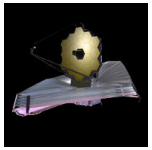

1493 - NIRSpec MOS F-Flat Characterization

Cycle: 1, Proposal Category: CAL/NIRSPEC

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
NGC2506-G13				
	2	3x1 FULLBOX-4TIGHT NIRCAM	NIRCam Imaging	(2) NGC2506G31
	3	p1, p2, p3, p4, p5, p6, p7, p8, p9, p0	NIRSpec MultiObject Spectroscopy	(3) NGC2506CAT20228417E

ABSTRACT

This program obtains observations needed to further calibrate the F-flat of the instrument flat field/throughput correction. The F-flat is one part of the 3 component NIRSpec flat field: the F-flat traces the field-dependent throughput of the OTE and instrument FORE optics, the S-flat traces the light path from the micro-shutter array up to but not including the FPA and the D-flat consists of the pixel-to-pixel variations of the detector, usually called the P-flat. Additional observations will be obtained at a wider range of positions than acquired during Commissioning to more accurately calibrate the field dependence, and remove uncertainties from the S-flat due to imperfect knowledge of the instrument's internal flat lamp profiles.

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

OBSERVING DESCRIPTION

This program will observe the solar analogue NGC 2506-G31 = GAIA DR3 3038045185547143936. This star will also be observed by the calibration progam PID 1538, Absolute Flux Calibration (G Dwarfs) with a wide variety of NIRCAM filters as well as the NIRSpec PRISM using both the FS/S1600A1 and IFU.

Here, we will observe NGC 2506-G31 at 10 positions spanning different corners of various MSA quadrants with the PRISM/CLEAR configuration. At each of these 10 points, a 3-shutter slitlet will be opened, and three exposures obtained while nodding the source in each of the open shutters. Exposures are comprised of two integrations with 10 groups each of NRSIRS2RAPID readout. These observations will then be used to update the MOS F-flat reference file. This set of measurements is the minimum sampling required to characterize any spatial dependence over the field. If we find evidence that variations exist at smaller scales, we will have to obtain additional points if our ability to achieve the required flux calibration accuracy for MOS mode is compromised.

In addition to the primary target, which will be placed in the center of preselected shutters, we will also observe other cluster stars that are available. We will give the highest priority to other solar analogues that have been identified in this field and other cluster main-sequence stars, especially those that fall within the footprint of NIRCAM imaging from this proposal or PID 1538. This will produce PRISM spectra of a number of other targets with well constrained SEDs that can be used to provide additional checks of the MOS throughput and of the cross-calibration with NIRCAM. Other solar analogues identified by Schalwin (2022) in this cluster are given weight = 400 or 401, with the extra point of weight given to stars which have at least some NIRCAM imaging observations. Other stars with Gaia colors, magnitudes, proper motion, and parallax consistent with solar analogues but which were not included in Schalwin's list are assigned weight of 100 or 101. Other stars close to the cluster main-sequence are assigned weight = 20 or 21. Stars not on the main-sequence are given weights of 10 or 11, while stars that would have been higher priority but for which the NIRCAM imaging suggests the posibility of some contamination are given a weight of 7.

To better verify each of the 10 pointings, we have also added a confirmation image for each configuration, along with a number of targets of suitable brightness for this purpose. A weight of 5 is assigned to these fainter stars.

We also include NIRCAM preimaging observations using F115W and F444W. These are somewhat deeper than the PID 1538 NIRCAM observations and will use a somewhat different footprint (the NIRCAM observations are biased toward the cluster center, while we need a symetric set of reference stars around the target, which is in the perhiphery of the cluster, to support offsets in all directions). Existing photometry suggests

that there should be plenty of refrence stars suitable for the F110W/NRSRAPID bin.

