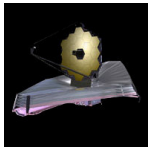

1532 - Coronagraph External Flatfield

Cycle: 1, Proposal Category: CAL/MIRI

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
P-FLAT				
	1	P-FLAT F1065C	MIRI Coronagraphic Photometric Calibration	(5) ZODIACAL-LIGHT-P5
	2	P-FLAT F1140C	MIRI Coronagraphic Photometric Calibration	(5) ZODIACAL-LIGHT-P5
	3	P-FLAT F1550C	MIRI Coronagraphic Photometric Calibration	(5) ZODIACAL-LIGHT-P5
	4	P-FLAT F2300C	MIRI Coronagraphic Photometric Calibration	(5) ZODIACAL-LIGHT-P5
L-FLAT				
	7	L-FLAT F1065C	MIRI Coronagraphic Photometric Calibration	(6) LMC-MIRI-A-IMAGERFOV
	8	L-FLAT F1140C	MIRI Coronagraphic Photometric Calibration	(6) LMC-MIRI-A-IMAGERFOV
	9	L-FLAT F1550C	MIRI Coronagraphic Photometric Calibration	(6) LMC-MIRI-A-IMAGERFOV
	10	L-FLAT F2300C	MIRI Coronagraphic Photometric Calibration	(6) LMC-MIRI-A-IMAGERFOV

ABSTRACT

This activity will build on commissioning activity CAR-MIRI-056, by providing updated flatfields for each coronagraphic aperture in Cycle 1. Both activities will provide data for two components of the flatfield: the Pixel-flat (P-flat) and the Low frequency flat (L-flat). The P-flat is obtained by dithering an extended source around each coronagraphic aperture, while the L-flat utilizes the 1000-points-of-light algorithm by dithering around a crowded star field. We will use the same technique as in commissioning: observing fields with strong zodiacal emission for the P-flats and the LMC

astrometric field for the L-flats.

This calibration program is provisional and may change in response to system developments and the final science program.

OBSERVING DESCRIPTION

Following the commissioning activity (CAL-MIRI-056), we will apply the algorithm developed by Arendt et al. (2000) for array calibration. This method basically shifts and adds the separate pointings to determine a mean, then shifts it back to each individual dither to determine responsivity variations as a function of position in each aperture. Flatfields generated in Cycle 1 will be compared to those from commissioning and if they are indistinguishable, they will be combined to improve the SNR.

TIMING CONSTRAINTS:

All timing constraints assume a launch date of 24 Dec 2021 and the beginning of Cycle 1 six months later.

All observations should be carried out within the first month of Cycle 1. There is a Special Requirements that links all of the observations together with a timing constraint Before Date 20-JUL-2022

Missed or failed observations should be repeated within the originally requested observing window.

DETAILED DESCRIPTION BELOW:

Both the P-flat and L-flat data will be obtained using the MIRI coronagraphic photometric template which provides a set 16 point dither pattern (4 positions each with a sub-dither of 4 points). The integration times in each dither position have been set to achieve a signal/noise ratio (SNR) of 300, which will give us a 3sigma detection on the expected 1% deviations in responsivity. However, it should be kept in mind that instrumental overhead dominate the total observing time for this activity.

This activity will be executed just once in Cycle 1. We assume that for the remainder of Cycle 1, we can use the internal lamp to monitor and update the P-flat and identify any pixels damaged from space weathering. In the one execution of this activity of Cycle 1, we will not repeat the full-frame P-flat measurements from commissioning. Instead, we will just use the coronagraphic subarrays for all measurements.

********** P-FLAT SIGNAL TO NOISE **********

Filter	Readout Array	# Of Groups	Zodi+JWST flux photon/s/pix	Zodi+JWST flux total photon/pix	Zodi+JWST flux SNR
F1065C	SUB 150	152	87725		296
F1140C	SUB 150	159	91699		303
F1550C	SUB 150	130	75053		274
F2300C	SUB 100	364	188594		434

The target for the P-FLAT is Zodiacal Light. Zodiacal dust distribution has the maximum at the distance of Earth. Therefore to get maximum flux, the pointing is perpendicular to the direction of the Sun, and in the ecliptic plane. The 5-8 degree absolute latitude from the ecliptic plane is proposed to avoid the moving asteroid belt objects, but still have high flux from the Zodical light. To define a fixed RA and DEC, the schedule window must be known. The 5 proposed targets cover a wide Observing Window for easy schedulability. Only one must be run.

