



## 2609 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

Cycle: 1, Proposal Category: GO

### INVESTIGATORS

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Dr. Karoline Gilbert (CoI) (CoPI)	Space Telescope Science Institute
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Prof. Evan Kirby (CoI)	University of Notre Dame
Dr. Ivanna Escala (CoI)	Princeton University
Dr. Mark Fardal (CoI)	Eureka Scientific Inc.
Dr. Amanda Quirk (CoI)	University of California - Santa Cruz

### OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
Observation Folder				
	1	NIRCam preimaging	NIRCam Imaging	(6) M31-NIRCAM-PREIMAGING
	11	NIRCam preimaging	NIRCam Imaging	(6) M31-NIRCAM-PREIMAGING

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
	6	M71_test68	NIRSpec MultiObject Spectroscopy	(13) M71-NEWCATALOG-GAIAEDR3
	7	IC166_test64	NIRSpec MultiObject Spectroscopy	(12) IC166-NEWCATALOG-GAIAEDR3
	8	NGC6791_all2	NIRSpec MultiObject Spectroscopy	(11) NGC6791-NEWCATALOG-GAIAEDR3
	10	NGC6791_plan8	NIRSpec MultiObject Spectroscopy	(11) NGC6791-NEWCATALOG-GAIAEDR3
	9	M31-FINAL-LONG	NIRSpec MultiObject Spectroscopy	(14) M31-FINAL-MSATA+TARGETS

## ABSTRACT

The recent era of large, ground-based abundance surveys has unraveled the chemical structures of our Milky Way galaxy. The most striking abundance feature is the alpha-abundance bimodality. The low-alpha stars are younger (1-8 Gyr) while the high-alpha stars are older (8-12 Gyr) and have a thicker distribution. There are a number of different models that attempt to explain this chemical feature, but so far none have been strongly favored by the data. However, they do make different predictions about the prevalence of the alpha-bimodality in Milky Way-mass galaxies. Therefore, we propose to take NIRSpec MSA medium-resolution ( $R=2700$ ), high-S/N observations of  $\sim 130$  red giant branch stars in the M31 disk with which we will measure precise metallicity and alpha-abundances (to  $\sim 0.03$  dex) and search for an alpha-bimodality. These first precise elemental abundances in the M31 disk will double our sample of MW-mass galaxies with which to compare and constraint the models. This will allow us to take a big step forward in our understanding of the most important chemical process at work in our galaxy. In addition, we will use the abundance information, in combination with accurate star formation histories from the PHAT survey, to probe the chemical evolution of the M31 disk in more detail using one-zone chemical evolution models that will allow us to constrain the star formation efficiency, inflow and outflow rates, and initial mass function. This pilot program will demonstrate the utility of NIRSpec for obtaining individual elemental abundances to explore the chemical enrichment of stellar populations lying well beyond the Milky Way in the Local Group.

## OBSERVING DESCRIPTION

Overall, our goal is to obtain medium-resolution high-S/N NIRSpec spectra of  $\sim 130$  RGB stars in the M31 disk to measure precise metallicity and alpha-element abundances to search for the alpha-bimodality that is seen clearly in the Milky Way's disk.

M31 NIRSpec MSA observations:

We will observe stars at the tip of the M31 disk giant branch ( $18.7 < F160W < 20.0$ ) in Brick19 of the PHAT catalog which is at a radius slightly farther out than the equivalent of the solar circle in M31. We will use the G140H/F100LP grism/filter setup that provides medium-resolution ( $R=2700$ ) spectra in the 0.9-1.8 micron wavelength range. A setup with single shutter slits provides  $\sim 130$  RGB stars in one configuration.

In five hours of exposure time (100 groups per integration, 2 integrations per exposure, and 6 dither positions, with the NRSIRS2RAPID readout

## JWST Proposal 2609 (Created: Thursday, June 1, 2023 at 5:01:43 PM Eastern Standard Time) - Overview

pattern), a S/N of 100 per pixel can be obtained for the stars at the tip of the giant branch. Monte Carlo simulations with a grid of synthetic spectra indicate that these spectra can provide abundance precision of 0.03 dex in [Fe/H] and 0.02 dex in [alpha/Fe], enough to discern the Milky Way's alpha-bimodality.

