

# 1566 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Cycle: 1, Proposal Category: GO

# **INVESTIGATORS**

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Dr. Nathan X. Roth (CoI)	Catholic University of America	nathaniel.x.roth@nasa.gov		

# **OBSERVATIONS**

Folder	Observation	Label	Observing Template	Science Target		
PANST	ARRS-C17K2 S	pectra				
	1	MIRI-IFUs-C17K2PS	MIRI Medium Resolution Spectroscopy	(1) PANSTARRS-C17K2		
	2	OFFSET-MIRI-IFUs-C 17K2PS	MIRI Medium Resolution Spectroscopy	(4) OFFSET-PANSTARRS-C17K2		
	3	MIRI-IFUs-C17K2PS	MIRI Medium Resolution Spectroscopy	(1) PANSTARRS-C17K2		
	4	OFFSET-MIRI-IFUs-C 17K2PS	MIRI Medium Resolution Spectroscopy	(4) OFFSET-PANSTARRS-C17K2		
	5	MIRI-IFUs-C17K2PS	MIRI Medium Resolution Spectroscopy	(1) PANSTARRS-C17K2		
	6	OFFSET-MIRI-IFUs-C 17K2PS	MIRI Medium Resolution Spectroscopy	(4) OFFSET-PANSTARRS-C17K2		
	7	NIRSPEC-IFU-C17K2 PS	NIRSpec IFU Spectroscopy	(1) PANSTARRS-C17K2		
	8	OFFSET-NIRSPEC-IF U-C17K2PS	NIRSpec IFU Spectroscopy	(4) OFFSET-PANSTARRS-C17K2		

JWST Proposal 1566 (Created: Wednesday, August 24, 2022 at 2:00:29 PM Eastern Standard Time) - Overview Folder Observation Label Observing Template Science Target PANSTARRS-C17K2 Imaging 11 NIRCam-Nucleus NIRCam Imaging (5) IMAGE-PANSTARRS-C17K2-COPY PANSTARRS-C17K2 Imaging Retry NIRCam-Nucleus-Retr | NIRCam Imaging 28 (8) IMAGE-PANSTARRS-C17K2-UPDATED PANSTARRS-C17K2 Spectra Redo 12 MIRI-IFUs-C17K2PS MIRI Medium Resolution Spectroscopy (6) PANSTARRS-C17K2-UPDATED 13 OFFSET-MIRI-IFUs-C | MIRI Medium Resolution Spectroscopy (7) OFFSET-PANSTARRS-C17K2-UPDATED 17K2PS MIRI Medium Resolution Spectroscopy 14 MIRI-IFUs-C17K2PS (6) PANSTARRS-C17K2-UPDATED 15 OFFSET-MIRI-IFUs-C | MIRI Medium Resolution Spectroscopy (7) OFFSET-PANSTARRS-C17K2-UPDATED 17K2PS MIRI-IFUs-C17K2PS 16 MIRI Medium Resolution Spectroscopy (6) PANSTARRS-C17K2-UPDATED 17 OFFSET-MIRI-IFUs-C | MIRI Medium Resolution Spectroscopy (7) OFFSET-PANSTARRS-C17K2-UPDATED 17K2PS 18 NIRSPEC-IFU-C17K2 | NIRSpec IFU Spectroscopy (6) PANSTARRS-C17K2-UPDATED

# PANSTARRS-C17K2 Spectra Redo 2

U-C17K2PS

26	NIRSPEC-IFU-C17K2   PS-REDO2	NIRSpec IFU Spectroscopy	(6) PANSTARRS-C17K2-UPDATED
27	OFFSET-NIRSPEC-IF U-C17K2PS-REDO2	NIRSpec IFU Spectroscopy	(7) OFFSET-PANSTARRS-C17K2-UPDATED

(7) OFFSET-PANSTARRS-C17K2-UPDATED

### **ABSTRACT**

19

Comets are our most direct link to the earliest stages of the formation and evolution of the solar system. The abundances and spatial distribution of major gas species (H2O, CO2, CO) and major dust species (silicate and carbonaceous) in comet comae provide direct insight into the chemistry and internal composition of primitive bodies. Comets and asteroids delivered these materials and pre-biotic precursors to the terrestrial planet zone potentially catalyzing life. JWST will advance a key goal of planetary science: ascertain the content, origin, and evolution of the solar system and the delivery of pre-biotic volatiles by evaluating the characteristics of refractory materials,

