



8714 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold Jupiter

Cycle: 4, Proposal Category: GO

INVESTIGATORS

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Dr. William Raal Thompson (CoI) (CSA Member)	NRC Herzberg Institute of Astrophysics
Dr. Heather A. Knutson (CoI)	California Institute of Technology
Dr. Rebecca Oppenheimer (CoI)	American Museum of Natural History
Dr. Christian Marois (CoI) (CSA Member)	Dominion Astrophysical Observatory
Dr. Alexander Bogdan Madurowicz (CoI)	Space Telescope Science Institute
Katelyn Horstman (CoI)	California Institute of Technology
Prof. Bjorn Benneke (CoI)	University of California - Los Angeles

OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
NIRSpec IFU Spectroscopy				
	1	NIRSpec roll 1	NIRSpec IFU Spectroscopy	(3) -eps-Ind-Ab
	2	NIRSpec roll 2	NIRSpec IFU Spectroscopy	(3) -eps-Ind-Ab
MIRI MRS Spectroscopy-SLOWR1				
	3	MIRI roll 1	MIRI Medium Resolution Spectroscopy	(3) -eps-Ind-Ab

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
	4	MIRI roll 2	MIRI Medium Resolution Spectroscopy	(3) -eps-Ind-Ab
	5	MIRI BACKGROUND	MIRI Medium Resolution Spectroscopy	(3) -eps-Ind-Ab
NIRCam Imaging				
	6	NIRCam roll 1	NIRCam Coronagraphic Imaging	(2) -eps-Ind
	7	NIRCam roll 2	NIRCam Coronagraphic Imaging	(2) -eps-Ind

ABSTRACT

eps Indi Ab is the first mature ($\sim 2\text{-}6$ Gyr) cold Jupiter (~ 275 K) to be directly imaged. Orbiting a mid-K star with a semi-major axis of 21 ± 4 AU, the planet has a dynamical mass of 9.2 ± 0.8 MJup from an updated orbital analysis. So far, the planet has only been detected in two filters with MIRI imaging (10.65 and 15.5 microns), resulting in very limited information about its atmosphere. We propose to comprehensively characterize eps Indi Ab's atmosphere with NIRSpec and MIRI medium-resolution spectroscopy (3-20 micron) along with near-infrared photometry (3.9-4.4 micron). These observations will provide the first measurements of deuterium (D, from CH₃D) and a nitrogen isotopologue (15N, from 15NH₃) in any exoplanet to date, allowing us to test whether its D/H and 15N/14N are enriched, like Uranus or Neptune, or whether it follows the protostellar values. We will complement these isotopic ratios with precise measurements of N/H, S/H, C/H, O/H, and 13C/12C to test major uncertainties in planet formation models. These include 1) whether late-stage solid accretion significantly enriches the atmospheres of giant planets, 2) the relative role of pebble v.s. planetesimal accretion in forming wide-separation (>10 AU) giant planets, and 3) the degree to which these planets subsequently undergo migration. Most of the stellar abundances used for comparison with the planet values will be measured from planned Cycle 3 observations (GO 5765) of eps Indi BC, the T dwarf binary in the same system.

OBSERVING DESCRIPTION

We will collect medium resolution spectroscopy of eps Indi Ab using the NIRSpec IFU and MIRI MRS, as well as NIRCam coronagraphic imaging in two filters.

The NIRSpec IFU observations will use the 2.9-5.3 micron filter (F290LP) at moderate resolution (G395H; $R \sim 2,700$). The speckles at the planet's location will likely be brighter than the planet itself, so we split the observations into two rolls in order to perform angular differential imaging (ADI) and subtract the stellar halo. We choose 16 dithers to overcome systematics introduced by spatial undersampling of the NIRSpec detector.

The MIRI MRS observations will be performed in four channels with all three dispersers. Together, this covers a wavelength range of $\sim 5\text{-}28$ micron. The maximum of 4 dithers is selected. We select simultaneous imaging with the MIRI imager to obtain accurate astrometry which will help with the

reduction of the dithered MRS observations. We also split the MIRI MRS observations into two rolls in order to perform ADI subtraction of the speckles.