### Cluster calibration MSA observations:

We will obtain NIRSpec MSA observations with the identical setup (G140H/F100LP) of three Milky Way star cluster with ground based literature abundance measurements. The clusters M71 ([Fe/H]=-0.8, 26 stars), IC166 ([Fe/H]=-0.10, 13 stars), and NGC6791 ([Fe/H]=+0.35, 15 stars) span the expected metallicities of the M31 disk stars and will allow us to validate, and if necessary, calibrate our abundances. We will use 2 shutter slitlets with nodding and observe each cluster with a single configuration for 350 seconds (5 groups per integration, 2 integrations per exposure, 2 nod positions, with the NRSIRS2RAPID readout pattern). These observations provide S/N=140 spectra for the well-studied cluster stars (H~13th magnitude).

### NIRCam pre-imaging observations:

By the time the JWST observations will have been taken, over ten years will have passed since the PHAT HST observations were taken. Therefore, we require NIRCam preimaging observations to obtain reliable astrometry for targeting and acquisition. We will use the FULLBOX 8NIRSPEC dither pattern and use the F150W short filter and F277W longer filter and expose for 161 seconds (5 groups per integration, 1 integrations per exposure, 8 dithers, with the BRIGHT1 readout pattern). These data will also be used in combination with the PHAT observations to derive precise proper motions for the M31 disk and halo stars.

Proposal 2609 - Targets - Searching for the Alpha-Abundance Bimodality in the M31 Disk

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	M31-B19-RGB-FIELDS1278	RA: 00 46 15.3110 (11.5637958d) Dec: +42 05 18.00 (42.08833d) Equinox: J2000		
<i>Comments:</i> <i>Description=[]</i>				
(6)	M31-NIRCAM- PREIMAGING	RA: 00 46 9.0000 (11.5375000d) Dec: +42 05 16.00 (42.08778d) Equinox: J2000		
<i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Spiral galaxies]</i>				
(11)	NGC6791-NEWCATALOG- GAIAEDR3	RA: 19 20 52.6752 (290.2194800d) Dec: +37 45 58.42 (37.76623d) Equinox: J2000		
<i>Comments:</i> <i>Description=[]</i>				
(12)	IC166-NEWCATALOG- GAIAEDR3	RA: 01 52 23.2848 (28.0970200d) Dec: +61 51 54.46 (61.86513d) Equinox: J2000		
<i>Comments:</i> <i>Description=[]</i>				
(13)	M71-NEWCATALOG- GAIAEDR3	RA: 19 53 46.1636 (298.4423483d) Dec: +18 46 22.58 (18.77294d) Equinox: J2000		
<i>Comments:</i> <i>Description=[]</i>				
(14)	M31-FINAL- MSATA+TARGETS	RA: 00 46 9.7030 (11.5404292d) Dec: +42 05 24.91 (42.09025d) Equinox: J2000		
<i>Comments:</i> <i>Description=[]</i>				

Fixed Targets

Proposal 2609 - Observation 1 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