********** L-FLAT SIGNAL TO NOISE **********

Filter	Readout Array	# Of Groups
F1065C	SUB 150	
F1140C	SUB 150	
F1550C	SUB 150	
F2300C	SUB 100	

The target for the L-FLAT is the LMC, the JWST astrometric field. Note that as defined in the APT there may be an issue with coronagraphs falling outside the bounds of the astrometric field due to position angle. It is not yet clear how scheduling will impact the position angle, but we coordinate with the MIRI distortion CAR to select the final target coordinates when the scheduling is better defined.

Proposal 1532 - Targets - Coronagraph External Flatfield

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	ZODIACAL-LIGHT-P1	RA: 09 23 11.8569 (140.7994037d) Dec: +20 15 17.09 (20.25475d) Equinox: J2000		
Comments: Use if measurement scheduled: 04.NOV—23.DEC or 23.MAR—13.MAY *feild with strong zodiacal emission, for P-flat* *Category=Calibration* *Description=[External flat field, Telescope/sky background]* *Extended=YES*				
(2)	ZODIACAL-LIGHT-P2	RA: 00 08 21.5696 (2.0898733d) Dec: -04 36 22.48 (-4.60624d) Equinox: J2000		
Comments: Use if measurement scheduled: 08.NOV—27.DEC or 17.JUN—06.AUG *Category=Calibration* *Description=[External flat field, Telescope/sky background]* *Extended=YES*				
(3)	ZODIACAL-LIGHT-P3	RA: 21 18 2.4724 (319.5103017d) Dec: +04 30 36.91 (4.51025d) Equinox: J2000		
Comments: Use if measurement scheduled: 02.OCT—21.NOV or 09.MAY—03.JUL *Category=Calibration* *Description=[External flat field, Telescope/sky background]* *Extended=YES*				
(4)	ZODIACAL-LIGHT-P4	RA: 12 08 14.2038 (182.0591825d) Dec: +04 09 57.52 (4.16598d) Equinox: J2000		
Comments: Use if measurement scheduled: 17.DEC—04.FEB or 06.MAY—27.JUN *Category=Calibration* *Description=[External flat field, Telescope/sky background]* *Extended=YES*				
(5)	ZODIACAL-LIGHT-P5	RA: 15 19 45.3776 (229.9390733d) Dec: -11 42 13.19 (-11.70366d) Equinox: J2000		
Comments: Use if measurement scheduled: 04.FEB—26.MAR or 28.JUN—18.AUG *Category=Calibration* *Description=[External flat field, Telescope/sky background]* *Extended=YES*				
(6)	LMC-MIRI-A-IMAGERFOV	RA: 05 22 11.7600 (80.5490000d) Dec: -69 31 32.30 (-69.52564d) Equinox: J2000		
Comments: LMC astrometric field, used for the L-flats. *Category=Calibration* *Description=[Astrometric, Coronagraphic, External flat field, Photometric, Telescope/sky background]*				

Observation

Proposal 1532, Observation 1: P-FLAT F1065C Tue Jan 11 18:01:08 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Photometric Calibration

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
(5)	ZODIACAL-LIGHT-P5	RA: 15 19 45.3776 (229.9390733d) Dec: -11 42 13.19 (-11.70366d) Equinox: J2000		

Comments: Use if measurement scheduled: 04.FEB—26.MAR or 28.JUN—18.AUG
Category=Calibration
Description=[External flat field, Telescope/sky background]
Extended=YES

Template

Subarray
MASK1065

Dithers

#	Starting Set	Number of Sets	Optimized For	Direction
1	1	1	POINT SOURCE	POSITIVE

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F1065C	FAST	150	1	1	4	4	143.808	

Special Requirements

Before Date 01-AUG-2022

2 After 1 by 0 Days to 15 Days
3 After 1 by 0 Days to 15 Days
4 After 1 by 0 Days to 15 Days
7 After 1 by 0 Days to 15 Days
8 After 1 by 0 Days to 15 Days
9 After 1 by 0 Days to 15 Days
10 After 1 by 0 Days to 15 Days

Observation

Proposal 1532, Observation 2: P-FLAT F1140C Tue Jan 11 18:01:08 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Photometric Calibration

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
(5)	ZODIACAL-LIGHT-P5	RA: 15 19 45.3776 (229.9390733d) Dec: -11 42 13.19 (-11.70366d) Equinox: J2000		

Comments: Use if measurement scheduled: 04.FEB—26.MAR or 28.JUN—18.AUG
Category=Calibration
Description=[External flat field, Telescope/sky background]
Extended=YES

Template

Subarray
MASK1140

Dithers

#	Starting Set	Number of Sets	Optimized For	Direction
1	1	1	POINT SOURCE	POSITIVE

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F1140C	FAST	150	1	1	4	4	143.808	

Special Requirements

2 After 1 by 0 Days to 15 Days

Observation

Proposal 1532, Observation 3: P-FLAT F1550C Tue Jan 11 18:01:08 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Photometric Calibration