For both NIRSpec and MIRI, the planet's spectrum will be extracted using proven high-contrast techniques from Cycle 1 and 2 observations, which have been shown to reach the photon-noise limit. The planet's spectrum will be high-pass filtered in order to subtract the stellar speckles, so we will use the requested NIRCcam photometry and archival MIRI photometry to anchor the continuum flux level.

With NIRCcam, we will obtain imaging with the F410M and F430M filters using the round coronagraphic mask MASK430R (best performance at >1.5 arcsec). This choice of filters covers peaks in the planet flux for all plausible models and offers the highest S/N for detection. For each filter, we will obtain imaging of eps Ind Ab with two roll angles spaced by 10-14 degrees to use ADI for subtracting the stellar PSF. Given the large separation of the planet (~ 3.65 arcsec), we do not require reference star observations.

Proposal 8714 - Targets - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold Jupiter

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	-eps-Ind	RA: 22 03 29.3779 (330.8724079d) Dec: -56 47 50.12 (-56.79726d) Equinox: J2000	Proper Motion RA: 3966.661 mas/yr Proper Motion Dec: -2536.192 mas/yr Parallax: 0.2748431" Epoch of Position: 2016	
Fixed Targets	<p><i>Comments: Using the Gaia DR3 coordinates at Epoch = 2016.</i> Category=Star Description=[K dwarfs] Extended=NO</p>			
	(3)	-eps-Ind-Ab	RA: 22 03 29.6255 (330.8734396d) Dec: -56 47 47.15 (-56.79643d) Equinox: J2000	Proper Motion RA: 3966.661 mas/yr Proper Motion Dec: -2536.192 mas/yr Parallax: 0.2748431" Epoch of Position: 2016
<p><i>Comments: This is the science target, a planet around eps Indi A. The NIRSpect and MIRI observations will be centered around the planet. NIRCcam coronagraphy will be centered around the star.</i></p>				
<p><i>The planet's relative astrometry is determined from an updated orbit fit.</i> Category=Star Description=[Exoplanets] Extended=NO</p>				

Proposal 8714 - Observation 1 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

Tue Aug 26 21:00:17 GMT 2025

Observation	<p>Proposal 8714, Observation 1: NIRSpec roll 1</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSpec IFU Spectroscopy</p> <p><i>Comments: Added V3PA range constraints to avoid the science target landing on its host star's diffraction features.</i></p>											
	<p>(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(NIRSpec roll 1 (Obs 1)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>											
Diagnosics												
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous			
	(3)	-eps-Ind-Ab	RA: 22 03 29.6255 (330.8734396d) Dec: -56 47 47.15 (-56.79643d) Equinox: J2000			Proper Motion RA: 3966.661 mas/yr Proper Motion Dec: -2536.192 mas/yr Parallax: 0.2748431" Epoch of Position: 2016						
<p><i>Comments: This is the science target, a planet around eps Indi A. The NIRSpec and MIRI observations will be centered around the planet. NIRCcam coronagraphy will be centered around the star.</i></p> <p><i>The planet's relative astrometry is determined from an updated orbit fit.</i></p> <p>Category=Star Description=[Exoplanets] Extended=NO</p>												
Template	TA Method						HFF Readout Mode					
	NONE						false					
Dithers	#	Dither Type		Size	Starting Point		Number of Points	Points				
	1	CYCLING		SMALL	1		16					
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1	G395H/F290LP	NRSIRS2RAPID	33	1	false	true	NONE	16	16	7936.356	
Special Requirements	Aperture PA Range 8.97164917 to 38.97164917 Degrees (V3 230.0 to 260.0) Aperture PA Range 128.97164917 to 158.97164917 Degrees (V3 350.0 to 20.0) Aperture PA Range 188.97164917 to 218.97164917 Degrees (V3 50.0 to 80.0) Aperture PA Range 308.97164917 to 338.97164917 Degrees (V3 170.0 to 200.0)											
	Group Observations 1, 2, Non-interruptible Aperture PA Offset 1 from 2 by 9 to 16 Degrees (Same offsets in V3)											