Thu Jun 01 22:01:43 GMT 2023

<b>Observation</b>	<p><b>Proposal 2609, Observation 1: NIRCam preimaging</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: NIRCam Imaging</p>									
<b>Diagnostics</b>	<p>(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(Visit 1:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>									
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>		<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>		
	(6)	M31-NIRCAM-PREIMAGING	RA: 00 46 9.0000 (11.5375000d) Dec: +42 05 16.00 (42.08778d) Equinox: J2000							
	<p><i>Comments:</i>  <i>Category=Galaxy</i>  <i>Description=[Spiral galaxies]</i></p>									
<b>Template</b>	<b>Module</b>		<b>Subarray</b>			<b>Target Placement</b>				
	ALL		FULL			Module Gap				
<b>Dithers</b>	<b>#</b>	<b>Primary Dither Type</b>		<b>Primary Dithers</b>	<b>Subpixel Dither Type</b>		<b>Dither Size</b>	<b>Subpixel Positions</b>		
	1	FULLBOX		8NIRSPEC	STANDARD			1		
<b>Spectral Elements</b>	<b>#</b>	<b>Short Filter</b>	<b>Long Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Total Integrations</b>	<b>Total Dithers</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	F150W	F277W	BRIGHT1	5	2	16	8	1631.989	60564
<b>Special Requirements</b>	<p>Group Visits within 53.0 Days</p> <p>Visits Same PA</p>									

Proposal 2609 - Observation 11 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

Thu Jun 01 22:01:43 GMT 2023

<b>Observation</b>	<p><b>Proposal 2609, Observation 11: NIRCam preimaging</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: NIRCam Imaging</p>									
<b>Diagnostics</b>	<p>(Visit 11:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(Visit 11:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>									
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>		<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>		
	(6)	M31-NIRCAM-PREIMAGING	RA: 00 46 9.0000 (11.5375000d) Dec: +42 05 16.00 (42.08778d) Equinox: J2000							
	<p><i>Comments:</i>                      Category=Galaxy                      Description=[Spiral galaxies]</p>									
<b>Template</b>	<b>Module</b>		<b>Subarray</b>			<b>Target Placement</b>				
	ALL		FULL			Module Gap				
<b>Dithers</b>	<b>#</b>	<b>Primary Dither Type</b>		<b>Primary Dithers</b>	<b>Subpixel Dither Type</b>		<b>Dither Size</b>	<b>Subpixel Positions</b>		
	1	FULLBOX		8NIRSPEC	STANDARD			1		
<b>Spectral Elements</b>	<b>#</b>	<b>Short Filter</b>	<b>Long Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Total Integrations</b>	<b>Total Dithers</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	F150W	F277W	BRIGHT1	5	2	16	8	1631.989	60564
<b>Special Requirements</b>	<p>Group Visits within 53.0 Days                      Visits Same PA</p>									

Proposal 2609 - Observation 6 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

Thu Jun 01 22:01:43 GMT 2023

<b>Observation</b>	<b>Proposal 2609, Observation 6: M71_test68</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRSpec MultiObject Spectroscopy										
	(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 6:1) Warning (Form): The recommended value is 8 Reference Stars for this template.										
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>		<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(13)	M71-NEWCATALOG-GAIAEDR3	RA: 19 53 46.1636 (298.4423483d) Dec: +18 46 22.58 (18.77294d) Equinox: J2000								
<i>Comments: Description=[]</i>											
<b>Acquisition</b>	<b>#</b>	<b>Reference Star Bin</b>	<b>Target</b>	<b>Filter</b>	<b>MSA Configuration</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	Filter: F110W; Readout: NRSRAPID; 6 sources in 3 quads; [ Optimal TA Accuracy ]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	
<b>Template</b>	<b>TA Method</b>	<b>Obtain Confirmation Images</b>	<b>Science Aperture</b>	<b>Primary Candidate List</b>	<b>Filler Candidate List</b>	<b>Spectral Overlap Map</b>	<b>Spectral Overlap Threshold</b>				
	MSATA	After Target ACQ	MSA Center	M71-NEWCATALOG-GAIAEDR3 (11806 sources)		jwst-nirspec-g140h	1.5				
<b>Reference Stars</b>	<b>Visit</b>	<b>ID</b>	<b>RA</b>	<b>Dec</b>	<b>Magnitude</b>	<b>Visit</b>	<b>ID</b>	<b>RA</b>	<b>Dec</b>	<b>Magnitude</b>	
	1	11101	298.474519	18.755050	19.61905811199931	1	11188	298.460113	18.747963	20.4742403553057	
	1	11177	298.437389	18.731200	19.66426908447473	1	11189	298.471303	18.761022	19.62025951842123	
	1	11178	298.434819	18.733557	19.59195755172024	1	11201	298.402632	18.753615	19.77174262095858	
<b>Confirmation</b>	<b>#</b>	<b>Confirmation Type</b>	<b>Conf. Readout Pattern</b>	<b>Conf. Groups/Int</b>	<b>Conf. Integrations/Exp</b>	<b>Conf. Total Integrations</b>	<b>Conf. Total Exposure Time</b>				
	1	After Target Acq	NRSIRS2RAPID	3	1	1	58.356				

