



6647 - CAL-NRS-317: NIRSpec Cycle 3 Fixed Slits Subarray Spectroscopic Flats - S-flats

Cycle: 3, Proposal Category: CAL/NIRSPEC

INVESTIGATORS

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OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
NRS-317 Cy 3: NIRSpec internal spectral flatfield subarrays				
	1	NRS-317 Cy 3: NRS internal spec flats subarray PRISM	NIRSpec Internal Lamp	NONE
	21	NRS-317 Cy 3: NRS internal spec flats subarray G140H F100LP FLAT1	NIRSpec Internal Lamp	NONE
	22	NRS-317 Cy 3: NRS internal spec flats subarray G140H F070LP FLAT4	NIRSpec Internal Lamp	NONE
	301	NRS-317 Cy 3: NRS internal spec flats subarray G235H catchup	NIRSpec Internal Lamp	NONE
	302	NRS-317 Cy 3: NRS internal spec flats subarray G395H catchup	NIRSpec Internal Lamp	NONE

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
	31	NRS-317 Cy 3: NRS in ternal spec flats subarray G235H	NIRSpec Internal Lamp	NONE
	32	NRS-317 Cy 3: NRS in ternal spec flats subarray G395H	NIRSpec Internal Lamp	NONE
	4	NRS-317 Cy 3: NRS in ternal spec flats subarray G140M	NIRSpec Internal Lamp	NONE
	5	NRS-317 Cy 3: NRS in ternal spec flats subarray G235M, G395M	NIRSpec Internal Lamp	NONE

ABSTRACT

This program will acquire the spectroscopic (lamp) flats for the FS mode using the ALLSLITS subarray.. Observations will be acquired for all of the NIRSpec disperser/lamp combinations. These observations will be used to develop S-flat reference files that are essential for minimizing flat field calibration noise for FS and/or BOTS observations that need improved signal-to-noise. In addition to the commissioning, cycle 1, and cycle 2 flats, these flats will further decrease the noise from the flat fielding process for science observation processing. The flats will also be assessed to evaluate any possible temporal evolution in the flat field. The S-flat is one part of the 3 component NIRSpec flat field in addition to the F-flat and the D-flat.

This calibration program may change in response to system developments and the final Cycle 3 science program.

OBSERVING DESCRIPTION

ALLSLITS exposures taken with all 9 disperser/ lamp configurations (filter set to OPAQUE).

subarray gain is always 2.

Uses internal lamp flat template therefore slew parallel only special requirement is required.

The flat field response is purely a property of the detector pixel, therefore data for other subarrays can be cut out of the ALLSLITS subarray.

SUB2048 and SUB512 are used with PRISM, medium-dispersion (M-mode), and high-dispersion (H-mode) gratings because S1600A1 will saturate too quickly in the ALLSLITS exposures.

Integrations are selected to avoid saturation, should be adjusted if saturation or a signal deficiency is noted

group all exposures in a particular visit with an individual grating to minimize GWA moves.

Similar programs were executed in Cycles 1 and 2 (Cycle 1 program: “Spectroscopic Subarray Flats” – PID 1486 and Cycle 2 program: “NIRSpec Subarray Spectroscopic Flats (CAL-NRS-204)” – PID 4458). The Cycle 1 program included special additional observations to examine the characteristics of saturation for cases with several spectral elements by using a lamp that was not standard for those particular gratings. Those supplemental observations do not contribute to the reference file development and are not included in the Cycle 3 program. The epochs of observations in previous cycles were not constrained which led to uneven sampling intervals between epochs of observation that are potentially unfavorable to ideal temporal monitoring. Moderate timing constraints are applied to the Cycle 3 observations to establish approximately uniform sampling intervals between Cycle 2 and Cycle 3 observations for each setup to the extent possible. Due to an oversight, both the Cycle 1 and Cycle 2 programs did not obtain important G395H, G235H, and G140H SUB2048 observations needed to replace the impact of S1600A1 trace saturation in the baseline ALLSLITS exposures. Recent analysis has confirmed these observations are required. The Cycle 3 program includes these additional observations in Obs 21, 22, 31, 32, 301, and 302. With one exception the balance of the observations (Obs 1, 4, and 5) in the Cycle 3 program are identical to Obs 1, 4, and 5 of both the Cycle 1 and 2 programs and consist of all other core observations needed to produce S-flat reference files. The noted exception is one additional SUB512 exposure with FLAT4 has been added to Obs 1 of the Cycle 3 program due to unexpected saturation discovered in recent analysis of the Cycle 1 and 2 SUB512 data. In Cycles 1 and 2 the G140H/F070LP and G140H/F100LP ALLSLITS exposures were obtained in the same observation (Obs 2 of those programs) and the G235H and G395H ALLSLITS exposures were also obtained in one observation (Obs 3 of those programs). Due to the addition of the SUB2048 exposures for these spectral elements, in order to facilitate slew parallel scheduling the exposures for each of these gratings for Cycle 3 are placed in separate observations (Obs 21, 22, 31, 32, 301, and 302). Medium-dispersion ALLSLITS and SUB2048 exposures will be obtained in Obs 4 and 5, as in both Cycles 1 and 2.