Proposal 8714 - Observation 2 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

Tue Aug 26 21:00:17 GMT 2025

Observation	<p>Proposal 8714, Observation 2: NIRSpec roll 2</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSpec IFU Spectroscopy</p> <p><i>Comments: Added V3PA range constraints to avoid the science target landing on its host star's diffraction features.</i></p>											
	<p>(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(NIRSpec roll 2 (Obs 2)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>											
Diagnosics												
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous			
	(3)	-eps-Ind-Ab	RA: 22 03 29.6255 (330.8734396d) Dec: -56 47 47.15 (-56.79643d) Equinox: J2000			Proper Motion RA: 3966.661 mas/yr Proper Motion Dec: -2536.192 mas/yr Parallax: 0.2748431" Epoch of Position: 2016						
<p><i>Comments: This is the science target, a planet around eps Indi A. The NIRSpec and MIRI observations will be centered around the planet. NIRCcam coronagraphy will be centered around the star.</i></p> <p><i>The planet's relative astrometry is determined from an updated orbit fit.</i></p> <p>Category=Star Description=[Exoplanets] Extended=NO</p>												
Template	TA Method						HFF Readout Mode					
	NONE						false					
Dithers	#	Dither Type		Size	Starting Point		Number of Points	Points				
	1	CYCLING		SMALL	1		16					
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1	G395H/F290LP	NRSIRS2RAPID	33	1	false	true	NONE	16	16	7936.356	
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	Group Observations 1, 2, Non-interruptible Aperture PA Offset 1 from 2 by 9 to 16 Degrees (Same offsets in V3)											

Proposal 8714 - Observation 3 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

Tue Aug 26 21:00:17 GMT 2025

Observation	<p>Proposal 8714, Observation 3: MIRI roll 1</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: MIRI Medium Resolution Spectroscopy</p> <p><i>Comments: Justification of data excess: these observations provide the minimum S/N to make a confident detection of 15NH3, and constrain 15N/14N at the 20% level. We require all 3 sub-bands to detect all molecules and isotopologues of interest. The dithers are important in order to spatially sample the detector better.</i></p> <p><i>Added V3PA range constraints to avoid the science target landing on its host star's diffraction features.</i></p> <p><i>The MIRI observations are ordered into a non-interruptible sequence.</i></p> <p><i>The simultaneous imaging when MRS observes the science target is used to acquire sky backgrounds. Therefore, the Warning (Form): Imager Filter overlap is not relevant. These imager backgrounds will be used to calibrate the imaging data in Obs 5, when MRS observes the BKG and the imager observes the science target.</i></p>														
Diagnostics	<p>(MIRI roll 1 (Obs 3)) Warning (Form): Imager Filter overlap.</p> <p>(MIRI roll 1 (Obs 3)) Warning (Form): Imager Filter overlap.</p> <p>(MIRI roll 1 (Obs 3)) Warning (Form): Imager Filter overlap.</p> <p>(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(MIRI roll 1 (Obs 3)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>														
Fixed Targets	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Target Coord. Corrections</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(3)</td> <td>-eps-Ind-Ab</td> <td>RA: 22 03 29.6255 (330.8734396d) Dec: -56 47 47.15 (-56.79643d) Equinox: J2000</td> <td>Proper Motion RA: 3966.661 mas/yr Proper Motion Dec: -2536.192 mas/yr Parallax: 0.2748431" Epoch of Position: 2016</td> <td></td> </tr> </tbody> </table> <p><i>Comments: This is the science target, a planet around eps Indi A. The NIRSpec and MIRI observations will be centered around the planet. NIRCcam coronagraphy will be centered around the star.</i></p> <p><i>The planet's relative astrometry is determined from an updated orbit fit.</i></p> <p>Category=Star Description=[Exoplanets] Extended=NO</p>					#	Name	Target Coordinates	Target Coord. Corrections	Miscellaneous	(3)	-eps-Ind-Ab	RA: 22 03 29.6255 (330.8734396d) Dec: -56 47 47.15 (-56.79643d) Equinox: J2000	Proper Motion RA: 3966.661 mas/yr Proper Motion Dec: -2536.192 mas/yr Parallax: 0.2748431" Epoch of Position: 2016	
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1	NONE														
Template	<table border="1"> <thead> <tr> <th>AcqFilter</th> <th>Primary Channel</th> <th>Simultaneous Imaging</th> <th>Imager Subarray</th> <th>Grating Wheel Direction</th> </tr> </thead> <tbody> <tr> <td></td> <td>All MRS</td> <td>YES</td> <td>FULL</td> <td>Allow Auto Reorder</td> </tr> </tbody> </table>					AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction		All MRS	YES	FULL	Allow Auto Reorder
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Dithers	<table border="1"> <thead> <tr> <th>#</th> <th>Dither Type</th> <th>Optimized For</th> <th>Direction</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4-Point</td> <td>EXTENDED SOURCE</td> <td>NEGATIVE</td> </tr> </tbody> </table>					#	Dither Type	Optimized For	Direction	1	4-Point	EXTENDED SOURCE	NEGATIVE		
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1	4-Point	EXTENDED SOURCE	NEGATIVE												