Proposal 2609 - Observation 6 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

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
	Special Requirements	1	1 (G140H/F100LP)	c1	2 Shutter Slitlet	298.438612625 Degrees 18.750916111111 11 Degrees	217.97689037248 98			2	4
MSA Scheduled Aperture PA 217.9780 to 217.9780 Degrees (V3 79.40348 to 79.40348)											

Proposal 2609 - Observation 7 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

Thu Jun 01 22:01:43 GMT 2023

<b>Observation</b>	<b>Proposal 2609, Observation 7: IC166_test64</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRSspec MultiObject Spectroscopy										
	(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 7:1) Warning (Form): The recommended value is 8 Reference Stars for this template.										
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>		<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(12)	IC166-NEWCATALOG-GAIAEDR3	RA: 01 52 23.2848 (28.0970200d) Dec: +61 51 54.46 (61.86513d) Equinox: J2000								
<i>Comments: Description=[]</i>											
<b>Acquisition</b>	<b>#</b>	<b>Reference Star Bin</b>	<b>Target</b>	<b>Filter</b>	<b>MSA Configuration</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	Filter: F110W; Readout: NRSRAPID; 6 sources in 2 quads; [ Optimal TA Accuracy ]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	
<b>Template</b>	<b>TA Method</b>	<b>Obtain Confirmation Images</b>	<b>Science Aperture</b>	<b>Primary Candidate List</b>	<b>Filler Candidate List</b>	<b>Spectral Overlap Map</b>	<b>Spectral Overlap Threshold</b>				
	MSATA	After Target ACQ	MSA Center	IC166-NEWCATALOG-GAIAEDR3 (6280 sources)		jwst-nirspec-g140h	1.5				
<b>Reference Stars</b>	<b>Visit</b>	<b>ID</b>	<b>RA</b>	<b>Dec</b>	<b>Magnitude</b>	<b>Visit</b>	<b>ID</b>	<b>RA</b>	<b>Dec</b>	<b>Magnitude</b>	
	1	6046	28.189142	61.878179	19.62190179997035	1	6058	28.176408	61.888021	19.69734679519506	
	1	6051	28.168201	61.889455	19.75274826853505	1	6061	28.120778	61.890328	19.60039775843010	
	1	6055	28.201128	61.894134	19.81627513823542	1	6070	28.116832	61.905794	19.82217904045213	
<b>Confirmation</b>	<b>#</b>	<b>Confirmation Type</b>	<b>Conf. Readout Pattern</b>	<b>Conf. Groups/Int</b>	<b>Conf. Integrations/Exp</b>	<b>Conf. Total Integrations</b>	<b>Conf. Total Exposure Time</b>				
	1	After Target Acq	NRSIRS2RAPID	3	1	1	58.356				

Proposal 2609 - Observation 7 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

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
	Special Requirements	1	1 (G140H/F100LP)	c1	2 Shutter Slitlet	28.129529625 Degrees 61.881750555555 556 Degrees	303.80391251504 76			2	4
MSA Scheduled Aperture PA 303.7753 to 303.7753 Degrees (V3 165.20071 to 165.20071)											

Proposal 2609 - Observation 8 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