For a K2V star that gives S/N=20 for MSATA with F110W/NRSRAPID, our selected NIRCAM setup of 4 grps x 2 integrations with the BRIGHT2 readout gives S/N=42 for F115W and S/N=31 for F444W at a single dither position. We'll use a 3x1 mosaic with the FULLBOX 4TIGHT to cover the detector gaps and provide pre-imaging coverage for 3 of the 4 quads even at the corner positions of our NIRSPEC mosaic. This should provide an adequate number of reference stars. The brighter calibration targets being observed have accurate Gaia coordinates and proper motions.
Given that accurate placement of our target in the middle of the selected shutter at each pointing is critical for our calibration goals, we require 10 reference stars with astrometry good to 10 mas or better be used at each pointing. The F444W was chosen for the long wavelength channel to provide additional calibration checks on the red end of the NIRSpec PRISM througput, especially for stars that do not fall in the PID 1538 NIRCAM footprint where multi-band photometry will be available.

Timing Constraints
We've added a BEFORE 30-JUN-2023 constraint as it is a priority to collect this calibration data before the end of cycle 1.

Proposal 1493 - Targets - NIRSpec MOS F-Flat Characterization

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	NGC2506G31	RA: 08 00 14.2120 (120.0592167d) Dec: -10 47 29.46 (-10.79152d) Equinox: J2000	Proper Motion RA: -2.515 mas/yr Proper Motion Dec: 4.057 mas/yr Parallax: 0.0001" Epoch of Position: 2016	
Comments: *Category=Star* *Description=[G dwarfs]* *Extended=NO*				
(3)	NGC2506CAT20228417E	RA: 08 00 10.0879 (120.0420329d) Dec: -10 46 52.06 (-10.78113d) Equinox: J2000		
Comments: *Description=[]*				

Observation

Proposal 1493, Observation 2: 3x1 FULLBOX-4TIGHT NIRCAM Mon Feb 13 18:01:57 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Diagnostics

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

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

(Visit 2:3) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	NGC2506G31	RA: 08 00 14.2120 (120.0592167d) Dec: -10 47 29.46 (-10.79152d) Equinox: J2000	Proper Motion RA: -2.515 mas/yr Proper Motion Dec: 4.057 mas/yr Parallax: 0.0001" Epoch of Position: 2016	

Comments:
Category=Star
Description=[G dwarfs]
Extended=NO

Template

Module	Subarray
ALL	FULL

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift	Column shift	Tile Order
3	1	5.0	10.0	0.0	0.0	HILBERT_CURVE

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
1	FULLBOX	4TIGHT	STANDARD		1

Spectral Elements

#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F115W	F444W	BRIGHT2	4	2	8	4	730.1	

Special Requirements	
	Sequence Visits within 53.0 Days Visits Same PA 3 After 2 by 60.0 Days to <None specified>

Observation

Proposal 1493, Observation 3: p1, p2, p3, p4, p5, p6, p7, p8, p9, p0 Mon Feb 13 18:01:57 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject Spectroscopy

Diagnostics

(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 3:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 3:3) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 3:4) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 3:5) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 3:6) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 3:7) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(3)	NGC2506CAT20228417E	RA: 08 00 10.0879 (120.0420329d) Dec: -10 46 52.06 (-10.78113d) Equinox: J2000		

Comments:
Description=[]

Acquisition

#	Reference Star Bin	Target	Filter	MSA Configuration	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	Filter: F110W; Readout: NRSRAPID; 10 sources in 4 quads; [Optimal TA Accuracy]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	
2	Filter: F110W; Readout: NRSRAPID; 10 sources in 4 quads; [Optimal TA Accuracy]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	
3	Filter: F110W; Readout: NRSRAPID; 10 sources in 3 quads; [Optimal TA Accuracy]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	
4	Filter: F110W; Readout: NRSRAPID; 10 sources in 4 quads; [Optimal TA Accuracy]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	
5	Filter: F110W; Readout: NRSRAPID; 10 sources in 4 quads; [Optimal TA Accuracy]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	
6	Filter: F110W; Readout: NRSRAPID; 10 sources in 4 quads; [Optimal TA Accuracy]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	
7	Filter: F110W; Readout: NRSRAPID; 10 sources in 4 quads; [Optimal TA Accuracy]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	

