DEFAULT	
<b>Spectral Elements</b>	<b>#</b>	<b>Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Exposures/Dith</b>	<b>Dither</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	F2100W	FASTR1	20	50	1	Dither 1	4	200	1256.786	

Proposal 1194 - Observation 17 - Characterization of the HR 8799 planetary system and planet search

Special Requirements

Sequence Observations 7, 10, 13, 14, 17, 20, Non-interruptible

Proposal 1194 - Observation 10 - Characterization of the HR 8799 planetary system and planet search

Fri Oct 06 21:00:15 GMT 2023

<b>Observation</b>	<p><b>Proposal 1194, Observation 10: HR8799 2100W</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: MIRI Imaging</p>										
<b>Diagnostics</b>	(Visit 10:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>		
	(6)	HR8799-NOBGD	RA: 23 07 28.7155 (346.8696479d) Dec: +21 08 3.30 (21.13425d) Equinox: J2000			Proper Motion RA: 108.551 mas/yr Proper Motion Dec: -49.639 mas/yr Parallax: 0.02476" Epoch of Position: 2000					
	<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Simbad coordinates corrected from RA: 23 07 28.7151 DEC: +21 08 3.31 to RA: 23 07 28.7155 &amp; DEC: +21 08 03.305</i>  <a href="http://simbad.u-strasbg.fr/simbad/sim-id?Ident=HR+8799">http://simbad.u-strasbg.fr/simbad/sim-id?Ident=HR+8799</a></p> <p><i>Teff ~ 7430 K</i>  <i>F0+VKA5mA5 type star</i>  <i>Kmag=5.24</i>  <i>Category=Star</i>  <i>Description=[Exoplanet Systems]</i>  <i>Extended=NO</i></p>										
<b>Template</b>	<p><b>Subarray</b></p> <p>SUB256</p>										
<b>Dithers</b>	<b>#</b>	<b>Dither Type</b>	<b>Starting Point</b>	<b>Number of Points</b>	<b>Points</b>	<b>Starting Set</b>	<b>Number of Sets</b>	<b>Optimized For</b>	<b>Direction</b>	<b>Pattern Size</b>	
	1	4-Point-Sets				1	1	EXTENDED SOURCE	POSITIVE	DEFAULT	
<b>Spectral Elements</b>	<b>#</b>	<b>Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Exposures/Dith</b>	<b>Dither</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	F2100W	FASTR1	20	50	1	Dither 1	4	200	1256.786	



Proposal 1194 - Observation 10 - Characterization of the HR 8799 planetary system and planet search

Special Requirements

Sequence Observations 7, 10, 13, 14, 17, 20, Non-interruptible