All exposures for an individual grating are in a single visit. Typically one spectral element is used per visit with the exception of observation 5 which includes all exposures for both G235M and G395M. Total time investment for high S/N flats is approximately 3.5 hours.

exposures:

Obs 1:

fixedslit allslits flat5 prism nrsrapid 7 10 10

brighobj sub512 flat4 prism nrsrapid 2 500 500

Obs 21:

fixedslit allslits flat1 g140h nrsrapid 12 10 10

brightobj sub2048 flat1 g140h nrsrapid 24 10 10

Obs 22:

fixedslit allslits flat4 g140h nrsrapid 12 10 10

brightobj sub2048 flat4 g140h nrsrapid 24 10 10

Obs 301 and 31:

fixedslit allslits flat2 g235h nrsrapid 12 10 10

brightobj sub2048 flat2 g235h nrsrapid 24 10 10

Obs 302 and 32:

fixedslit allslits flat3 g395h nrsrapid 8 10 10

brightobj sub2048 flat3 g395h nrsrapid 16 10 10

Obs 4:

fixedslit allslits flat1 g140m nrsrapid 8 10 10

fixedslit allslits flat4 g140m nrsrapid 4 10 10

brightobj sub2048 flat1 g140m nrsrapid 8 10 10

brightobj sub2048 flat4 g140m nrsrapid 8 10 10

Obs 5:

fixedslit allslits flat2 g235m nrsrapid 5 10 10

brightobj sub2048 flat2 g235m nrsrapid 10 10 10

fixedslit allslits flat3 g395m nrsrapid 4 10 10

brightobj sub2048 flat3 g395m nrsrapid 8 10 10

TIMING CONSTRAINTS and Summary:

- In order to meet monitoring requirements while providing some flexibility in scheduling the observations, moderate timing constraints (4-week duration for Obs 301 and 302 and ~2-month durations for all other observations) are applied via BETWEEN Special Requirements for each

observation.

- For Obs 1, 21, 22,, 31, 32, 4, and 5 these timing constraints serve to establish approximate one-year intervals since the equivalent observations were performed in Cycle 2 and to normalize monitoring intervals for possible future epochs of observation in later cycles. Ideally, future cycle programs would include these six observations.
- For Obs 301 and 302 the shorter 4-week constraint serves to obtain, as soon as possible, necessary observations (G235H and G395H SUB2048) that had been overlooked in previous cycles. Obs 301 and 302 need NOT be repeated in future cycles.
- No special "catchup" observations for G140H are needed, even though SUB2048 observations were also overlooked in earlier cycles, as the regular cadence observations for G140H occurs sufficiently early in Cycle 3.
- Visits are planned so they can be scheduled in slews.

This calibration program may change in response to system developments and the final Cycle 3 science program.

Proposal 6647 - Observation 1 - CAL-NRS-317: NIRSpec Cycle 3 Fixed Slits Subarray Spectroscopic Flats - S-flats

Observation	<p>Proposal 6647, Observation 1: NRS-317 Cy 3: NRS internal spec flats subarray PRISM Fri May 24 22:02:55 GMT 2024</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSpec Internal Lamp</p>											
Diagnostics	(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Spectral Elements	#	Operating Mode	Subarray	Lamp	MSA Configuration	Grating	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	FIXEDSLIT	ALLSLITS	FLAT5	ALLCLOSED	PRISM	NRSRAPID	7	10	10	439.725	
	2	BRIGHTOBJ	SUB512	FLAT5	ALLCLOSED	PRISM	NRSRAPID	110	10	10	251.242	
	3	BRIGHTOBJ	SUB512	FLAT4	ALLCLOSED	PRISM	NRSRAPID	2	500	500	349.48	
Special Requirements	<p>Between Dates 05-AUG-2024:00:00:00 and 30-SEP-2024:00:00:00</p> <p>No Parallel Attachments</p> <p>Parallel slew only</p>											

