



8142 - JEDIS: The JWST Eccentric debris DIsk Survey

Cycle: 4, Proposal Category: GO

INVESTIGATORS

<i>Name</i>	<i>Institution</i>
Dr. Josh Lovell (PI)	Smithsonian Institution Astrophysical Observatory
Dr. Meredith Hughes (CoI)	Wesleyan University
Dr. ANTONIO HALES (CoI)	Associated Universities, Inc.
Prof. Meredith MacGregor (CoI)	The Johns Hopkins University
Dr. Nicole Pawellek (CoI) (ESA Member)	University of Vienna
Dr. David Wilner (CoI)	Smithsonian Institution Astrophysical Observatory
Dr. Brenda Matthews (CoI) (CSA Member)	National Research Council of Canada
Prof. Eugene Chiang (CoI)	University of California - Berkeley
Dr. Antranik Sefilian (CoI)	University of Arizona
Prof. Mark Wyatt (CoI) (ESA Member)	University of Cambridge
Sebastian Marino (CoI) (ESA Member)	University of Exeter
Dr. Grant Kennedy (CoI) (ESA Member)	University of Warwick
Dr. Tim Pearce (CoI) (ESA Member)	University of Warwick
Dr. Johan Olofsson (CoI) (ESA Member)	European Southern Observatory - Germany
Dr. Mark Booth (CoI) (ESA Member)	UK Astronomy Technology Centre
Dr. Carlos del Burgo (CoI) (ESA Member)	Universidad de La Laguna
Dr. Andras Gaspar (CoI)	University of Arizona
Katie Crotts (CoI)	Space Telescope Science Institute

OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
HD15115				
	7	PSF Ref	MIRI Imaging	(5) HD-15003

Folder	Observation	Label	Observing Template	Science Target
	1	Roll 1	MIRI Imaging	(1) HD-15115
	11	Roll 1 - Repeat of obs 1	MIRI Imaging	(1) HD-15115
	2	Roll 2	MIRI Imaging	(1) HD-15115
HD53143				
	3	Roll 1	MIRI Imaging	(2) HD-53143
	4	Roll 2	MIRI Imaging	(2) HD-53143
	6	BACKGROUND	MIRI Imaging	(4) BACKGROUND_HD53143

ABSTRACT

Disk observations are key to understanding the histories and evolution of exoplanetary systems.

Whilst bright protoplanetary disks provide crucial insights into the early formation of giant planets over the first $\sim 1\text{--}10$ Myr, fainter debris disks provide essential clues on the formation of planets and the evolution of exoplanetary architectures over $10\text{s--}1000\text{s}$ of Myr. By resolving rings of circumstellar material produced in debris disks, it is possible to pinpoint the locations of perturbing bodies that are either in the act of sweeping up dust, or have already cleared out dust-producing planetesimals.

We propose to image two eccentric debris disks with MIRI to complete observations of all MIRI-resolvable eccentric rings.

Based on their characteristic emission profiles at mid-infrared wavelengths, resolved eccentric disks in the mid-IR provide important constraints on models of planet-disk interactions.

Our observations will enable tests of new theoretical predictions for mid-infrared debris disk morphologies, only possible with the sensitivity and resolution of JWST MIRI. By fitting such models to the proposed observations, we will connect eccentric debris disk images to their underlying exoplanetary architectures.

Our investigation will jointly utilize the latest available ALMA data, to simultaneously model and fit mid-infrared JWST MIRI and millimeter ALMA data.

Our proposed eccentric disk observations follow directly from the release of iconic JWST MIRI images of Fomalhaut's eccentric ring, and promise brand-new science to place in context how extra-Solar planetary systems are shaped after their formation.

OBSERVING DESCRIPTION

We will obtain MIRI images with the F2550W filter of two eccentric debris disks; HD15115 and HD53143.

Our choice of filter maximises sensitivity to disk emission, as proven by other published JWST MIRI images of nearby debris disks.

JWST Proposal 8142 (Created: Wednesday, January 21, 2026, 2:00:55PM Eastern Standard Time) - Overview

With the ETC we have determined the optimal readout strategy for our observing sequence, increasing the integration number to maximise sensitivity, whilst maximising the number of groups per integration (to avoid saturating the MIRI detectors for our setup). We note that any saturation at the location of the star will not impact our science but that our setup should avoid this entirely. We adopt the BRIGHTSKY array with FASTR1 readout to optimise SNR for given time on sources.

