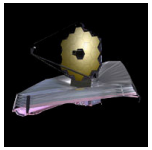

3760 - Investigating the cause of the 3 µm absorption feature on asteroids

Cycle: 2, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
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Margaret McAdam (CoI)	NASA Ames Research Center
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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Polana				
	1	Polana NIR	NIRSpec IFU Spectroscopy	(1) POLANA_NIRSpec
	2	Polana MIR	MIRI Medium Resolution Spectroscopy	(5) POLANA_MIRI
	5	Polana MIR BACKGROUND	MIRI Medium Resolution Spectroscopy	(3) POLANA-BACKGROUND
Henrietta				
	3	Henrietta NIR	NIRSpec IFU Spectroscopy	(2) HENRIETTA_NIRSpec
	4	Henrietta MIR	MIRI Medium Resolution Spectroscopy	(6) HENRIETTA_MIRI
	7	Henrietta MIR	MIRI Medium Resolution Spectroscopy	(6) HENRIETTA_MIRI
	6	Henrietta MIR BACKGROUND	MIRI Medium Resolution Spectroscopy	(4) HENRIETTA-BACKGROUND
	8	Henrietta MIR BACKGROUND	MIRI Medium Resolution Spectroscopy	(4) HENRIETTA-BACKGROUND

ABSTRACT

Correlating the abundance of hydration on asteroids with their location in the asteroid belt can constrain conditions and subsequent evolution of the early solar system, with additional implications for how water was delivered to Earth. Hypotheses related to the distribution of hydration in the solar system can be tested by observing compositionally similar asteroids in different regions of the asteroid belt. A widely used method for determining hydration on asteroids is through the detection of an absorption band near 3 micron caused by the O-H fundamental stretching mode. The band center and shape of the 3 micron feature has implications for the type and abundance of asteroidal hydration. There is no way to distinguish the cause of the 3 micron feature (H2O, aqueously altered minerals, or a combination of both) without spectra at complementary wavelengths. The MIR spectral region offers an opportunity to disentangle the effects of H2O and aqueously altered minerals on asteroid surfaces. Molecular H2O and aqueously altered minerals have distinct spectral features across the MIR bandpass. The goal of this program is to use MIRI MRS and NIRSpec IFU to distinguish between water ice, aqueously altered minerals, or a combination of both as the compositional component(s) responsible for the 3 micron absorption. We will observe two asteroids that are representatives of two major groupings of asteroids defined by their 3 micron band shapes: (142) Polana and (225) Henrietta. We will compare the spectra from both intruments from labratory spectra of relevant minerals to constrain the compositions of both asteroids and determine the level of aqueous alteration on both.

OBSERVING DESCRIPTION

We propose to observe asteroids (142) Polana and (225) Henrietta using both NIRSpec IFU and MIRI MRS. We will detect and, if present, measure the band center and strength of the 3 micron feature, 6 micron feature, and features related to aqueously altered minerals located at 6.3, 6.5, 7.1, 9.0, 9.5, 12.0, 16.5. 20.6, and 22.5 micron. The JWST MTVT shows two possible observing windows for Henrietta and one for Polana. We request that the observation be made during the second observing window for Henrietta (2024-APR-04), as the object will be brighter and SNR will be higher.

We will use the NIRSpec Integral Field Unit (IFU) instrument to observe Polana and Henrietta to identify the presence and shape of the 3 micron feature. We require a wavelength range of 2.2-4.0 micron to sufficiently characterize band shape. We will use the medium spectral resolution configuration with disperser-filter combinations G235M/F170LP (1.66-3.07 micron) and G395M/F290LP (2.87-5.10 micron). The total wavelength range of 1.66-5.10 micron is more than enough to establish the baseline continuum needed for accurate measurement of the 3 micron band. Based on previous 3 micron measurements, we require SNR > 10 to effectively characterize shape, strength, and band center. The ETC calculated exposure times for both filters are 350 seconds. We will use the FULL subarray and the NRSIRS2RAPID readout pattern. Each observation also includes a nod off scene with the aperture centered on the source.