Proposal 8714 - Observation 3 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

Spectral Elements	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	Spectral Elements	1		IMAGER	F1800W	FASTR1	5	53	1	Dither 1	4	212	3518.751
1		LONG(C)	MRSLONG		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
1		LONG(C)	MRSSHORT		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
2			IMAGER	F2100W	FASTR1	5	53	1	Dither 1	4	212	3518.751	
2		MEDIUM(B)	MRSLONG		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
2		MEDIUM(B)	MRSSHORT		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
3			IMAGER	F2550W	FASTR1	5	53	1	Dither 1	4	212	3518.751	
3		SHORT(A)	MRSLONG		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
3		SHORT(A)	MRSSHORT		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
Special Requirements	Aperture PA Range 50.0 to 80.0 Degrees (V3 50.0 to 80.0)												
	Aperture PA Range 170.0 to 200.0 Degrees (V3 170.0 to 200.0)												
	Aperture PA Range 350.0 to 20.0 Degrees (V3 350.0 to 20.0)												
	Group Observations 3, 4, 5, Non-interruptible Aperture PA Offset 3 from 4 by 10 to 16 Degrees (Same offsets in V3)												

Proposal 8714 - Observation 4 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

Tue Aug 26 21:00:17 GMT 2025

Observation	<p>Proposal 8714, Observation 4: MIRI roll 2</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: MIRI Medium Resolution Spectroscopy</p> <p><i>Comments: Justification of data excess: these observations provide the minimum S/N to make a confident detection of 15NH3, and constrain 15N/14N at the 20% level. We require all 3 sub-bands to detect all molecules and isotopologues of interest. The dithers are important in order to spatially sample the detector better.</i></p> <p><i>Added V3PA range constraints to avoid the science target landing on its host star's diffraction features.</i></p> <p><i>The simultaneous imaging when MRS observes the science target is used to acquire sky backgrounds. Therefore, the Warning (Form): Imager Filter overlap is not relevant. These imager backgrounds will be used to calibrate the imaging data in Obs 5, when MRS observes the BKG and the imager observes the science target.</i></p>														
Diagnostics	<p>(MIRI roll 2 (Obs 4)) Warning (Form): Imager Filter overlap.</p> <p>(MIRI roll 2 (Obs 4)) Warning (Form): Imager Filter overlap.</p> <p>(MIRI roll 2 (Obs 4)) Warning (Form): Imager Filter overlap.</p> <p>(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(MIRI roll 2 (Obs 4)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>														
Fixed Targets	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(3)</td> <td>-eps-Ind-Ab</td> <td>RA: 22 03 29.6255 (330.8734396d) Dec: -56 47 47.15 (-56.79643d) Equinox: J2000</td> <td>Proper Motion RA: 3966.661 mas/yr Proper Motion Dec: -2536.192 mas/yr Parallax: 0.2748431" Epoch of Position: 2016</td> <td></td> </tr> </tbody> </table> <p><i>Comments: This is the science target, a planet around eps Indi A. The NIRSpec and MIRI observations will be centered around the planet. NIRCcam coronagraphy will be centered around the star.