Our exposures are only slightly longer than those of Fomalhaut, in order to produce maps with comparable sensitivity to the disk emission to conduct our science.

For HD53143, we propose observations in the following order, in a non-interruptable sequence:

- 1 -- observe target source at orientation 1 with a 4-point dither pattern,
- 2 -- observe target source at orientation 2 (a roll angle/PA offset of 10-14 degrees) with a 4-point dither pattern,
- 3 -- observe background (using same setup as previous observation).

For HD15115, we propose observations in the following order, in a non-interruptable sequence:

- 1 -- observe reference PSF star target with a 4-point dither pattern,
- 2 -- observe target source at orientation 1 (a roll angle/PA offset of 10-14 degrees) with a 4-point dither pattern,
- 3 -- observe target source at orientation 2 (a roll angle/PA offset of 10-14 degrees) with a 4-point dither pattern.

Note that targets 1 and 2 do not require imaging back-to-back, easing schedulability.

Reference PSF subtraction will be conducted for both science targets utilising the source observed in Observation 7.

Background observations from Observation 6 will be used for both science targets. Additional backgrounds can be produced (if necessary) through the data itself based on the selected dither strategy, and source properties.

To optimally locate the sources at the center of the 4-point dither patterns of the BRIGHTSKY detector array, we add y-axis offsets of +10 to HD53143 (science target 1), HD15115 (science target 2) and HD15003 (PSF reference star). We place these sources at the same location on the detector array to enhance our calibration and analysis methodology.

Proposal 8142 - Targets - JEDIS: The JWST Eccentric debris Disk Survey

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	HD-15115	RA: 02 26 16.2458 (36.5676908d) Dec: +06 17 33.19 (6.29255d) Equinox: J2000	Proper Motion RA: 88.013 mas/yr Proper Motion Dec: -50.41899994466803 mas/yr Parallax: 0.020502600000000003" Epoch of Position: 2000	
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM. Category=Star Description=[Circumstellar disks, Circumstellar dust, Circumstellar gas, Debris disks]				
	(2)	HD-53143	RA: 06 59 59.6551 (104.9985629d) Dec: -61 20 10.25 (-61.33618d) Equinox: J2000	Proper Motion RA: -161.873 mas/yr Proper Motion Dec: 264.836 mas/yr Parallax: 0.054525199999999996" Epoch of Position: 2000	
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM. Category=Star Description=[Circumstellar disks, Circumstellar dust, Circumstellar gas, Debris disks]				
	(4)	BACKGROUND_HD53143	RA: 06 58 59.6551 (104.7485629d) Dec: -61 20 10.25 (-61.33618d) Equinox: J2000		
	Comments: Category=Calibration Description=[External flat field]				
	(5)	HD-15003	RA: 02 25 7.9878 (36.2832825d) Dec: +00 38 10.63 (.63629d) Equinox: J2000	Proper Motion RA: 3.019 mas/yr Proper Motion Dec: -43.458000027385424 mas/yr Parallax: 0.0039085000000000005" Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM. Category=Calibration Description=[Point spread function] Extended=NO					

Proposal 8142 - Observation 7 - JEDIS: The JWST Eccentric debris Disk Survey

Observation	Proposal 8142, Observation 7: PSF Ref										Wed Jan 21 19:00:55 GMT 2026
	Diagnostic Status: Warning										
Observing Template: MIRI Imaging											
Diagnostics	(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous	
	(5)	HD-15003	RA: 02 25 7.9878 (36.2832825d) Dec: +00 38 10.63 (.63629d) Equinox: J2000				Proper Motion RA: 3.019 mas/yr Proper Motion Dec: -43.458000027385424 mas/yr Parallax: 0.0039085000000000005" Epoch of Position: 2000				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.										
	Category=Calibration Description=[Point spread function] Extended=NO										
Template	Subarray										
	BRIGHTSKY										
Dithers	#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size	
	1	4-Point-Sets				1	1	EXTENDED SOURCE	POSITIVE	DEFAULT	
Spectral Elements	#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1	F2550W	FASTR1	23	15	1	Dither 1	4	60	1242.542	

Proposal 8142 - Observation 7 - JEDIS: The JWST Eccentric debris Disk Survey

Special Requirements	Offset 0.0 arcsec, 10.0 arcsec Sequence Observations 7, 1, 2 (reordered), Non-interruptible
----------------------	---