We will use the MIRI Medium Resolution Spectroscopy (MRS) instrument to observe both asteroids to identify the presence and strength of spectral

features corresponding to molecular H2O and aqueously altered minerals. We will use all four wavelength channels to cover the wavelengths of expected spectral features. Based on previous detections of the 6 micron band, we require a SNR > 100 for all channels. The ETC calculated exposure times are 410, 133, 1098, 432, 144, and 1154 seconds for SHORTA, SHORTB, SHORTC, LONGA, LONGB, LONGC, respectively. These exposure times allow for every wavelength to have at least SNR of 100 while ensuring that the detector does not saturate. We will use the FULL subarray and the FASTR1 readout pattern. Each observation also includes a nod off scene with the aperture centered on the source.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(1)	POLANA_NIRSpec	TYPE=ASTEROID,A=2.418400838689463,E=0.1343702637350477,I=2.238331996486044,O=291.2775799876144,W=291.8823125552266,M=330.7188682215486,EQUINOX=J2000,EPOCH=20-OCT-2014:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				
(2)	HENRIETTA_NIRSpec	TYPE=ASTEROID,A=3.392290347050211,E=0.2642092423551054,I=20.86732014646787,O=197.1167671565339,W=104.331257005989,M=337.3982208080213,EQUINOX=J2000,EPOCH=07-JUN-2013:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				
(3)	POLANA-BACKGROUND	TYPE=ASTEROID,A=2.418400838689463,E=0.1343702637350477,I=2.238331996486044,O=291.2775799876144,W=291.8823125552266,M=330.7188682215486,EQUINOX=J2000,EPOCH=20-OCT-2014:00:00:00,EpochTimeScale=TDB	TYPE=POS_ANGLE,RAD=300,ANG=0,REF=NORTH	
Comments: Extended=YES				
(4)	HENRIETTA-BACKGROUND	TYPE=ASTEROID,A=3.392290347050211,E=0.2642092423551054,I=20.86732014646787,O=197.1167671565339,W=104.331257005989,M=337.3982208080213,EQUINOX=J2000,EPOCH=07-JUN-2013:00:00:00,EpochTimeScale=TDB	TYPE=POS_ANGLE,RAD=300,ANG=0,REF=NORTH	
Comments: Extended=YES				
(5)	POLANA_MIRI	TYPE=ASTEROID,A=2.418400838689463,E=0.1343702637350477,I=2.238331996486044,O=291.2775799876144,W=291.8823125552266,M=330.7188682215486,EQUINOX=J2000,EPOCH=20-OCT-2014:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				
(6)	HENRIETTA_MIRI	TYPE=ASTEROID,A=3.392290347050211,E=0.2642092423551054,I=20.86732014646787,O=197.1167671565339,W=104.331257005989,M=337.3982208080213,EQUINOX=J2000,EPOCH=07-JUN-2013:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				

Observation

Proposal 3760, Observation 1: Polana NIR

Tue Dec 12 18:00:27 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

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

(Polana NIR (Obs 1)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(1)	POLANA_NIRSpec	TYPE=ASTEROID,A=2.418400838689463,E=0.1343702637350477,I=2.238331996486044,O=291.2775799876144,W=291.8823125552266,M=330.7188682215486,EQUINOX=J2000,EPOCH=20-OCT-2014:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Template

TA Method
NONE

Dithers

#	Dither Type	Size	Starting Point	Number of Points	Points
1	CYCLING	SMALL	1	4	

Spectral Elements

#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	G235M/F170LP	NRSIRS2RAPID	5	1	false	true	NONE	4	4	350.133	145285
2	G395M/F290LP	NRSIRS2RAPID	5	1	false	true	NONE	4	4	350.133	145285

