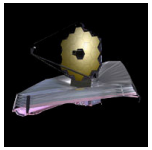

1249 - Neptune

Cycle: 1, Proposal Category: GTO

INVESTIGATORS

Name	*Institution*
Prof. Leigh Fletcher (PI) (ESA Member)	**University of Leicester**
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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Neptune Spectral Map				
	1	Neptune-Lon000	MIRI Medium Resolution Spectroscopy	(1) NEPTUNE
	2	Neptune-Lon180	MIRI Medium Resolution Spectroscopy	(1) NEPTUNE
	4	Neptune-Background	MIRI Medium Resolution Spectroscopy	(4) NEPTUNE-BACKGROUND
	5	NIRSPEC-Lon000	NIRSpec IFU Spectroscopy	(1) NEPTUNE
	6	NIRSPEC-Lon180	NIRSpec IFU Spectroscopy	(1) NEPTUNE
	7	NIRSPEC-Background	NIRSpec IFU Spectroscopy	(4) NEPTUNE-BACKGROUND

ABSTRACT

We propose to explore the middle atmospheric circulation of this archetypal ice giant world using spatially-resolved global maps of atmospheric temperatures and tracers of dynamics and chemistry (e.g., hydrocarbon species). With simultaneous multi-wavelength (5-29 m) spectral imaging, we will: (i) reveal the unusual environmental conditions within Neptune’s summer south polar vortex; (ii) search for evidence of vertical coupling between tropospheric storm systems/wind fields and stratospheric dynamics; and (iii) search for evidence of tropical vertical oscillation patterns. JWST results for Neptune and Uranus will be intercompared to understand the similarities and differences between the two ice giants.

OBSERVING DESCRIPTION

Neptune global spatial-spectral map using MIRI and NIRSPEC, sampling two opposite hemispheres of the planet, 180 degrees apart. Neptune rotates in 16 hours, 6 minutes. The time between adjacent observations should therefore be ~8 hours.

Notes:

1. SCHEDULING: Each longitude has been defined seperately to allow the visits to be seperated if necessary, but it makes most sense to execute all observations during one 16-hour rotation of Neptune, reducing the need for major slews.

2. PRECISE LONGITUDES ARE FLEXIBLE: As long as there is 180 degrees between each MIRI frame, then we still sample all 360 degrees of longitude. A "time after" constraint has been used to enforce this.

3. DITHERING: MIRI assumes a 4-point dither pattern to optimise the imaging of this 2.3" diameter disc. Large 1" dither offsets should be avoided, as the purpose is to improve spatial sampling for ALL of the MIRI channels. If a 2-point dither pattern is found to be sufficient for these moving targets, then we would consider changing the dithering technique prior to execution to increase the exposure time. NIRSPEC also assumes a 4-point dither pattern.

4. BACKGROUND: MIRI and NIRSPEC observations assume a single offset to a background region of sky (20" is acceptable, provided no Neptunian satellites are in the field of view). This would be best scheduled immediately before or after one of the science exposures.

5. SATURATION: The SHORT detector (channels 1 and 2) show no sign of saturating for 10 groups in the methane band at 7.66 μm (the brightest spectral point from 5-11 μm). The LONG detector (channels 3 and 4) saturate in the 5th group near C2H2 emission at 13.7 μm, so we selected 5 groups (the minimum recommended).

Proposal 1249 - Targets - Neptune

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(1)	NEPTUNE	STD=NEPTUNE		
Comments: Extended=YES				
(4)	NEPTUNE-BACKGROUND	STD=NEPTUNE	TYPE=POS_ANGLE,RAD=300,ANG=0,REF=NORTH	
Comments: Extended=YES				

Observation

Proposal 1249, Observation 1: Neptune-Lon000 Fri Jun 16 23:00:50 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