Proposal 8142 - Observation 1 - JEDIS: The JWST Eccentric debris Disk Survey

Observation	Proposal 8142, Observation 1: Roll 1										Wed Jan 21 19:00:55 GMT 2026
	Diagnostic Status: Warning										
	Observing Template: MIRI Imaging										
	Background Observations:[]										
Diagnostics	(Roll 1 (Obs 1)) Warning (Form): Target requiring background exposure selected for template that doesn't require background exposure										
	(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
	(Roll 1 (Obs 1)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.										
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous		
	(1)	HD-15115	RA: 02 26 16.2458 (36.5676908d) Dec: +06 17 33.19 (6.29255d) Equinox: J2000			Proper Motion RA: 88.013 mas/yr Proper Motion Dec: -50.41899994466803 mas/yr Parallax: 0.020502600000000003" Epoch of Position: 2000					
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.										
	Category=Star Description=[Circumstellar disks, Circumstellar dust, Circumstellar gas, Debris disks]										
Template	Subarray										
	BRIGHTSKY										
Dithers	#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size	
	1	4-Point-Sets				1	1	EXTENDED SOURCE	POSITIVE	DEFAULT	
Spectral Elements	#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1	F2550W	FASTR1	23	15	1	Dither 1	4	60	1242.542	227065
Special Requirements	Offset 0.0 arcsec, 10.0 arcsec										
	Sequence Observations 7, 1, 2 (reordered), Non-interruptible Aperture PA Offset 2 from 1 by 10 to 14 Degrees (Same offsets in V3)										

Proposal 8142 - Observation 11 - JEDIS: The JWST Eccentric debris Disk Survey

Observation	Proposal 8142, Observation 11: Roll 1 - Repeat of obs 1										Wed Jan 21 19:00:55 GMT 2026
	Diagnostic Status: Warning										
	Observing Template: MIRI Imaging										
	Background Observations:[]										
Diagnostics	(Roll 1 - Repeat of obs 1 (Obs 11)) Warning (Form): Target requiring background exposure selected for template that doesn't require background exposure										
	(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)	HD-15115	RA: 02 26 16.2458 (36.5676908d)			Proper Motion RA: 88.013 mas/yr					
			Dec: +06 17 33.19 (6.29255d)			Proper Motion Dec: -50.41899994466803 mas/yr					
			Equinox: J2000			Parallax: 0.020502600000000003"					
						Epoch of Position: 2000					
			Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.								
Template	SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.										
	Category=Star										
	Description=[Circumstellar disks, Circumstellar dust, Circumstellar gas, Debris disks]										
Dithers	Subarray										
	BRIGHTSKY										
Dithers	#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size	
	1	4-Point-Sets				1	1	EXTENDED SOURCE	POSITIVE	DEFAULT	
Spectral Elements	#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1	F2550W	FASTR1	23	15	1	Dither 1	4	60	1242.542	227065
Special Requirements	Offset 0.0 arcsec, 10.0 arcsec										

Proposal 8142 - Observation 2 - JEDIS: The JWST Eccentric debris Disk Survey

Observation	Proposal 8142, Observation 2: Roll 2										Wed Jan 21 19:00:55 GMT 2026
	Diagnostic Status: Warning										
	Observing Template: MIRI Imaging										
	Background Observations:[]										
Diagnostics	(Roll 2 (Obs 2)) Warning (Form): Target requiring background exposure selected for template that doesn't require background exposure										
	(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
	(Roll 2 (Obs 2)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.										
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections		Miscellaneous		
	(1)	HD-15115	RA: 02 26 16.2458 (36.5676908d) Dec: +06 17 33.19 (6.29255d) Equinox: J2000				Proper Motion RA: 88.013 mas/yr Proper Motion Dec: -50.41899994466803 mas/yr Parallax: 0.020502600000000003" Epoch of Position: 2000				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.										
	Category=Star Description=[Circumstellar disks, Circumstellar dust, Circumstellar gas, Debris disks]										
Template	Subarray										
	BRIGHTSKY										
Dithers	#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size	
	1	4-Point-Sets				1	1	EXTENDED SOURCE	POSITIVE	DEFAULT	
Spectral Elements	#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1	F2550W	FASTR1	23	15	1	Dither 1	4	60	1242.542	227065
Special Requirements	Offset 0.0 arcsec, 10.0 arcsec										
	Sequence Observations 7, 1, 2 (reordered), Non-interruptible Aperture PA Offset 2 from 1 by 10 to 14 Degrees (Same offsets in V3)										