Proposal 6647 - Observation 21 - CAL-NRS-317: NIRSpec Cycle 3 Fixed Slits Subarray Spectroscopic Flats - S-flats

Fri May 24 22:02:55 GMT 2024

Observation	<p>Proposal 6647, Observation 21: NRS-317 Cy 3: NRS internal spec flats subarray G140H F100LP FLAT1 Diagnostic Status: Warning Observing Template: NIRSpec Internal Lamp</p>											
Diagnostics	<p>(Visit 21:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>											
Spectral Elements	#	Operating Mode	Subarray	Lamp	MSA Configuration	Grating	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	FIXEDSLIT	ALLSLITS	FLAT1	ALLCLOSED	G140H	NRSRAPID	12	10	10	714.425	
	2	BRIGHTOBJ	SUB2048	FLAT1	ALLCLOSED	G140H	NRSRAPID	24	10	10	225.705	
Special Requirements	<p>Between Dates 30-SEP-2024:00:00:00 and 25-NOV-2024:00:00:00 No Parallel Attachments Parallel slew only</p>											

Proposal 6647 - Observation 22 - CAL-NRS-317: NIRSpec Cycle 3 Fixed Slits Subarray Spectroscopic Flats - S-flats

Fri May 24 22:02:55 GMT 2024

Observation	<p>Proposal 6647, Observation 22: NRS-317 Cy 3: NRS internal spec flats subarray G140H F070LP FLAT4 Diagnostic Status: Warning Observing Template: NIRSpec Internal Lamp</p>											
Diagnostics	<p>(Visit 22:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>											
Spectral Elements	#	Operating Mode	Subarray	Lamp	MSA Configuration	Grating	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	FIXEDSLIT	ALLSLITS	FLAT4	ALLCLOSED	G140H	NRSRAPID	12	10	10	714.425	
	2	BRIGHTOBJ	SUB2048	FLAT4	ALLCLOSED	G140H	NRSRAPID	24	10	10	225.705	
Special Requirements	<p>Between Dates 30-SEP-2024:00:00:00 and 25-NOV-2024:00:00:00 No Parallel Attachments Parallel slew only</p>											

Proposal 6647 - Observation 301 - CAL-NRS-317: NIRSpec Cycle 3 Fixed Slits Subarray Spectroscopic Flats - S-flats

Fri May 24 22:02:55 GMT 2024

Observation	<p>Proposal 6647, Observation 301: NRS-317 Cy 3: NRS internal spec flats subarray G235H catchup</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSpec Internal Lamp</p>											
Diagnostics	<p>(Visit 301:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>											
Spectral Elements	#	Operating Mode	Subarray	Lamp	MSA Configuration	Grating	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	FIXEDSLIT	ALLSLITS	FLAT2	ALLCLOSED	G235H	NRSRAPID	12	10	10	714.425	
	2	BRIGHTOBJ	SUB2048	FLAT2	ALLCLOSED	G235H	NRSRAPID	24	10	10	225.705	
Special Requirements	<p>Between Dates 01-JUL-2024:00:00:00 and 29-JUL-2024:00:00:00</p> <p>No Parallel Attachments</p> <p>Parallel slew only</p>											

Proposal 6647 - Observation 302 - CAL-NRS-317: NIRSpec Cycle 3 Fixed Slits Subarray Spectroscopic Flats - S-flats

Fri May 24 22:02:55 GMT 2024

Observation	<p>Proposal 6647, Observation 302: NRS-317 Cy 3: NRS internal spec flats subarray G395H catchup</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSpec Internal Lamp</p>											
Diagnostics	<p>(Visit 302:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>											
Spectral Elements	#	Operating Mode	Subarray	Lamp	MSA Configuration	Grating	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	FIXEDSLIT	ALLSLITS	FLAT3	ALLCLOSED	G395H	NRSRAPID	8	10	10	494.665	
	2	BRIGHTOBJ	SUB2048	FLAT3	ALLCLOSED	G395H	NRSRAPID	16	10	10	153.545	
Special Requirements	<p>Between Dates 01-JUL-2024:00:00:00 and 29-JUL-2024:00:00:00</p> <p>No Parallel Attachments</p> <p>Parallel slew only</p>											

Proposal 6647 - Observation 31 - CAL-NRS-317: NIRSpec Cycle 3 Fixed Slits Subarray Spectroscopic Flats - S-flats

