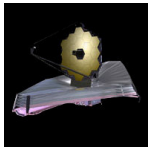

3779 - The MIRI MRS Library

Cycle: 2, Proposal Category: GO

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1	10 Lac bkg SHORT	MIRI Medium Resolution Spectroscopy	(1) 10LAC-BKG
	2	10 Lac mosaic SHORT	MIRI Medium Resolution Spectroscopy	(2) 10LAC
	3	10 Lac bkg MEDIUM	MIRI Medium Resolution Spectroscopy	(1) 10LAC-BKG
	4	10 Lac mosaic MEDIUM	MIRI Medium Resolution Spectroscopy	(2) 10LAC
	5	10 Lac bkg LONG	MIRI Medium Resolution Spectroscopy	(1) 10LAC-BKG
	6	10 Lac mosaic LONG	MIRI Medium Resolution Spectroscopy	(2) 10LAC

ABSTRACT

We propose the JWST Cycle 2 Calibration GO program, `The MIRI MRS library' in order to address the need for high spectroscopic fidelity in the mid-infrared. The goal of this proposal is to derive pointing-specific calibration solutions for spatially unresolved (point) sources. These solutions include pointing-specific: detector pixel non-linearity, fringe modulation, spectrophotometric correction, and detector-based point spread functions (PSFs). The MIRI MRS calibration pipeline outputs spectra in the 4.9 to 27.9 micron range with a spectral resolution of 4000-1500. The MRS has yielded never-before seen molecular features, and unprecedented sensitivity on the continuum of dust and ice features. Despite the breathtaking sensitivity of JWST and MIRI, persisting complex calibration issues bias the scientific interpretation of point source data: (1) detector-induced spectral fringes affect the pristine shape of molecular features, (2) amplifier-induced voltage-debiasing affects the pixel response, which in turn affects the shape of the continuum, (3) a significant non-repeatability of the MRS astrometric pointing causes both the fringes, the pixel response, and the detected PSF to be pointing-dependent. This calibration program will aim to fix these persisting issues for the largest majority of the MRS observations of point sources.

OBSERVING DESCRIPTION

The bright O9V star 10 Lac (HD 214680) will be observed in a 3x3 fine raster mosaic around the nominal 4-point POSITIVE and NEGATIVE dither positions. The source and the dedicated background have already been observed as part of the Cycle 1 calibration activity PID 1524. In order to achieve the required pointing separation for the raster points of the source a mosaic with 99% row and column overlap is used. This will allow to sample the PSF and the MRS spectral fringes in an intra-pixel pattern to derive optimized calibration files for all MRS point source observations. For each exposure a single integration with a FASTR1 read-out pattern is used, where the number of frames has been optimized to cover the pixel dynamic range in the MRS Channel 1 wavelengths (4.9-7.7 m). Target acquisition is taken using the source itself in order to make sure that the source location is within the required uncertainty for the purpose of this proposal. The dedicated background is taken with the same number of frames as the science source, in a 2-point point source dither pattern. This will allow to directly compare with the identical background taken as part of PID 1524. The background and science observations (obs 1 and obs 2) should be taken in a non-interruptible sequence.

Due to the implemented mosaic pattern, dither patterns, and number of frames per integration, the science observation (obs 2) has a data excess over the middle threshold. This is necessary in order to meet the goals of the calibration proposal.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	10LAC-BKG	RA: 22 39 18.9265 (339.8288604d) Dec: +39 01 37.59 (39.02711d) Equinox: J2000	Proper Motion RA: 0 mas/yr Proper Motion Dec: 0 mas/yr Parallax: 0"	
Comments: *Category=Calibration* *Description=[Telescope/sky background]* *Extended=YES*				
(2)	10LAC	RA: 22 39 15.6782 (339.8153258d) Dec: +39 03 0.89 (39.05025d) Equinox: J2000	Proper Motion RA: -2.7470389405505694E-5 sec of time/yr Proper Motion Dec: -0.005459999965751194 arcsec/yr Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Calibration* *Description=[Astrometric, Point spread function, Spectrophotometric]* *Extended=NO*				

Observation

Proposal 3779, Observation 1: 10 Lac bkg SHORT Wed Sep 13 21:01:31 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [10 Lac mosaic SHORT (Obs 2)]

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)	10LAC-BKG	RA: 22 39 18.9265 (339.8288604d)	Proper Motion RA: 0 mas/yr	
		Dec: +39 01 37.59 (39.02711d)	Proper Motion Dec: 0 mas/yr	
		Equinox: J2000	Parallax: 0"	

Comments:
Category=Calibration
Description=[Telescope/sky background]
Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	NO	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	2-Point	POINT 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	SHORT(A)	MRSLONG		FASTR1	100	1	1	Dither 1	2	2	555.008	
1	SHORT(A)	MRSSHORT		FASTR1	100	1	1	Dither 1	2	2	555.008	

Special Requirements	Sequence Observations 1, 2, Non-interruptible

Observation

Proposal 3779, Observation 2: 10 Lac mosaic SHORT Wed Sep 13 21:01:31 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[10 Lac bkg SHORT (Obs 1)]

Diagnostics

(Visit 2:1) Warning (Form): Data Excess over lower threshold

(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)	10LAC	RA: 22 39 15.6782 (339.8153258d) Dec: +39 03 0.89 (39.05025d) Equinox: J2000	Proper Motion RA: -2.7470389405505694E-5 sec of time/yr Proper Motion Dec: -0.005459999965751194 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Calibration
Description=[Astrometric, Point spread function, Spectrophotometric]
Extended=NO