OFFSET-NIRSPEC-IF | NIRSpec IFU Spectroscopy

JWST Proposal 1566 (Created: Wednesday, August 24, 2022 at 2:00:29 PM Eastern Standard Time) - Overview ices, organic species and volatiles of comets. This JWST program is designed to determine the physico-chemical properties of material in the inner 3000 km coma of comet C/2017 K2 (Pan-STARRS) near perihelion. JWST is indispensable for this science because its sensitivity to faint surface brightness extended emission combined with the spectral resolving power (2400+) and continuous spectra grasp (2.87-28.8 micron) enables spatial-spectral mapping to trace the coma distribution of dust and gas simultaneously. Evaluating the characteristics of refractory materials, ices, organic species, and volatiles of comets enhances understanding of the origin and evolution of our solar system and the potential for life elsewhere. Processes that occurred in our protoplanetary disk must be taking place at some level in the youngest of these exoplanetary systems, although the details will differ. The narrative tale gleaned through the JWST study of comets is an account of human origins.

# **OBSERVING DESCRIPTION**

The proposed observational campaign is designed to produce ~2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3 micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit. Four-point dither used, with extended source flag. As the coma will fill the IFU FOV, dedicated off-target background observations are required. TA will not be used. A NIRCam image (F164N, F405N) will be obtained to enable estimates of the nucleus emission to assist post-processing analysis of the spectra. The JPL Horizons position is expected to be of high astrometric accuracy. The observation window is constrained to periods when the comet is within ~ 2.3 AU of Sun.

Proposal 1566 - Targets - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

#	Name	Level 1	Level 2 Level 3
processir scientists	ng of the background frame (offset <sub>)</sub> s B. Sargent and S. Brinkman.	TYPE=COMET,Q=1.798801516922625,E=1.0004326 48857823,I=87.54501442428581 ,O=88.26026333043211,W=236.1717099510239,T=19 -DEC- 2022:21:56:03,TTimeScale=TDB,EQUINOX=J2000,E POCH=27-AUG- 2020:00:00:00,EpochTimeScale=TDB,R0=5. ,DT=0. ,A1=0.,A2=-4.23957490921E-8,A3=0. ,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0. the target (target #1) now as background checked and target from target position) and the target frame as recommended	
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Commen	nts: Extended=YES		
(5)	IMAGE-PANSTARRS- C17K2-COPY	TYPE=COMET,Q=1.798801516922625,E=1.0004326 48857823,I=87.54501442428581 ,O=88.26026333043211,W=236.1717099510239,T=19-DEC- 2022:21:56:03,TTimeScale=TDB,EQUINOX=J2000,EPOCH=27-AUG- 2020:00:00:00;EpochTimeScale=TDB,R0=5. ,DT=0. ,A1=0.,A2=-4.23957490921E-8,A3=0. ,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRAT=0.	
because i	the NIRCam imaging observations ervations folder, corrected the PAN	ation from MIRI Instrument Scientist (Beth Sargent) email a did not include a dedicated background observation"). Fo STARRS NIRCAM Nucleus observation to use target#5.	of 2021.Jul.20, modified the proposal APT to fix potential pipeline error problem ("raise error exception in API Illowed instructions: Copied science target and renamed it Image-PANSTARRS*, which is now Target #5, then in
(6)	PANSTARRS-C17K2- UPDATED	TYPE=COMET,Q=1.79847283776299,E=1.00044993 0386448,I=87.54671635743803 ,O=88.25606731140094,W=236.1764754949283,T=19-DEC- 2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,E POCH=24-OCT- 2020:00:00:00,EpochTimeScale=TDB,R0=5. ,DT=0. ,A1=2.632422685623E-8,A2=-3.526120185852E- 8,A3=0. ,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0.	
processin	ng of the background frame (offset s B. Sargent and S. Brinkman.	the target (target #1) now as background checked and targ from target position) and the target frame as recommended	et#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline by the assigned MIRI and NIRSPEC GO Instrument Support