Thu Jun 01 22:01:43 GMT 2023

<b>Observation</b>	<b>Proposal 2609, Observation 8: NGC6791_all2</b> <b>Diagnostic Status: Error</b> Observing Template: NIRSpec MultiObject Spectroscopy																																																	
	(NGC6791_all2 (Obs 8)) Error (Form): This observation was created with an Aperture PA of 272.9100 but it has been assigned an Aperture PA of 272.9187 (Aperture PA) Error (Form): This observation was created with an Aperture PA of 272.9100 but it has been assigned an Aperture PA of 272.9187 (NGC6791_all2 (Obs 8)) Warning (Form): Config c1 (#1) has 1 primary slits affected by failed closed shutters. (NGC6791_all2 (Obs 8)) Warning (Form): Config c1 (#1) has 2 primary slit traces affected by failed open shutters. (Visit 8:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 8:1) Warning (Form): The recommended value is 8 Reference Stars for this template.																																																	
<b>Diagnostics</b>																																																		
<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(11)</td> <td>NGC6791-NEWCATALOG-GAIAEDR3</td> <td>RA: 19 20 52.6752 (290.2194800d) Dec: +37 45 58.42 (37.76623d) Equinox: J2000</td> <td></td> <td></td> </tr> </tbody> </table> Comments: Description=[]										#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous	(11)	NGC6791-NEWCATALOG-GAIAEDR3	RA: 19 20 52.6752 (290.2194800d) Dec: +37 45 58.42 (37.76623d) Equinox: J2000																																
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	#	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; 5 sources in 4 quads; [ Optimal TA Accuracy ]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788																																									
<b>Template</b>	<table border="1"> <thead> <tr> <th>TA Method</th> <th>Obtain Confirmation Images</th> <th>Science Aperture</th> <th>Primary Candidate List</th> <th>Filler Candidate List</th> <th>Spectral Overlap Map</th> <th>Spectral Overlap Threshold</th> </tr> </thead> <tbody> <tr> <td>MSATA</td> <td>No</td> <td>MSA Center</td> <td>NGC6791-NEWCATALOG-GAIAEDR3 (10293 sources)</td> <td></td> <td>rwst-nirspec-g140h</td> <td>1.5</td> </tr> </tbody> </table>										TA Method	Obtain Confirmation Images	Science Aperture	Primary Candidate List	Filler Candidate List	Spectral Overlap Map	Spectral Overlap Threshold	MSATA	No	MSA Center	NGC6791-NEWCATALOG-GAIAEDR3 (10293 sources)		rwst-nirspec-g140h	1.5																										
	TA Method	Obtain Confirmation Images	Science Aperture	Primary Candidate List	Filler Candidate List	Spectral Overlap Map	Spectral Overlap Threshold																																											
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<b>Reference Stars</b>	<table border="1"> <thead> <tr> <th>Visit</th> <th>ID</th> <th>RA</th> <th>Dec</th> <th>Magnitude</th> <th>Visit</th> <th>ID</th> <th>RA</th> <th>Dec</th> <th>Magnitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>10115</td> <td>290.243005</td> <td>37.786660</td> <td>19.66912356756403</td> <td>1</td> <td>10132</td> <td>290.198926</td> <td>37.809513</td> <td>20.39917177351379</td> </tr> <tr> <td>1</td> <td>10122</td> <td>290.197878</td> <td>37.793780</td> <td>19.86257849852306</td> <td>1</td> <td>10150</td> <td>290.232564</td> <td>37.812344</td> <td>19.57542978416043</td> </tr> <tr> <td>1</td> <td>10123</td> <td>290.189639</td> <td>37.783798</td> <td>19.88487429270892</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>										Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude	1	10115	290.243005	37.786660	19.66912356756403	1	10132	290.198926	37.809513	20.39917177351379	1	10122	290.197878	37.793780	19.86257849852306	1	10150	290.232564	37.812344	19.57542978416043	1	10123	290.189639	37.783798	19.88487429270892					
	Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude																																								
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Proposal 2609 - Observation 8 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

Special Requirements

MSA Scheduled Aperture PA 272.9187 to 272.9187 Degrees (V3 134.3441 to 134.3441)

Proposal 2609 - Observation 10 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