</i></p> <p><i>The planet's relative astrometry is determined from an updated orbit fit.</i></p> <p><i>Category=Star</i> <i>Description=[Exoplanets]</i> <i>Extended=NO</i></p>					#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous	(3)	-eps-Ind-Ab	RA: 22 03 29.6255 (330.8734396d) Dec: -56 47 47.15 (-56.79643d) Equinox: J2000	Proper Motion RA: 3966.661 mas/yr Proper Motion Dec: -2536.192 mas/yr Parallax: 0.2748431" Epoch of Position: 2016	
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(3)	-eps-Ind-Ab	RA: 22 03 29.6255 (330.8734396d) Dec: -56 47 47.15 (-56.79643d) Equinox: J2000	Proper Motion RA: 3966.661 mas/yr Proper Motion Dec: -2536.192 mas/yr Parallax: 0.2748431" Epoch of Position: 2016												
Acquisition	<table border="1"> <thead> <tr> <th>#</th> <th>Target</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>NONE</td> </tr> </tbody> </table>					#	Target	1	NONE						
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Template	<table border="1"> <thead> <tr> <th>AcqFilter</th> <th>Primary Channel</th> <th>Simultaneous Imaging</th> <th>Imager Subarray</th> <th>Grating Wheel Direction</th> </tr> </thead> <tbody> <tr> <td></td> <td>All MRS</td> <td>YES</td> <td>FULL</td> <td>Allow Auto Reorder</td> </tr> </tbody> </table>					AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction		All MRS	YES	FULL	Allow Auto Reorder
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Dithers	<table border="1"> <thead> <tr> <th>#</th> <th>Dither Type</th> <th>Optimized For</th> <th>Direction</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4-Point</td> <td>EXTENDED SOURCE</td> <td>NEGATIVE</td> </tr> </tbody> </table>					#	Dither Type	Optimized For	Direction	1	4-Point	EXTENDED SOURCE	NEGATIVE		
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1	4-Point	EXTENDED SOURCE	NEGATIVE												

Proposal 8714 - Observation 4 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

Spectral Elements	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
		1		IMAGER	F1800W	FASTR1	5	53	1	Dither 1	4	212	3518.751
	1	LONG(C)	MRSLONG		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
	1	LONG(C)	MRSSHORT		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
	2		IMAGER	F2100W	FASTR1	5	53	1	Dither 1	4	212	3518.751	
	2	MEDIUM(B)	MRSLONG		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
	2	MEDIUM(B)	MRSSHORT		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
	3		IMAGER	F2550W	FASTR1	5	53	1	Dither 1	4	212	3518.751	
	3	SHORT(A)	MRSLONG		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
	3	SHORT(A)	MRSSHORT		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
Special Requirements	Aperture PA Range 50.0 to 80.0 Degrees (V3 50.0 to 80.0) Aperture PA Range 170.0 to 200.0 Degrees (V3 170.0 to 200.0) Aperture PA Range 350.0 to 20.0 Degrees (V3 350.0 to 20.0) Group Observations 3, 4, 5, Non-interruptible Aperture PA Offset 3 from 4 by 10 to 16 Degrees (Same offsets in V3)												

Proposal 8714 - Observation 5 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