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

(Neptune-Lon000 (Obs 1)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

(Visit 1:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

Solar System Targets

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

Comments: Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
F1500W	ALL	YES	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	EXTENDED SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F1000W	FASTR1	5	6	1	Dither 1	4	24	388.506	
1	SHORT(A)	MRSLONG		FASTR1	5	6	1	Dither 1	4	24	388.506	
1	SHORT(A)	MRSSHORT		FASTR1	8	4	1	Dither 1	4	16	388.506	
2		IMAGER	F1000W	FASTR1	5	6	1	Dither 1	4	24	388.506	
2	MEDIUM(B)	MRSLONG		FASTR1	5	6	1	Dither 1	4	24	388.506	
2	MEDIUM(B)	MRSSHORT		FASTR1	8	4	1	Dither 1	4	16	388.506	
3		IMAGER	F1000W	FASTR1	5	6	1	Dither 1	4	24	388.506	
3	LONG(C)	MRSLONG		FASTR1	5	6	1	Dither 1	4	24	388.506	
3	LONG(C)	MRSSHORT		FASTR1	8	4	1	Dither 1	4	16	388.506	

Special Requirements	
	After Date 22-JUN-2023:03:56:48 Sequence Observations 1, 4, 5, 7, Non-interruptible DEFAULT WINDOW: ANGULAR RATE NEPTUNE FROM JWST LESS THAN 0.03 DEFAULT WINDOW: NOT ECLIPSE PENUMBRAL PARTIAL OF NEPTUNE BY TRITON FROM JWST

Observation

Proposal 1249, Observation 2: Neptune-Lon180 Fri Jun 16 23:00:50 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

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

(Neptune-Lon180 (Obs 2)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

(Visit 2:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

Solar System Targets

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

Comments: Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
F1500W	ALL	YES	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	EXTENDED SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F560W	FASTR1	5	6	1	Dither 1	4	24	388.506	
1	SHORT(A)	MRSLONG		FASTR1	5	6	1	Dither 1	4	24	388.506	
1	SHORT(A)	MRSSHORT		FASTR1	8	4	1	Dither 1	4	16	388.506	
2		IMAGER	F560W	FASTR1	5	6	1	Dither 1	4	24	388.506	
2	MEDIUM(B)	MRSLONG		FASTR1	5	6	1	Dither 1	4	24	388.506	
2	MEDIUM(B)	MRSSHORT		FASTR1	8	4	1	Dither 1	4	16	388.506	
3		IMAGER	F560W	FASTR1	5	6	1	Dither 1	4	24	388.506	
3	LONG(C)	MRSLONG		FASTR1	5	6	1	Dither 1	4	24	388.506	
3	LONG(C)	MRSSHORT		FASTR1	8	4	1	Dither 1	4	16	388.506	

Special Requirements	
	After Date 22-JUN-2023:12:05:46 Sequence Observations 2, 6, Non-interruptible DEFAULT WINDOW: ANGULAR RATE NEPTUNE FROM JWST LESS THAN 0.03 DEFAULT WINDOW: NOT ECLIPSE PENUMBRAL PARTIAL OF NEPTUNE BY TRITON FROM JWST

Observation

Proposal 1249, Observation 4: Neptune-Background Fri Jun 16 23:00:50 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Neptune-Background (Obs 4)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

(Visit 4:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(4)	NEPTUNE-BACKGROUND	STD=NEPTUNE	TYPE=POS_ANGLE,RAD=300,ANG=0,REF=NORTH	

Comments: Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
F1500W	ALL	YES	FULL	NEUTRAL

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F560W	FASTR1	5	6	1	None	1	6	97.126	
1	SHORT(A)	MRSLONG		FASTR1	5	6	1	None	1	6	97.126	
1	SHORT(A)	MRSSHORT		FASTR1	8	4	1	None	1	4	97.126	
2		IMAGER	F560W	FASTR1	5	6	1	None	1	6	97.126	
2	MEDIUM(B)	MRSLONG		FASTR1	5	6	1	None	1	6	97.126	
2	MEDIUM(B)	MRSSHORT		FASTR1	8	4	1	None	1	4	97.126	
3		IMAGER	F560W	FASTR1	5	6	1	None	1	6	97.126	
3	LONG(C)	MRSLONG		FASTR1	5	6	1	None	1	6	97.126	
3	LONG(C)	MRSSHORT		FASTR1	8	4	1	None	1	4	97.126	