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	FAST	4	1	1	11.1	116250

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	NO	FULL	NEUTRAL

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order
3	3	99.0	99.0	0.0	0.0	DEFAULT

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	POINT SOURCE	NEGATIVE
2	4-Point	POINT SOURCE	POSITIVE

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	SHORT(A)	MRSLONG		FASTR1	100	1	1	Dither 1	4	4	1110.016	
1	SHORT(A)	MRSSHORT		FASTR1	100	1	1	Dither 1	4	4	1110.016	
2	SHORT(A)	MRSLONG		FASTR1	100	1	1	Dither 2	4	4	1110.016	
2	SHORT(A)	MRSSHORT		FASTR1	100	1	1	Dither 2	4	4	1110.016	

Special Requirements	Sequence Observations 1, 2, Non-interruptible

Observation

Proposal 3779, Observation 3: 10 Lac bkg MEDIUM Wed Sep 13 21:01:31 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [10 Lac mosaic MEDIUM (Obs 4)]

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
(1)	10LAC-BKG	RA: 22 39 18.9265 (339.8288604d) Dec: +39 01 37.59 (39.02711d) Equinox: J2000	Proper Motion RA: 0 mas/yr Proper Motion Dec: 0 mas/yr Parallax: 0"	

Comments:
Category=Calibration
Description=[Telescope/sky background]
Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	NO	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	2-Point	POINT 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	MEDIUM(B)	MRSLONG		FASTR1	100	1	1	Dither 1	2	2	555.008	
1	MEDIUM(B)	MRSSHORT		FASTR1	100	1	1	Dither 1	2	2	555.008	

Special Requirements	Sequence Observations 3, 4, Non-interruptible

Observation

Proposal 3779, Observation 4: 10 Lac mosaic MEDIUM Wed Sep 13 21:01:31 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[10 Lac bkg MEDIUM (Obs 3)]

Diagnostics

(Visit 4:1) Warning (Form): Data Excess over lower threshold

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	10LAC	RA: 22 39 15.6782 (339.8153258d) Dec: +39 03 0.89 (39.05025d) Equinox: J2000	Proper Motion RA: -2.7470389405505694E-5 sec of time/yr Proper Motion Dec: -0.005459999965751194 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Calibration
Description=[Astrometric, Point spread function, Spectrophotometric]
Extended=NO

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	FAST	4	1	1	11.1	116250

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	NO	FULL	NEUTRAL

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order
3	3	99.0	99.0	0.0	0.0	DEFAULT

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	POINT SOURCE	NEGATIVE
2	4-Point	POINT SOURCE	POSITIVE

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	MEDIUM(B)	MRSLONG		FASTR1	100	1	1	Dither 1	4	4	1110.016	
1	MEDIUM(B)	MRSSHORT		FASTR1	100	1	1	Dither 1	4	4	1110.016	
2	MEDIUM(B)	MRSLONG		FASTR1	100	1	1	Dither 2	4	4	1110.016	
2	MEDIUM(B)	MRSSHORT		FASTR1	100	1	1	Dither 2	4	4	1110.016	

Special Requirements	Sequence Observations 3, 4, Non-interruptible

Observation

Proposal 3779, Observation 5: 10 Lac bkg LONG Wed Sep 13 21:01:31 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [10 Lac mosaic LONG (Obs 6)]

Diagnostics

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	10LAC-BKG	RA: 22 39 18.9265 (339.8288604d) Dec: +39 01 37.59 (39.02711d) Equinox: J2000	Proper Motion RA: 0 mas/yr Proper Motion Dec: 0 mas/yr Parallax: 0"	

Comments:
Category=Calibration
Description=[Telescope/sky background]
Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	NO	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	2-Point	POINT 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	LONG(C)	MRSLONG		FASTR1	100	1	1	Dither 1	2	2	555.008	
1	LONG(C)	MRSSHORT		FASTR1	100	1	1	Dither 1	2	2	555.008	

Special Requirements	Sequence Observations 5, 6, Non-interruptible

Observation

Proposal 3779, Observation 6: 10 Lac mosaic LONG Wed Sep 13 21:01:31 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[10 Lac bkg LONG (Obs 5)]

Diagnostics

(Visit 6:1) Warning (Form): Data Excess over lower threshold

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	10LAC	RA: 22 39 15.6782 (339.8153258d) Dec: +39 03 0.89 (39.05025d) Equinox: J2000	Proper Motion RA: -2.7470389405505694E-5 sec of time/yr Proper Motion Dec: -0.005459999965751194 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Calibration
Description=[Astrometric, Point spread function, Spectrophotometric]
Extended=NO

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	FAST	4	1	1	11.1	116250

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	NO	FULL	NEUTRAL

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order
3	3	99.0	99.0	0.0	0.0	DEFAULT

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	POINT SOURCE	NEGATIVE
2	4-Point	POINT SOURCE	POSITIVE

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	LONG(C)	MRSLONG		FASTR1	100	1	1	Dither 1	4	4	1110.016	
1	LONG(C)	MRSSHORT		FASTR1	100	1	1	Dither 1	4	4	1110.016	
2	LONG(C)	MRSLONG		FASTR1	100	1	1	Dither 2	4	4	1110.016	
2	LONG(C)	MRSSHORT		FASTR1	100	1	1	Dither 2	4	4	1110.016	

Special Requirements	Sequence Observations 5, 6, Non-interruptible