Tue Aug 26 21:00:17 GMT 2025

Observation	Proposal 8714, Observation 5: MIRI BACKGROUND Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy <i>Comments: Added MIRI MRS dedicated BACKGROUND observation. The MIRI Imager will be used simultaneously to observe the star-planet system, hence primary channel = Imager.</i> <i>The MIRI MRS field will land on regions of the sky with no obvious point source (background star/galaxy).</i>												
	(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
Diagnostics													
Fixed Targets	#	Name	Target Coordinates			Target, Coord. Corrections			Miscellaneous				
	(3)	-eps-Ind-Ab	RA: 22 03 29.6255 (330.8734396d) Dec: -56 47 47.15 (-56.79643d) Equinox: J2000			Proper Motion RA: 3966.661 mas/yr Proper Motion Dec: -2536.192 mas/yr Parallax: 0.2748431" Epoch of Position: 2016							
<i>Comments: This is the science target, a planet around eps Indi A. The NIRSpec and MIRI observations will be centered around the planet. NIRCcam coronagraphy will be centered around the star.</i> <i>The planet's relative astrometry is determined from an updated orbit fit.</i> Category=Star Description=[Exoplanets] Extended=NO													
Acquisition	#	Target											
	1	NONE											
Template	AcqFilter	Primary Channel			Simultaneous Imaging			Imager Subarray		Grating Wheel Direction			
		Imager			YES			FULL		Allow Auto Reorder			
Dithers	#	Dither Type				Optimized For				Direction			
	1	4-Point				BACKGROUND				NEGATIVE			
Spectral Elements	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1		IMAGER	F1800W	FASTR1	5	53	1	Dither 1	4	212	3518.751	
	1	LONG(C)	MRSLONG		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
	1	LONG(C)	MRSSHORT		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
	2		IMAGER	F2100W	FASTR1	5	53	1	Dither 1	4	212	3518.751	
	2	MEDIUM(B)	MRSLONG		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
	2	MEDIUM(B)	MRSSHORT		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
	3		IMAGER	F2550W	FASTR1	5	53	1	Dither 1	4	212	3518.751	
	3	SHORT(A)	MRSLONG		SLOWR1	18	2	1	Dither 1	4	8	3535.708	
	3	SHORT(A)	MRSSHORT		SLOWR1	18	2	1	Dither 1	4	8	3535.708	

Proposal 8714 - Observation 5 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

Special Requirements

Aperture PA Range 54.83544897 to 84.83544897 Degrees (V3 50.0 to 80.0)
Aperture PA Range 174.83544897 to 204.83544897 Degrees (V3 170.0 to 200.0)
Aperture PA Range 354.83544897 to 24.83544897 Degrees (V3 350.0 to 20.0)

Group Observations 3, 4, 5, Non-interruptible

Proposal 8714 - Observation 6 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

Tue Aug 26 21:00:17 GMT 2025

Observation	<p>Proposal 8714, Observation 6: NIRCam roll 1</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCam Coronagraphic Imaging</p> <p><i>Comments: We do not need a reference star observation, as the planet is located at a separation of ~3.65 arcsec from the star, where ADI is shown to perform as good as RDI+ADI.</i></p> <p><i>Justification of data excess: our integration time of 1800 sec (30 min, split into 2 rolls) is necessary to detect the planet with S/N>10. The 2 rolls are necessary for ADI subtraction of the host star PSF.</i></p> <p><i>The offset values were provided by our NIRCam instrument reviewer (Girard).</i></p>																																							
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Proposal 8714 - Observation 6 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

PSF References	NIRCam roll 2 (Obs 7) (Filters [F200W/F410M, F200W/F430M]) Additional Justification: true
Special Requirements	Aperture PA Range 260 to 24 Degrees (V3 259.82286192 to 23.82286192) Offset -0.01 arcsec, -0.018 arcsec No Parallel Attachments Sequence Observations 6, 7, Non-interruptible Aperture PA Offset 7 from 6 by 10 to 14 Degrees (Same offsets in V3)

Proposal 8714 - Observation 7 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

Tue Aug 26 21:00:17 GMT 2025

Observation	<p>Proposal 8714, Observation 7: NIRCcam roll 2</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p> <p><i>Comments: Justification of data excess: our integration time of 1800 sec (30 min, split into 2 rolls) is necessary to detect the planet with S/N>10. The 2 rolls are necessary for ADI subtraction of the host star PSF.</i></p> <p><i>We do not need a reference star observation, as the planet is located at a separation of ~3.65 arcsec from the star, where ADI is shown to perform as good as RDI+ADI.</i></p> <p><i>The offset values were provided by our NIRCcam instrument reviewer (Girard).</i></p>																																							
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Proposal 8714 - Observation 7 - Combining isotopic and elemental abundances to unveil the formation and accretion history of a cold ...

PSF References	NIRCam roll 1 (Obs 6) (Filters [F200W/F410M, F200W/F430M]) Additional Justification: true
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