



## 4515 - Galactic Center Astrometry

Cycle: 3, Proposal Category: GTO

### INVESTIGATORS

<i>Name</i>	<i>Institution</i>
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Dr. Laura L. Watkins (CoI) (ESA Member)	Space Telescope Science Institute - ESA - JWST
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### OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
GCe3				
	1	Third visit	NIRCam Imaging	(1) NAME-GAL-CENTER
	101	Third visit	NIRCam Imaging	(1) NAME-GAL-CENTER
GCe4				
	2	Fourth visit	NIRCam Imaging	(1) NAME-GAL-CENTER

### ABSTRACT

We will observe the Galactic Center with NIRCam to study the orbits of stars around the supermassive black hole and the structure of the nuclear star cluster. We will focus on the fainter stars, which are harder to measure from the ground. We will observe mainly through medium-band filters in order to go deep without saturating the bright stars too much. This set of observations will constitute the final third and fourth epochs. Combined with two epochs already taken in Cycles 1 and 2, we will measure proper motions; four epochs are necessary to account for curvature in the orbits so close to the Galactic Center.

## **OBSERVING DESCRIPTION**

We will observe the Galactic center mainly through medium-band filters, which will provide a nice compromise between not missing too many of the bright stars and going deep enough to provide a good complement to ground-based observations. We were able to fit in 5-7 secondary dithers per epoch. This choice should allow an exquisite reconstruction of the JWST PSF, which is of course critical to high-accuracy astrometry. NIRISS will be observed in parallel so that we can get some additional information for a nearby field.

In Cycle 1, observations were executed at the beginning of August 2022. In Cycle 2, observations are planned for August/September 2023.

This APT file is used for Cycle 3 observations. The changes with respect to Cycle 1 (GTO 1306 program) strategy are the following:

- Two epochs instead of one (one at the beginning of Cycle 3 and one at the end);
- 5 subpixel dither positions for epoch 3 and 7 for epoch 4;
- Different NIRCcam LW filter for epoch 4 (F405N+F444W LW filter to decrease the number of pixel with hard saturation --no slope-- in the LW data);
- Different NIRISS filter for epoch 3 (F140M filter to make a CMD with NIRISS data only).

We ask for the following special requirements:

- V3 PA of 87.032906090762 deg. This is needed to perfectly overlap the Cycle 3 observations with those of Cycles 1 and 2 both for NIRCcam and NIRISS detectors;
- "Before date 10/31/2024" for epoch 3 and "Between dates 10/31/2024 and 10/31/2025" for epoch 4. We need observations taken nearly a year apart;
- Offset (X,Y)=(52,34.5) arcsec. This puts the Galactic Center at the center of NIRCcam's SW SCA B3.

We will re-evaluate the filter choices after we received the Cycle 2 data, so that we can better assess how the PSF and saturation levels vary as a function of wavelength.

## Proposal 4515 - Targets - Galactic Center Astrometry

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	NAME-GAL-CENTER	RA: 17 45 40.0400 (266.4168333d) Dec: -29 00 28.00 (-29.00778d) Equinox: J2000		
<i>Comments: We use an "offset" special requirement to put the Galactic Center at the center of NIRCam's short-wave SCA B3.</i> <i>Category=Stellar Cluster</i> <i>Description=[Stellar associations]</i>					

# Proposal 4515 - Observation 1 - Galactic Center Astrometry

Fri Aug 30 17:00:09 GMT 2024

<b>Observation</b>	<b>Proposal 4515, Observation 1: Third visit</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRCcam Imaging Coordinated Parallel Template(s): NIRISS Imaging <i>Comments: We will re-evaluate the filter choices after we received the Cycle 2 data, so that we can better assess how the PSF and saturation levels vary as a function of wavelength.</i>									
<b>Diagnostics</b>	(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.									
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>		<b>Miscellaneous</b>		
	(1)	NAME-GAL-CENTER	RA: 17 45 40.0400 (266.4168333d) Dec: -29 00 28.00 (-29.00778d) Equinox: J2000							
	<i>Comments: We use an "offset" special requirement to put the Galactic Center at the center of NIRCcam's short-wave SCA B3.</i> Category=Stellar Cluster Description=Stellar associations									
<b>Template</b>	<b>NIRCcam Imaging</b>					<b>NIRISS Imaging</b>				
	Module: ALL Subarray: FULL Target Placement: Module Gap									
<b>Dithers</b>	<b>#</b>	<b>Primary Dither Type</b>		<b>Primary Dithers</b>	<b>Dither Size</b>	<b>Subpixel Positions</b>		<b>Coordinated Parallel Subpixel Selector</b>		<b>Dither Direct Images Primes</b>
	1	NONE				5		NIRCcam Only		NO_DITHERING
<b>Spectral Elements</b>	<b>NIRCcam Imaging</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	F182M	F360M	SHALLOW2	4	1	5	5	912.625	
<b>Spectral Elements</b>	<b>NIRISS Imaging</b>	<b>Filter</b>	<b>Grism</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	F140M		NISRAPID	16	1	5	5	912.625	