Template

TA Method	Obtain Confirmation Images	Science Aperture	Primary Candidate List	Filler Candidate List	Spectral Overlap Map	Spectral Overlap Threshold
MSATA	After Target ACQ and New MSA Config	MSA Center	NGC2506-main-seq (678 sources)	Filler (943 sources)	jwst-nirspec-prism	1.5

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	544	120.075668	-10.813213	20.4636	1	1395	120.035787	-10.815672	20.6058
1	663	120.071984	-10.809690	20.9702	1	1490	120.031337	-10.817088	20.0584
1	737	120.058743	-10.836098	20.4292	1	1588	120.042774	-10.776794	21.0628
1	752	120.069478	-10.807350	20.9779	1	1599	120.036148	-10.792678	20.4811
1	765	120.058819	-10.831870	21.1582	1	1671	120.034157	-10.788613	21.0951
Visit	**ID**	**RA**	**Dec**	**Magnitude**	**Visit**	**ID**	**RA**	**Dec**	**Magnitude**
2	149	120.087191	-10.844809	20.6066	2	720	120.077753	-10.789689	20.3092
2	288	120.095659	-10.802240	20.3526	2	796	120.065154	-10.812495	20.7801
2	398	120.090084	-10.801512	20.4477	2	824	120.060375	-10.819855	20.8824
2	453	120.070117	-10.842468	20.2335	2	862	120.073735	-10.782257	20.1003
2	470	120.072485	-10.833804	20.8143	2	885	120.072900	-10.781671	20.3223
Visit	**ID**	**RA**	**Dec**	**Magnitude**	**Visit**	**ID**	**RA**	**Dec**	**Magnitude**
3	39	120.120427	-10.777815	21.5116	3	703	120.092674	-10.753424	20.7421
3	195	120.109766	-10.779156	21.5873	3	729	120.087645	-10.763634	20.2674
3	465	120.101653	-10.761231	21.4177	3	862	120.073735	-10.782257	20.1003
3	512	120.084061	-10.796348	20.1139	3	885	120.072900	-10.781671	20.3223
3	595	120.081461	-10.792323	21.5940	3	908	120.080998	-10.757926	21.6150
Visit	**ID**	**RA**	**Dec**	**Magnitude**	**Visit**	**ID**	**RA**	**Dec**	**Magnitude**
4	350	120.098461	-10.786719	20.0544	4	1139	120.056987	-10.789163	20.4090
4	444	120.095333	-10.779698	20.6298	4	1165	120.068744	-10.756230	20.3071
4	544	120.075668	-10.813213	20.4636	4	1200	120.060229	-10.774581	20.3047
4	603	120.087576	-10.776102	20.2745	4	1351	120.058175	-10.763380	20.2607
4	661	120.072476	-10.808488	20.5639	4	1442	120.052684	-10.767778	20.2571
Visit	**ID**	**RA**	**Dec**	**Magnitude**	**Visit**	**ID**	**RA**	**Dec**	**Magnitude**
5	862	120.073735	-10.782257	20.1003	5	1442	120.052684	-10.767778	20.2571
5	885	120.072900	-10.781671	20.3223	5	1599	120.036148	-10.792678	20.4811
5	1130	120.062732	-10.775639	20.6654	5	1681	120.041973	-10.767343	20.1787
5	1139	120.056987	-10.789163	20.4090	5	1819	120.034975	-10.769845	20.5921
5	1395	120.035787	-10.815672	20.6058	5	1834	120.035785	-10.765886	20.6769
Visit	**ID**	**RA**	**Dec**	**Magnitude**	**Visit**	**ID**	**RA**	**Dec**	**Magnitude**
6	1395	120.035787	-10.815672	20.6058	6	1998	120.026035	-10.773083	20.1531
6	1449	120.046823	-10.781794	20.8520	6	2002	120.024939	-10.775831	21.0605
6	1565	120.026909	-10.819951	20.4405	6	2114	120.017407	-10.783536	20.8620
6	1599	120.036148	-10.792678	20.4811	6	2192	120.003850	-10.809351	20.9387
6	1625	120.027442	-10.811887	20.6611	6	2351	120.017242	-10.759471	20.2291
Visit	**ID**	**RA**	**Dec**	**Magnitude**	**Visit**	**ID**	**RA**	**Dec**	**Magnitude**
7	956	120.072671	-10.771763	20.8560	7	1956	120.035203	-10.753812	20.5599
7	1130	120.062732	-10.775639	20.6654	7	1981	120.041075	-10.736666	20.2307
7	1200	120.060229	-10.774581	20.3047	7	1998	120.026035	-10.773083	20.1531
7	1201	120.061817	-10.770444	20.1702	7	2108	120.024332	-10.766529	20.4927
7	1599	120.036148	-10.792678	20.4811	7	2167	120.035601	-10.731599	20.2330