Special Requirements	
	Between Dates 21-JUN-2023:00:00:00 and 24-JUN-2023:00:00:00 Sequence Observations 1, 4, 5, 7, Non-interruptible DEFAULT WINDOW: ANGULAR RATE NEPTUNE-BACKGROUND FROM JWST LESS THAN 0.03 DEFAULT WINDOW: NOT ECLIPSE PENUMBRAL PARTIAL OF NEPTUNE-BACKGROUND BY TRITON FROM JWST

Observation

Proposal 1249, Observation 5: NIRSPEC-Lon000 Fri Jun 16 23:00:50 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(NIRSPEC-Lon000 (Obs 5)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

(Visit 5:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

Solar System Targets

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

Comments: Extended=YES

Template

TA Method
NONE

Dithers

#	Dither Type	Size	Starting Point	Number of Points	Points
1	4-POINT-DITHER				

Spectral Elements

#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	G395H/F290LP	NRSRAPID	10	4	false	true	NONE	4	16	1889.672	
2	G235H/F170LP	NRSRAPID	10	4	false	true	NONE	4	16	1889.672	

Special Requirements

Between Dates 21-JUN-2023:00:00:00 and 24-JUN-2023:00:00:00

Sequence Observations 1, 4, 5, 7, Non-interruptible

DEFAULT WINDOW: NOT ECLIPSE PENUMBRAL PARTIAL OF NEPTUNE BY TRITON FROM JWST
DEFAULT WINDOW: ANGULAR RATE NEPTUNE FROM JWST LESS THAN 0.03

Observation

Proposal 1249, Observation 6: NIRSPEC-Lon180 Fri Jun 16 23:00:50 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(NIRSPEC-Lon180 (Obs 6)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

(Visit 6:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

Solar System Targets

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

Comments: Extended=YES

Template

TA Method
NONE

Dithers

#	Dither Type	Size	Starting Point	Number of Points	Points
1	4-POINT-DITHER				

Spectral Elements

#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	G395H/F290LP	NRSRAPID	10	4	false	true	NONE	4	16	1889.672	
2	G235H/F170LP	NRSRAPID	10	4	false	true	NONE	4	16	1889.672	

Special Requirements

Between Dates 21-JUN-2023:00:00:00 and 24-JUN-2023:00:00:00

Sequence Observations 2, 6, Non-interruptible

DEFAULT WINDOW: NOT ECLIPSE PENUMBRAL PARTIAL OF NEPTUNE BY TRITON FROM JWST
DEFAULT WINDOW: ANGULAR RATE NEPTUNE FROM JWST LESS THAN 0.03

Observation

Proposal 1249, Observation 7: NIRSPEC-Background Fri Jun 16 23:00:50 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(NIRSPEC-Background (Obs 7)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

(Visit 7:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(4)	NEPTUNE-BACKGROUND	STD=NEPTUNE	TYPE=POS_ANGLE,RAD=300,ANG=0,REF=NORTH	

Comments: Extended=YES

Template

TA Method
NONE

Dithers

#	Dither Type	Size	Starting Point	Number of Points	Points
1	NONE				

Spectral Elements

#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	G395H/F290LP	NRSRAPID	10	4	false	false	NONE	1	4	472.418	
2	G235H/F170LP	NRSRAPID	10	4	false	false	NONE	1	4	472.418	

Special Requirements

Between Dates 21-JUN-2023:00:00:00 and 24-JUN-2023:00:00:00

Sequence Observations 1, 4, 5, 7, Non-interruptible

DEFAULT WINDOW: NOT OCCULTATION OF NEPTUNE-BACKGROUND BY NEPTUNE FROM JWST
DEFAULT WINDOW: NOT ECLIPSE PENUMBRAL PARTIAL OF NEPTUNE-BACKGROUND BY TRITON FROM JWST
DEFAULT WINDOW: ANGULAR RATE NEPTUNE-BACKGROUND FROM JWST LESS THAN 0.03