Observation	Proposal 6647, Observation 31: NRS-317 Cy 3: NRS internal spec flats subarray G235H Fri May 24 22:02:55 GMT 2024 Diagnostic Status: Warning Observing Template: NIRSpec Internal Lamp											
Diagnostics	(Visit 31:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Spectral Elements	#	Operating Mode	Subarray	Lamp	MSA Configuration	Grating	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	FIXEDSLIT	ALLSLITS	FLAT2	ALLCLOSED	G235H	NRSRAPID	12	10	10	714.425	
	2	BRIGHTOBJ	SUB2048	FLAT2	ALLCLOSED	G235H	NRSRAPID	24	10	10	225.705	
Special Requirements	Between Dates 25-NOV-2024:00:00:00 and 27-JAN-2025:00:00:00 No Parallel Attachments Parallel slew only											

Proposal 6647 - Observation 32 - CAL-NRS-317: NIRSpec Cycle 3 Fixed Slits Subarray Spectroscopic Flats - S-flats

Observation	Proposal 6647, Observation 32: NRS-317 Cy 3: NRS internal spec flats subarray G395H Fri May 24 22:02:55 GMT 2024 Diagnostic Status: Warning Observing Template: NIRSpec Internal Lamp											
Diagnostics	(Visit 32:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Spectral Elements	#	Operating Mode	Subarray	Lamp	MSA Configuration	Grating	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	FIXEDSLIT	ALLSLITS	FLAT3	ALLCLOSED	G395H	NRSRAPID	8	10	10	494.665	
	2	BRIGHTOBJ	SUB2048	FLAT3	ALLCLOSED	G395H	NRSRAPID	16	10	10	153.545	
Special Requirements	Between Dates 25-NOV-2024:00:00:00 and 27-JAN-2025:00:00:00 No Parallel Attachments Parallel slew only											

Proposal 6647 - Observation 4 - CAL-NRS-317: NIRSpec Cycle 3 Fixed Slits Subarray Spectroscopic Flats - S-flats

Fri May 24 22:02:55 GMT 2024

Observation	<p>Proposal 6647, Observation 4: NRS-317 Cy 3: NRS internal spec flats subarray G140M</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSpec Internal Lamp</p>											
Diagnostics	<p>(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>											
Spectral Elements	#	Operating Mode	Subarray	Lamp	MSA Configuration	Grating	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	FIXEDSLIT	ALLSLITS	FLAT1	ALLCLOSED	G140M	NRSRAPID	4	10	10	274.905	
	2	FIXEDSLIT	ALLSLITS	FLAT4	ALLCLOSED	G140M	NRSRAPID	4	10	10	274.905	
	3	BRIGHTOBJ	SUB2048	FLAT1	ALLCLOSED	G140M	NRSRAPID	8	10	10	81.385	
	4	BRIGHTOBJ	SUB2048	FLAT4	ALLCLOSED	G140M	NRSRAPID	8	10	10	81.385	
Special Requirements	<p>Between Dates 27-JAN-2025:00:00:00 and 31-MAR-2025:00:00:00</p> <p>No Parallel Attachments</p> <p>Parallel slew only</p>											

Proposal 6647 - Observation 5 - CAL-NRS-317: NIRSpec Cycle 3 Fixed Slits Subarray Spectroscopic Flats - S-flats

Fri May 24 22:02:55 GMT 2024

Observation	<p>Proposal 6647, Observation 5: NRS-317 Cy 3: NRS internal spec flats subarray G235M, G395M</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSpec Internal Lamp</p>											
Diagnostics	<p>(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>											
Spectral Elements	#	Operating Mode	Subarray	Lamp	MSA Configuration	Grating	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	FIXEDSLIT	ALLSLITS	FLAT2	ALLCLOSED	G235M	NRSRAPID	5	10	10	329.845	
	2	BRIGHTOBJ	SUB2048	FLAT2	ALLCLOSED	G235M	NRSRAPID	10	10	10	99.425	
	3	FIXEDSLIT	ALLSLITS	FLAT3	ALLCLOSED	G395M	NRSRAPID	4	10	10	274.905	
	4	BRIGHTOBJ	SUB2048	FLAT3	ALLCLOSED	G395M	NRSRAPID	8	10	10	81.385	
Special Requirements	<p>Between Dates 31-MAR-2025:00:00:00 and 02-JUN-2025:00:00:00</p> <p>No Parallel Attachments</p> <p>Parallel slew only</p>											