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
(5)	ZODIACAL-LIGHT-P5	RA: 15 19 45.3776 (229.9390733d) Dec: -11 42 13.19 (-11.70366d) Equinox: J2000		

Comments: Use if measurement scheduled: 04.FEB—26.MAR or 28.JUN—18.AUG
Category=Calibration
Description=[External flat field, Telescope/sky background]
Extended=YES

Template

Subarray
MASK1550

Dithers

#	Starting Set	Number of Sets	Optimized For	Direction
1	1	1	POINT SOURCE	POSITIVE

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F1550C	FAST	150	1	1	4	4	143.808	

Special Requirements

3 After 1 by 0 Days to 15 Days

Observation

Proposal 1532, Observation 4: P-FLAT F2300C Tue Jan 11 18:01:08 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Photometric Calibration

Diagnostics

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(5)	ZODIACAL-LIGHT-P5	RA: 15 19 45.3776 (229.9390733d) Dec: -11 42 13.19 (-11.70366d) Equinox: J2000		

Comments: Use if measurement scheduled: 04.FEB—26.MAR or 28.JUN—18.AUG
Category=Calibration
Description=[External flat field, Telescope/sky background]
Extended=YES

Template

Subarray
MASKLYOT

Dithers

#	Starting Set	Number of Sets	Optimized For	Direction
1	1	1	POINT SOURCE	POSITIVE

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F2300C	FAST	100	1	1	4	4	129.6	

Special Requirements

4 After 1 by 0 Days to 15 Days

Observation

Proposal 1532, Observation 7: L-FLAT F1065C Tue Jan 11 18:01:08 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Photometric Calibration

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
(6)	LMC-MIRI-A-IMAGERFOV	RA: 05 22 11.7600 (80.5490000d) Dec: -69 31 32.30 (-69.52564d) Equinox: J2000		

Comments: LMC astrometric field, used for the L-flats.
Category=Calibration
Description=[Astrometric, Coronagraphic, External flat field, Photometric, Telescope/sky background]

Template

Subarray
MASK1065

Dithers

#	Starting Set	Number of Sets	Optimized For	Direction
1	1	1	POINT SOURCE	POSITIVE

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F1065C	FAST	150	5	1	4	20	719.04	

Special Requirements

7 After 1 by 0 Days to 15 Days

Observation

Proposal 1532, Observation 8: L-FLAT F1140C

Tue Jan 11 18:01:08 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Photometric Calibration

Diagnostics

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(6)	LMC-MIRI-A-IMAGERFOV	RA: 05 22 11.7600 (80.5490000d) Dec: -69 31 32.30 (-69.52564d) Equinox: J2000		

Comments: LMC astrometric field, used for the L-flats.
Category=Calibration
Description=[Astrometric, Coronagraphic, External flat field, Photometric, Telescope/sky background]

Template

Subarray
MASK1140

Dithers

#	Starting Set	Number of Sets	Optimized For	Direction
1	1	1	POINT SOURCE	POSITIVE

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F1140C	FAST	150	5	1	4	20	719.04	

Special Requirements

8 After 1 by 0 Days to 15 Days

Observation

Proposal 1532, Observation 9: L-FLAT F1550C Tue Jan 11 18:01:08 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Photometric Calibration

Diagnostics

(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(6)	LMC-MIRI-A-IMAGERFOV	RA: 05 22 11.7600 (80.5490000d) Dec: -69 31 32.30 (-69.52564d) Equinox: J2000		

Comments: LMC astrometric field, used for the L-flats.
Category=Calibration
Description=[Astrometric, Coronagraphic, External flat field, Photometric, Telescope/sky background]

Template

Subarray
MASK1550

Dithers

#	Starting Set	Number of Sets	Optimized For	Direction
1	1	1	POINT SOURCE	POSITIVE

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F1550C	FAST	150	5	1	4	20	719.04	

Special Requirements

9 After 1 by 0 Days to 15 Days

Observation

Proposal 1532, Observation 10: L-FLAT F2300C Tue Jan 11 18:01:08 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Coronagraphic Photometric Calibration

Diagnostics

(Visit 10:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(6)	LMC-MIRI-A-IMAGERFOV	RA: 05 22 11.7600 (80.5490000d) Dec: -69 31 32.30 (-69.52564d) Equinox: J2000		

Comments: LMC astrometric field, used for the L-flats.
Category=Calibration
Description=[Astrometric, Coronagraphic, External flat field, Photometric, Telescope/sky background]

Template

Subarray
MASKLYOT

Dithers

#	Starting Set	Number of Sets	Optimized For	Direction
1	1	1	POINT SOURCE	POSITIVE

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F2300C	FAST	100	5	1	4	20	648.0	

Special Requirements

10 After 1 by 0 Days to 15 Days