Special Requirements

DEFAULT WINDOW: ANGULAR RATE POLANA_NIRSpec FROM JWST LESS THAN 0.075

Observation

Proposal 3760, Observation 2: Polana MIR Tue Dec 12 18:00:27 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[Polana MIR BACKGROUND (Obs 5)]

Diagnostics

(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Polana MIR (Obs 2)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(5)	POLANA_MIRI	TYPE=ASTEROID,A=2.418400838689463,E=0.1343702637350477,I=2.238331996486044,O=291.2775799876144,W=291.8823125552266,M=330.7188682215486,EQUINOX=J2000,EPOCH=20-OCT-2014:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	EXTENDED SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F770W	FASTR1	50	1	1	Dither 1	4	4	555.008	
1	LONG(C)	MRSLONG		FASTR1	6	15	1	Dither 1	4	60	1154.417	145285
1	LONG(C)	MRSSHORT		FASTR1	9	10	1	Dither 1	4	40	1098.916	145285
2		IMAGER	F770W	FASTR1	13	1	1	Dither 1	4	4	144.302	
2	MEDIUM(B)	MRSLONG		FASTR1	6	2	1	Dither 1	4	8	144.302	145285
2	MEDIUM(B)	MRSSHORT		FASTR1	12	1	1	Dither 1	4	4	133.202	145285
3		IMAGER	F770W	FASTR1	39	1	1	Dither 1	4	4	432.906	
3	SHORT(A)	MRSLONG		FASTR1	9	4	1	Dither 1	4	16	432.906	145285
3	SHORT(A)	MRSSHORT		FASTR1	18	2	1	Dither 1	4	8	410.706	145285

Special Requirements	
	Sequence Observations 2, 5, Non-interruptible DEFAULT WINDOW: ANGULAR RATE POLANA_MIRI FROM JWST LESS THAN 0.075

Observation

Proposal 3760, Observation 5: Polana MIR BACKGROUND Tue Dec 12 18:00:27 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [Polana MIR (Obs 2)]

Diagnostics

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

(Polana MIR BACKGROUND (Obs 5)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(3)	POLANA-BACKGROUND	TYPE=ASTEROID,A=2.418400838689463,E=0.1343702637350477,I=2.238331996486044,O=291.2775799876144,W=291.8823125552266,M=330.7188682215486,EQUINOX=J2000,EPOCH=20-OCT-2014:00:00:00,EpochTimeScale=TDB	TYPE=POS_ANGLE,RAD=300,ANG=0,REF=NORTH	

Comments: Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	FULL	NEUTRAL

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F770W	FASTR1	50	1	1	None	1	1	138.752	
1	LONG(C)	MRSLONG		FASTR1	6	15	1	None	1	15	288.604	145285
1	LONG(C)	MRSSHORT		FASTR1	9	10	1	None	1	10	274.729	145285
2		IMAGER	F770W	FASTR1	13	1	1	None	1	1	36.076	
2	MEDIUM(B)	MRSLONG		FASTR1	6	2	1	None	1	2	36.076	145285
2	MEDIUM(B)	MRSSHORT		FASTR1	12	1	1	None	1	1	33.3	145285
3		IMAGER	F770W	FASTR1	39	1	1	None	1	1	108.227	
3	SHORT(A)	MRSLONG		FASTR1	9	4	1	None	1	4	108.227	145285
3	SHORT(A)	MRSSHORT		FASTR1	18	2	1	None	1	2	102.676	145285

Special Requirements	
	Sequence Observations 2, 5, Non-interruptible DEFAULT WINDOW: ANGULAR RATE POLANA-BACKGROUND FROM JWST LESS THAN 0.075

Observation

Proposal 3760, Observation 3: Henrietta NIR

Tue Dec 12 18:00:27 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

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

(Henrietta NIR (Obs 3)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(2)	HENRIETTA_NIRSpec	TYPE=ASTEROID,A=3.392290347050211,E=0.2642092423551054,I=20.86732014646787,O=197.1167671565339,W=104.331257005989,M=337.3982208080213,EQUINOX=J2000,EPOCH=07-JUN-2013:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Template