Proposal 8142 - Observation 3 - JEDIS: The JWST Eccentric debris Disk Survey

Observation	Proposal 8142, Observation 3: Roll 1										Wed Jan 21 19:00:55 GMT 2026
	Diagnostic Status: Warning										
	Observing Template: MIRI Imaging										
	Background Observations:[Roll 2 (Obs 4), BACKGROUND (Obs 6)]										
Diagnostics	(Roll 1 (Obs 3)) Warning (Form): Target requiring background exposure selected for template that doesn't require background exposure										
	(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
	(Roll 1 (Obs 3)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.										
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous		
	(2)	HD-53143	RA: 06 59 59.6551 (104.9985629d) Dec: -61 20 10.25 (-61.33618d) Equinox: J2000			Proper Motion RA: -161.873 mas/yr Proper Motion Dec: 264.836 mas/yr Parallax: 0.05452519999999996" Epoch of Position: 2000					
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.										
	Category=Star Description=[Circumstellar disks, Circumstellar dust, Circumstellar gas, Debris disks]										
Template	Subarray										
	BRIGHTSKY										
Dithers	#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size	
	1	4-Point-Sets				1	1	EXTENDED SOURCE	POSITIVE	DEFAULT	
Spectral Elements	#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1	F2550W	FASTR1	10	30	1	Dither 1	4	120	1138.708	227065
Special Requirements	Offset 0.0 arcsec, 10.0 arcsec										
	Group Observations 3, 4, 6, Non-interruptible Aperture PA Offset 3 from 4 by 10 to 14 Degrees (Same offsets in V3)										

Proposal 8142 - Observation 4 - JEDIS: The JWST Eccentric debris Disk Survey

Observation	Proposal 8142, Observation 4: Roll 2										
	Diagnostic Status: Warning										
	Observing Template: MIRI Imaging										
	Background Observations:[Roll 1 (Obs 3), BACKGROUND (Obs 6)]										
Diagnostics	(Roll 2 (Obs 4)) Warning (Form): Target requiring background exposure selected for template that doesn't require background exposure										
	(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
	(Roll 2 (Obs 4)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.										
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Miscellaneous			
	(2)	HD-53143	RA: 06 59 59.6551 (104.9985629d) Dec: -61 20 10.25 (-61.33618d) Equinox: J2000			Proper Motion RA: -161.873 mas/yr Proper Motion Dec: 264.836 mas/yr Parallax: 0.05452519999999996" Epoch of Position: 2000					
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.										
	Category=Star Description=[Circumstellar disks, Circumstellar dust, Circumstellar gas, Debris disks]										
Template	Subarray										
	BRIGHTSKY										
Dithers	#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size	
	1	4-Point-Sets				1	1	EXTENDED SOURCE	POSITIVE	DEFAULT	
Spectral Elements	#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1	F2550W	FASTR1	10	30	1	Dither 1	4	120	1138.708	227065
Special Requirements	Offset 0.0 arcsec, 10.0 arcsec										
	Group Observations 3, 4, 6, Non-interruptible Aperture PA Offset 3 from 4 by 10 to 14 Degrees (Same offsets in V3)										

Proposal 8142 - Observation 6 - JEDIS: The JWST Eccentric debris Disk Survey

Observation	Proposal 8142, Observation 6: BACKGROUND										Wed Jan 21 19:00:55 GMT 2026
	Diagnostic Status: Warning										
	Observing Template: MIRI Imaging										
	Background Observation For: [Roll 1 (Obs 3), Roll 2 (Obs 4)]										
	Comments: Background source for calibration										
Diagnostics	(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections		Miscellaneous		
	(4)	BACKGROUND_HD53143	RA: 06 58 59.6551 (104.7485629d) Dec: -61 20 10.25 (-61.33618d) Equinox: J2000								
	Comments: Category=Calibration Description=[External flat field]										
Template	Subarray										
	BRIGHTSKY										
Dithers	#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size	
	1	4-Point-Sets				1	1	EXTENDED SOURCE	POSITIVE	DEFAULT	
Spectral Elements	#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1	F2550W	FASTR1	10	30	1	Dither 1	4	120	1138.708	227065
Special Requirements	Group Observations 3, 4, 6, Non-interruptible										