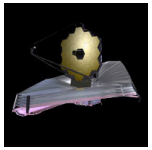

6379 - Structure and Dynamics of The Rings and Inner Moons of Uranus

Cycle: 3, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
System NIRCam				
	1	NIRCam Deep	NIRCam Imaging	(1) URANUS
	2	NIRCam Color	NIRCam Imaging	(1) URANUS
	3	Residual Persistence Check	NIRCam Dark	NONE

ABSTRACT

Uranus is unlike any other planet in the Solar System, not only because of its high axial tilt of ~98 degrees, which may reflect an early giant impact, but also because of its ring-moon system that features a closely-spaced configuration and generally low albedos, suggesting a non-icy composition, yet to be elucidated. NIRCam data will provide key parameters for a better understanding of the current configuration, history, origin, age, and evolution of its rings and moons. Furthermore, JWST observations of the faint and dusty rings will characterize the zeta ring and other material in the

ring plane orbiting near Uranus's cloud tops. This will also provide time-critical knowledge about potential hazards that will help shape the planning of NASA's Uranus Orbiter and Probe (UOP) mission.

OBSERVING DESCRIPTION

NIRCam Deep Imaging: We will use NIRCam to obtain our deepest survey of faint rings and small satellites in the Uranus system. These images will be centered on Uranus and employ the FULLP subarray, providing a 900,000-km field of view in the short-wavelength detector. This will encompass the entire system out to the orbit of Titania, and may even capture a brief appearance by Oberon near an image corner. We use the two widest filters, F150W2 and F322W2, to maximize our sensitivity to small moons and faint rings. Although Uranus will be heavily saturated, the moons and rings will not be. Similar observations of the Jupiter system in ERS program 1373 have shown that NIRCam is quite capable of obtaining clear images of faint moons and rings adjacent to a heavily overexposed planet.

NIRCam Color Imaging: A set of images through six wide filters (F090W, F115W, F150W, F227W, F356W, and F444W) will augment our NIRCam observations by providing broad color information across the entire system, including the moons that would require an excessive amount of JWST time to study using NIRSpec. Color information is also critical to our understanding of the particle sizes in the faint, dusty rings, because the observed color of dust particles varies with their size (as is illustrated by blue color of the mu ring). Our planned integrations are shorter than those in our deep imaging, so we will not be able to use them for the faintest components of the system. However, a newly discovered moon only 5 km in diameter would have SNR 5-10 in our color images. Note that, in order to maximize our integration times, we omit dithering in our NIRCam color images. Because small moons move and rings are extended sources, dithering is not critical to these observations.

Proposal 6379 - Targets - Structure and Dynamics of The Rings and Inner Moons of Uranus

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(1)	URANUS	STD=URANUS		
Comments: Extended=YES				

Observation

Proposal 6379, Observation 1: NIRCam Deep Thu Dec 12 18:00:09 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Diagnostics

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

(NIRCam Deep (Obs 1)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(1)	URANUS	STD=URANUS		

Comments: Extended=YES

Template

Module	Subarray
B	FULLP

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
1	NONE		SMALL-GRID-DITHER		5

Spectral Elements

#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F150W2	F322W2	BRIGHT1	10	10	50	5	10683.086	
2	F150W2	F322W2	BRIGHT1	10	10	50	5	10683.086	

Special Requirements

Offset -11.0 arcsec, -11.0 arcsec

Sequence Observations 1, 2, Non-interruptible

DEFAULT WINDOW: ANGULAR RATE URANUS FROM JWST LESS THAN 0.075

Observation

Proposal 6379, Observation 2: NIRCam Color Thu Dec 12 18:00:09 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Diagnostics

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

(NIRCam Color (Obs 2)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(1)	URANUS	STD=URANUS		

Comments: Extended=YES

Template

Module	Subarray
B	FULLP

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
1	NONE		SMALL-GRID-DITHER		2

Spectral Elements

#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F150W	F356W	BRIGHT1	10	5	10	2	2125.88	
2	F115W	F444W	BRIGHT1	9	5	10	2	1911.145	
3	F070W	F277W	BRIGHT1	10	5	10	2	2125.88	

Special Requirements

Offset -11.0 arcsec, -11.0 arcsec
Persistence Risk

3 After 2 by 3 Hours to 2 Days, Exclusive Use Of Instrument
Sequence Observations 1, 2, Non-interruptible

DEFAULT WINDOW: ANGULAR RATE URANUS FROM JWST LESS THAN 0.075

Observation

Proposal 6379, Observation 3: Residual Persistence Check Thu Dec 12 18:00:09 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRCam Dark

Diagnostics

(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Template

Module	Subarray	Science Template	Occulting Mask	No. of Output Channels
B	FULL	Imaging		4

Spectral Elements

#	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	MEDIUM8	10	1	1	1	1052.203	

Special Requirements

3 After 2 by 3 Hours to 2 Days, Exclusive Use Of Instrument