TA Method
NONE

Dithers

#	Dither Type	Size	Starting Point	Number of Points	Points
1	CYCLING	SMALL	1	4	

Spectral Elements

#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	G235M/F170LP	NRSIRS2RAPID	5	1	false	true	NONE	4	4	350.133	145285
2	G395M/F290LP	NRSIRS2RAPID	5	1	false	true	NONE	4	4	350.133	145285

Special Requirements

DEFAULT WINDOW: ANGULAR RATE HENRIETTA_NIRSpec FROM JWST LESS THAN 0.075

Observation

Proposal 3760, Observation 4: Henrietta MIR Tue Dec 12 18:00:27 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[Henrietta MIR BACKGROUND (Obs 6)]

Diagnostics

(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Henrietta MIR (Obs 4)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(6)	HENRIETTA_MIRI	TYPE=ASTEROID,A=3.392290347050211,E=0.2642092423551054,I=20.86732014646787,O=197.1167671565339,W=104.331257005989,M=337.3982208080213,EQUINOX=J2000,EPOCH=07-JUN-2013:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	EXTENDED SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F770W	FASTR1	45	1	1	Dither 1	4	4	499.507	
1	LONG(C)	MRSLONG		FASTR1	43	1	1	Dither 1	4	4	477.307	145285
1	LONG(C)	MRSSHORT		FASTR1	22	2	1	Dither 1	4	8	499.507	145285
2		IMAGER	F770W	FASTR1	50	1	1	Dither 1	4	4	555.008	
2	MEDIUM(B)	MRSLONG		FASTR1	49	5	1	Dither 1	4	20	2763.94	145285
2	MEDIUM(B)	MRSSHORT		FASTR1	126	2	1	Dither 1	4	8	2808.34	145285
3		IMAGER	F770W	FASTR1	50	1	1	Dither 1	4	4	555.008	
3	SHORT(A)	MRSLONG		FASTR1	67	3	1	Dither 1	4	12	2253.332	145285
3	SHORT(A)	MRSSHORT		FASTR1	100	2	1	Dither 1	4	8	2231.132	145285

Special Requirements	
	Sequence Observations 4, 6, Non-interruptible DEFAULT WINDOW: ANGULAR RATE HENRIETTA_MIRI FROM JWST LESS THAN 0.075

Observation

Proposal 3760, Observation 7: Henrietta MIR Tue Dec 12 18:00:27 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[Henrietta MIR BACKGROUND (Obs 8)]

Diagnostics

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

(Henrietta MIR (Obs 7)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(6)	HENRIETTA_MIRI	TYPE=ASTEROID,A=3.392290347050211,E=0.2642092423551054,I=20.86732014646787,O=197.1167671565339,W=104.331257005989,M=337.3982208080213,EQUINOX=J2000,EPOCH=07-JUN-2013:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	EXTENDED SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F770W	FASTR1	45	1	1	Dither 1	4	4	499.507	
1	LONG(C)	MRSLONG		FASTR1	43	1	1	Dither 1	4	4	477.307	145285
1	LONG(C)	MRSSHORT		FASTR1	22	2	1	Dither 1	4	8	499.507	145285
2		IMAGER	F770W	FASTR1	50	1	1	Dither 1	4	4	555.008	
2	MEDIUM(B)	MRSLONG		FASTR1	49	5	1	Dither 1	4	20	2763.94	145285
2	MEDIUM(B)	MRSSHORT		FASTR1	126	2	1	Dither 1	4	8	2808.34	145285
3		IMAGER	F770W	FASTR1	50	1	1	Dither 1	4	4	555.008	
3	SHORT(A)	MRSLONG		FASTR1	67	3	1	Dither 1	4	12	2253.332	145285
3	SHORT(A)	MRSSHORT		FASTR1	100	2	1	Dither 1	4	8	2231.132	145285