Thu Jun 01 22:01:43 GMT 2023

<b>Observation</b>	Proposal 2609, Observation 10: NGC6791_plan8 Diagnostic Status: Warning Observing Template: NIRSpec MultiObject Spectroscopy										
	(Visit 10:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
<b>Fixed Targets</b>	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous			
	(11)	NGC6791-NEWCATALOG-GAIAEDR3	RA: 19 20 52.6752 (290.2194800d) Dec: +37 45 58.42 (37.76623d) Equinox: J2000								
<i>Comments: Description=[]</i>											
<b>Acquisition</b>	#	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; 8 sources in 3 quads; [ Optimal TA Accuracy ]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	
<b>Template</b>	TA Method		Obtain Confirmation Images	Science Aperture	Primary Candidate List		Filler Candidate List	Spectral Overlap Map		Spectral Overlap Threshold	
	MSATA		No	MSA Center	NGC6791-NEWCATALOG-GAIAEDR3 (10293 sources)			jwst-nirspec-g140h		1.5	
<b>Reference Stars</b>	Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude	
	1	9676	290.214425	37.722246	19.60114150526444	1	10110	290.239767	37.762103	19.59396567980104	
	1	9807	290.244764	37.760202	19.90842425033934	1	10113	290.227911	37.784914	19.65834909978995	
	1	10108	290.213336	37.763514	19.63626098034242	1	10119	290.200945	37.772365	19.66713677246382	
	1	10109	290.216979	37.765777	19.53472147797217	1	10120	290.207631	37.777750	19.93354526251502	
<b>Spectral Elements</b>	#	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 (G140H/F100LP)	c1	2 Shutter Slitlet	290.21480908333 33 Degrees 37.753391111111 114 Degrees	318.15519770732 87			2	4	350.133

Proposal 2609 - Observation 10 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

Special Requirements

MSA Scheduled Aperture PA 318.1580 to 318.1580 Degrees (V3 179.58348 to 179.58348)

Proposal 2609 - Observation 9 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

Thu Jun 01 22:01:43 GMT 2023

<b>Observation</b>	<b>Proposal 2609, Observation 9: M31-FINAL-LONG</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRSPEC MultiObject Spectroscopy <i>Comments: We would like to get a verification image taken AFTER all of the spectroscopic exposures have been taken. This will be used to empirically verify the position of the stars in the slits and improve the RV accuracy.</i>																																																																																																			
	(M31-FINAL-LONG (Obs 9)) Warning (Form): Config c4 (#4) has 1 primary slits affected by failed closed shutters. (M31-FINAL-LONG (Obs 9)) Warning (Form): Config c5 (#5) has 1 primary slits affected by failed closed shutters. (Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.																																																																																																			
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Proposal 2609 - Observation 9 - Searching for the Alpha-Abundance Bimodality in the M31 Disk

	#	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
<b>Spectral Elements</b>	1	1 (G140H/F100LP)	c1		11.5490685 Degrees 42.096363333333 336 Degrees	227.89169799603 158			1	2	2946.956
	2	1 (G140H/F100LP)	c2		11.549135625000 002 Degrees 42.096308333333 33 Degrees	227.89174310553 813			1	2	2946.956
	3	1 (G140H/F100LP)	c3		11.549055791666 667 Degrees 42.096154722222 224 Degrees	227.89168991088 798			1	2	2946.956
	4	1 (G140H/F100LP)	c4		11.549257125 Degrees 42.095989166666 67 Degrees	227.89182521262 398			1	2	2946.956
	5	1 (G140H/F100LP)	c5		11.549177291666 668 Degrees 42.095835555555 56 Degrees	227.89177201796 27			1	2	2946.956
	6	1 (G140H/F100LP)	c6		11.549244416666 667 Degrees 42.095780277777 78 Degrees	227.89181712804 103			1	2	2946.956
<b>Special Requirements</b>	MSA Scheduled Aperture PA 227.8859 to 227.8859 Degrees (V3 89.31135 to 89.31135)										