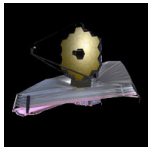

1200 - Architecture of Directly-Imaged Extrasolar Planetary Systems

Cycle: 1, Proposal Category: GTO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Deep search				
	1	Target 1	NIRISS Aperture Masking Interferometry	(1) HD-218396
	2	Target 2	NIRISS Aperture Masking Interferometry	(2) HD-95086
	3	PSF Ref	NIRISS Aperture Masking Interferometry	(4) HD-93649

ABSTRACT

The Aperture Masking Interferometry mode of JWST/NIRISS offers a rare opportunity to probe extrasolar planetary systems with separations from less than 0.1” to 0.4” in the thermal infrared. On the one hand, AO-fed instruments from the ground mostly operate in the near-infrared and offer deep contrast down to 0.2” at best. On the other hand, thermal infrared is a regime in which the spectral energy distribution of young planets peaks,

making AMI observations sensitive to planets with masses down to 4MJup around young and nearby stars. Therefore, AMI is an ideal mode that is complementary to ground based direct imaging to probe small angular separations to study the inner part of planetary systems. A complete knowledge of the architecture of extrasolar systems will provide an important observational test to overcome the main limitations of directly-imaged planets. Dynamical studies of multiple systems or systems with planets and disks give independent mass estimates that can be confronted with the model-dependent masses of these planets based on uncalibrated evolutionary tracks . We therefore propose in this project to make use of the AMI performance to help completing the view of the architecture of directly-imaged extrasolar planetary systems.

Observation IDs: DOYON_400[0-5]

OBSERVING DESCRIPTION

We will observe HD 95086 and HR 8799, two directly-imaged exoplanatery systems using NIRISS AMI at F380M with the SUB80 in staring mode as recommended. HD93649 will also be observed to calibrate the fringes and will be common to both targets. To benefit from the best calibration strategy, all observations have to be executed in a non-interruptible sequence.

The number of groups for each target has been verified with the JWST ETC based on their magnitude in the WISE 3.5 micron filter (close to the SPITZER filter bandpass in the ETC) magnitudes to prevent saturation and to optimize the TACQ: HR8799 (5.2), HD95086 (6.7), and HD93649 (5.7). The ETC workbook is #156907.

The required exposure time has been calculated on actual end-to-end simulations, not using the analytical formulae, with a well depth of ~30ke, not using the analytical formulae. Therefore, the number of photons in the following might not completelly match the settings for every target: HR8799 (1.06e10), HD95086 (1.14e10), and HD93649 (1.21e10).

Total requested time is 8.59h.

Our calibrator HD 93649 will also be observed in F480M and F430M to benefit program ID 1260 (PI Ford, observations DOYON_80[00-11]).

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HD-218396	RA: 23 07 28.7157 (346.8696488d) Dec: +21 08 3.31 (21.13425d) Equinox: J2000	Proper Motion RA: 108.284 mas/yr Proper Motion Dec: -50.03999999644293 mas/yr Parallax: 0.02476" Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[A stars, Exoplanet Systems, Pre-main sequence stars, Substellar companions]* *Extended=NO*				
(2)	HD-95086	RA: 10 57 3.0216 (164.2625900d) Dec: -68 40 2.45 (-68.66735d) Equinox: J2000	Proper Motion RA: -41.128 mas/yr Proper Motion Dec: 12.861 mas/yr Parallax: 0.01194" Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[A stars, Exoplanet Systems, Pre-main sequence stars, Substellar companions]*				
(4)	HD-93649	RA: 10 46 48.0773 (161.7003221d) Dec: -69 12 35.23 (-69.20979d) Equinox: J2000	Proper Motion RA: -7.380000000000001 mas/yr Proper Motion Dec: 2.622 mas/yr Parallax: 0.00131" Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Calibration* *Description=[A stars, Point spread function, Pointing and jitter test]*				

Observation

Proposal 1200, Observation 1: Target 1

Tue Jul 18 17:00:52 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRISS Aperture Masking Interferometry

Diagnostics

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HD-218396	RA: 23 07 28.7157 (346.8696488d)	Proper Motion RA: 108.284 mas/yr	
		Dec: +21 08 3.31 (21.13425d)	Proper Motion Dec: -50.03999999644293 mas/yr	
		Equinox: J2000	Parallax: 0.02476"	
			Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[A stars, Exoplanet Systems, Pre-main sequence stars, Substellar companions]
Extended=NO

Acquisition

#	Target	Acquisition Mode	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	AMIBRIGHT	F480M	NISRAPID	15	1	1	0.748	24997.1

Template

Subarray	Direct Image
SUB80	false

Dithers

#	Primary Dithers	Subpixel Positions
1	NONE	NONE

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F380M	NISRAPID	3	6864	1	6864	2211.855	

PSF References	PSF Ref (Obs 3) (PSF Reference; Filters [F380M, F430M, F480M]) Additional Justification: false
Special Requirements	Offset -0.007 arcsec, 0.019 arcsec No Parallel Attachments Sequence Observations 1, 2, 3, Non-interruptible

Observation

Proposal 1200, Observation 2: Target 2

Tue Jul 18 17:00:52 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRISS Aperture Masking Interferometry

Diagnostics

(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)	HD-95086	RA: 10 57 3.0216 (164.2625900d)	Proper Motion RA: -41.128 mas/yr	
		Dec: -68 40 2.45 (-68.66735d)	Proper Motion Dec: 12.861 mas/yr	
		Equinox: J2000	Parallax: 0.01194"	
			Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[A stars, Exoplanet Systems, Pre-main sequence stars, Substellar companions]

Acquisition

#	Target	Acquisition Mode	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	AMIBRIGHT	F480M	NISRAPID	19	1	1	0.93	24997.2

Template

Subarray	Direct Image
SUB80	true

Dithers

#	Primary Dithers	Subpixel Positions
1	NONE	NONE
2	NONE	NONE

Direct Image

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F380M	NISRAPID	2	750	1	750	185.1	

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F380M	NISRAPID	12	9792	1	9792	9803.75	

PSF References	PSF Ref (Obs 3) (PSF Reference; Filters [F380M, F430M, F480M]) Additional Justification: false
Special Requirements	Offset -0.007 arcsec, 0.019 arcsec No Parallel Attachments Sequence Observations 1, 2, 3, Non-interruptible

Observation

Proposal 1200, Observation 3: PSF Ref

Tue Jul 18 17:00:52 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRISS Aperture Masking Interferometry

Diagnostics

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(4)	HD-93649	RA: 10 46 48.0773 (161.7003221d) Dec: -69 12 35.23 (-69.20979d) Equinox: J2000	Proper Motion RA: -7.380000000000001 mas/yr Proper Motion Dec: 2.622 mas/yr Parallax: 0.00131" Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Calibration
Description=[A stars, Point spread function, Pointing and jitter test]

Acquisition

#	Target	Acquisition Mode	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	AMIBRIGHT	F480M	NISRAPID	15	1	1	0.748	24997.3

Template

Subarray	Direct Image
SUB80	false

Dithers

#	Primary Dithers	Subpixel Positions
1	NONE	NONE

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F480M	NISRAPID	13	156	1	156	167.956	
2	F430M	NISRAPID	9	185	1	185	143.353	
3	F380M	NISRAPID	4	9215	1	9215	3664.621	

PSF References	PSF Reference: true
Special Requirements	Offset -0.007 arcsec, 0.019 arcsec No Parallel Attachments Sequence Observations 1, 2, 3, Non-interruptible