Special Requirements	
	Sequence Observations 7, 8, Non-interruptible DEFAULT WINDOW: ANGULAR RATE HENRIETTA_MIRI FROM JWST LESS THAN 0.075

Observation

Proposal 3760, Observation 6: Henrietta MIR BACKGROUND Tue Dec 12 18:00:27 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [Henrietta MIR (Obs 4)]

Diagnostics

(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Henrietta MIR BACKGROUND (Obs 6)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(4)	HENRIETTA-BACKGROUND	TYPE=ASTEROID,A=3.392290347050211,E=0.2642092423551054,I=20.86732014646787,O=197.1167671565339,W=104.331257005989,M=337.3982208080213,EQUINOX=J2000,EPOCH=07-JUN-2013:00:00:00,EpochTimeScale=TDB	TYPE=POS_ANGLE,RAD=300,ANG=0,REF=NORTH	

Comments: Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	FULL	NEUTRAL

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F770W	FASTR1	45	1	1	None	1	1	124.877	
1	LONG(C)	MRSLONG		FASTR1	43	1	1	None	1	1	119.327	145285
1	LONG(C)	MRSSHORT		FASTR1	22	2	1	None	1	2	124.877	145285
2		IMAGER	F770W	FASTR1	50	1	1	None	1	1	138.752	
2	MEDIUM(B)	MRSLONG		FASTR1	49	5	1	None	1	5	690.985	145285
2	MEDIUM(B)	MRSSHORT		FASTR1	126	2	1	None	1	2	702.085	145285
3		IMAGER	F770W	FASTR1	50	1	1	None	1	1	138.752	
3	SHORT(A)	MRSLONG		FASTR1	67	3	1	None	1	3	563.333	145285
3	SHORT(A)	MRSSHORT		FASTR1	100	2	1	None	1	2	557.783	145285

Special Requirements	
	Sequence Observations 4, 6, Non-interruptible DEFAULT WINDOW: ANGULAR RATE HENRIETTA-BACKGROUND FROM JWST LESS THAN 0.075

Observation

Proposal 3760, Observation 8: Henrietta MIR BACKGROUND Tue Dec 12 18:00:27 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [Henrietta MIR (Obs 7)]

Diagnostics

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

(Henrietta MIR BACKGROUND (Obs 8)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(4)	HENRIETTA-BACKGROUND	TYPE=ASTEROID,A=3.392290347050211,E=0.2642092423551054,I=20.86732014646787,O=197.1167671565339,W=104.331257005989,M=337.3982208080213,EQUINOX=J2000,EPOCH=07-JUN-2013:00:00:00,EpochTimeScale=TDB	TYPE=POS_ANGLE,RAD=300,ANG=0,REF=NORTH	

Comments: Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	FULL	NEUTRAL

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F770W	FASTR1	45	1	1	None	1	1	124.877	
1	LONG(C)	MRSLONG		FASTR1	43	1	1	None	1	1	119.327	145285
1	LONG(C)	MRSSHORT		FASTR1	22	2	1	None	1	2	124.877	145285
2		IMAGER	F770W	FASTR1	50	1	1	None	1	1	138.752	
2	MEDIUM(B)	MRSLONG		FASTR1	49	5	1	None	1	5	690.985	145285
2	MEDIUM(B)	MRSSHORT		FASTR1	126	2	1	None	1	2	702.085	145285
3		IMAGER	F770W	FASTR1	50	1	1	None	1	1	138.752	
3	SHORT(A)	MRSLONG		FASTR1	67	3	1	None	1	3	563.333	145285
3	SHORT(A)	MRSSHORT		FASTR1	100	2	1	None	1	2	557.783	145285

Special Requirements	
	Sequence Observations 7, 8, Non-interruptible DEFAULT WINDOW: ANGULAR RATE HENRIETTA-BACKGROUND FROM JWST LESS THAN 0.075