Confirmation

#	Confirmation Type	Conf. Readout Pattern	Conf. Groups/Int	Conf. Integrations/Exp	Conf. Total Integrations	Conf. Total Exposure Time
1	c1 : p1	NRSIRS2RAPID	3	1	1	58.356
2	c1 : p3	NRSIRS2RAPID	3	1	1	58.356
3	c1 : p4	NRSIRS2RAPID	3	1	1	58.356
4	c1 : p6	NRSIRS2RAPID	3	1	1	58.356
5	c1 : p7	NRSIRS2RAPID	3	1	1	58.356
6	c1 : p8	NRSIRS2RAPID	3	1	1	58.356
7	c1 : p9	NRSIRS2RAPID	3	1	1	58.356
8	c1 : p2	NRSIRS2RAPID	3	1	1	58.356
9	c1 : p5	NRSIRS2RAPID	3	1	1	58.356
10	c1 : p0	NRSIRS2RAPID	3	1	1	58.356

Spectral Elements

#	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
1	1 (PRISM/CLEAR)	c1 : p1	3 Shutter Slitlet	120.05018875000002 Degrees -10.815963888888916 Degrees	215.89269596927628			3	6	962.867
2	1 (PRISM/CLEAR)	c1 : p2	3 Shutter Slitlet	120.06591291666666 Degrees -10.826555555555558 Degrees	215.8897818038029			3	6	962.867
3	1 (PRISM/CLEAR)	c1 : p3	3 Shutter Slitlet	120.07681083333333 Degrees -10.812175000000025 Degrees	215.88772222062374			3	6	962.867
4	1 (PRISM/CLEAR)	c1 : p4	3 Shutter Slitlet	120.0977375 Degrees -10.784524999999974 Degrees	215.88376701139822			3	6	962.867
5	1 (PRISM/CLEAR)	c1 : p5	3 Shutter Slitlet	120.07992083333333 Degrees -10.771397222222 Degrees	215.8870624694674			3	6	962.867
6	1 (PRISM/CLEAR)	c1 : p6	3 Shutter Slitlet	120.0701225 Degrees -10.789369444444446 Degrees	215.88892573689083			3	6	962.867
7	1 (PRISM/CLEAR)	c1 : p7	3 Shutter Slitlet	120.0464 Degrees -10.790069444444441 Degrees	215.89335275353753			3	6	962.867
8	1 (PRISM/CLEAR)	c1 : p8	3 Shutter Slitlet	120.02211666666666 Degrees -10.796474999999987 Degrees	215.8978979193761			3	6	962.867
9	1 (PRISM/CLEAR)	c1 : p9	3 Shutter Slitlet	120.04223083333333 Degrees -10.769622222222 Degrees	215.89408923088894			3	6	962.867
10	1 (PRISM/CLEAR)	c1 : p0	3 Shutter Slitlet	120.05385208333334 Degrees -10.753855555555 Degrees	215.8918880174863			3	6	962.867

Special Requirements	
	Sequence Visits within 53.0 Days Visits Same PA MSA Scheduled Aperture PA 215.8941497 to 215.8941497 Degrees (V3 77.31958 to 77.31958) Maximum Reference Stars 10 3 After 2 by 60.0 Days to <None specified>