## Proposal 4515 - Observation 1 - Galactic Center Astrometry

### Special Requirements

Before Date 31-OCT-2024:00:00:00  
Aperture PA Range 86.958329150762 to 86.958329150762 Degrees (V3 87.032906090762 to 87.032906090762)  
Offset 52.0 arcsec, 34.5 arcsec  
No Parallel Attachments

# Proposal 4515 - Observation 101 - Galactic Center Astrometry

Fri Aug 30 17:00:09 GMT 2024

<b>Observation</b>	<b>Proposal 4515, Observation 101: Third visit</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRCcam Imaging Coordinated Parallel Template(s): NIRISS Imaging <i>Comments: We will re-evaluate the filter choices after we received the Cycle 2 data, so that we can better assess how the PSF and saturation levels vary as a function of wavelength.</i>									
<b>Diagnostics</b>	(Visit 101:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.									
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>		<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>		
	(1)	NAME-GAL-CENTER	RA: 17 45 40.0400 (266.4168333d) Dec: -29 00 28.00 (-29.00778d) Equinox: J2000							
	<i>Comments: We use an "offset" special requirement to put the Galactic Center at the center of NIRCcam's short-wave SCA B3.</i> Category=Stellar Cluster Description=Stellar associations									
<b>Template</b>	<b>NIRCcam Imaging</b>					<b>NIRISS Imaging</b>				
	Module: ALL Subarray: FULL Target Placement: Module Gap									
<b>Dithers</b>	<b>#</b>	<b>Primary Dither Type</b>		<b>Primary Dithers</b>	<b>Dither Size</b>	<b>Subpixel Positions</b>		<b>Coordinated Parallel Subpixel Selector</b>	<b>Dither Direct Images Primes</b>	
	1	NONE				5		NIRCcam Only	NO_DITHERING	
<b>Spectral Elements</b>	<b>NIRCcam Imaging</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	F182M	F360M	SHALLOW2	4	1	5	5	912.625	
<b>Spectral Elements</b>	<b>NIRISS Imaging</b>	<b>Filter</b>	<b>Grism</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	F140M		NISRAPID	16	1	5	5	912.625	

## Proposal 4515 - Observation 101 - Galactic Center Astrometry

### Special Requirements

Before Date 31-OCT-2024:00:00:00  
Aperture PA Range 86.958329150762 to 86.958329150762 Degrees (V3 87.032906090762 to 87.032906090762)  
Offset 52.0 arcsec, 34.5 arcsec  
No Parallel Attachments

# Proposal 4515 - Observation 2 - Galactic Center Astrometry

Fri Aug 30 17:00:09 GMT 2024

<b>Observation</b>	<b>Proposal 4515, Observation 2: Fourth visit</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRCam Imaging Coordinated Parallel Template(s): NIRISS Imaging <i>Comments: We will re-evaluate the filter choices after we received the Cycle 2 data, so that we can better assess how the PSF and saturation levels vary as a function of wavelength.</i>									
	(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.									
<b>Diagnosics</b>										
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>		<b>Miscellaneous</b>		
	(1)	NAME-GAL-CENTER	RA: 17 45 40.0400 (266.4168333d) Dec: -29 00 28.00 (-29.00778d) Equinox: J2000							
<i>Comments: We use an "offset" special requirement to put the Galactic Center at the center of NIRCam's short-wave SCA B3.</i> Category=Stellar Cluster Description=[Stellar associations]										
<b>Template</b>	<b>NIRCam Imaging</b>					<b>NIRISS Imaging</b>				
	Module: ALL Subarray: FULL Target Placement: Module Gap									
<b>Dithers</b>	<b>#</b>	<b>Primary Dither Type</b>		<b>Primary Dithers</b>	<b>Dither Size</b>	<b>Subpixel Positions</b>		<b>Coordinated Parallel Subpixel Selector</b>		<b>Dither Direct Images Primes</b>
	1	NONE				7		NIRCam Only		NO_DITHERING
<b>Spectral Elements</b>	<b>NIRCam Imaging</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	F182M	F405N+F444W	SHALLOW2	4	1	7	7	1277.676	
<b>Spectral Elements</b>	<b>NIRISS Imaging</b>	<b>Filter</b>	<b>Grism</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	F158M		NISRAPID	16	1	7	7	1277.676	

## Proposal 4515 - Observation 2 - Galactic Center Astrometry

### Special Requirements

Between Dates 31-OCT-2024:00:00:00 and 31-OCT-2025:00:00:00  
Aperture PA Range 86.958329150762 to 86.958329150762 Degrees (V3 87.032906090762 to 87.032906090762)  
Offset 52.0 arcsec, 34.5 arcsec  
No Parallel Attachments