Proposal 1566 - Targets - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

(7)	OFFSET-PANSTARRS- C17K2-UPDATED	TYPE=COMET,Q=1.79847283776299,E=1.00044993								
(8)	tts: Extended=YES  IMAGE-PANSTARRS- C17K2-UPDATED	TYPE=COMET,Q=1.79847283776299,E=1.00044993 0386448,I=87.54671635743803 ,Q=88.25606731140094,W=236.1764754949283,T=19 -DEC- 2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,E POCH=24-OCT- 2020:00:00:00,EpochTimeScale=TDB,R0=5. ,DT=0. ,A1=2.632422685623E-8,A2=-3.526120185852E- 8,A3=0. ,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0.								
Comments: The APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame (offset from target position) and the target frame as recommended by the assigned MIRI and NIRSPEC GO Instrument Support scientists B. Sargent and S. Brinkman.  Extended=YES										

# Proposal 1566 - Observation 1 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

**Proposal 1566, Observation 1: MIRI-IFUs-C17K2PS**Wed Aug 24 19:00:29 GMT 2022

Diagnostic Status: Error

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[]

Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab.

The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs.

Special Requirements: (Non-Interruptible Observations)

Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelengths.

So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit.

(MIRI-IFUs-C17K2PS (Obs 1)) Error (Form): This target requires similar background exposures that are linked in a non-interruptible sequence.

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

	#	Name	Level 1	Level 2	Level 3
Ŋ	(1)	PANSTARRS-C17K2	TYPE=COMET,Q=1.798801516922625,E=1.0004326		
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0			e target (target #1) now as background checked and targe		
l W	processing o	f the background frame (offset fro	om target position) and the target frame as recommended i	by the assigned MIRI and NIRSPEC GO Instrument Supr	port

Comments: The AP1 target description for the target (target #1) now as background checked and target#4 is selected (OFFSE1-PANSTARRS-C1/PS), to enable proper pipeline processing of the background frame (offset from target position) and the target frame as recommended by the assigned MIRI and NIRSPEC GO Instrument Support scientists B. Sargent and S. Brinkman.

Extended=YES

Diagnostics

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Proposal 1566 - Observation 1 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

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Special Requirements	DEFAULT WI	NDOW: ANGU	LAR RATE PAN	NSTARRS-C1	7K2 FROM JWST	LESS THAN 0.0	03						

Comments: Extended=YES

Acquisition

Proposal 1566 - Observation 2 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS) Proposal 1566, Observation 2: OFFSET-MIRI-IFUs-C17K2PS Wed Aug 24 19:00:29 GMT 2022 Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [] Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab. The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs. Special Requirements: (Non-Interruptible Observations) Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelength's. So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit. Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. Diagnostics Name Level 1 Level 2 Level 3 System Targets (4) **OFFSET-PANSTARRS-**TYPE=COMET,Q=1.798801516922625,E=1.0004326 TYPE=POS ANGLE,RAD=180,ANG=90,REF=SUN C17K2 48857823.I=87.54501442428581 .O=88.26026333043211.W=236.1717099510239.T=19 2022:21:56:03.TTimeScale=TDB.EOUINOX=J2000.E POCH=27-AUG-2020:00:00:00,EpochTimeScale=TDB,R0=5. .DT=0. ,A1=0.,A2=-4.23957490921E-8,A3=0. Solar ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0.

**Target** NONE

Proposal 1566 - Observation 2 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

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<u>e</u>	1	SHORT(A)	MRSLONG		SLOWR1	45	1	1	Dither 1	4	4	4300.186	50940.7
□	1	SHORT(A)	MRSSHORT		SLOWR1	45	1	1	Dither 1	4	4	4300.186	50940.2
Spectral Elements													
Special Requirements	DEFAULT WI	'NDOW: ANGU	LAR RATE OFF	SET-PANSTA	ARRS-C17K2 FR	OM JWST LESS	THAN 0.03						

# Proposal 1566 - Observation 3 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 3: MIRI-IFUs-C17K2PS Wed Aug 24 19:00:29 GMT 2022

Diagnostic Status: Error

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[]

Diagnostics

Extended=YES

Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab.

The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs.

Special Requirements: (Non-Interruptible Observations)

Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelengths.

So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit.

(MIRI-IFUs-C17K2PS (Obs 3)) Error (Form): This target requires similar background exposures that are linked in a non-interruptible sequence.

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

	#	# Name	Level 1	Level 2	Level 3
lar System Targets		(1) PANSTARRS-C17K2	TYPE=COMET,Q=1.798801516922625,E=1.0004326 48857823,I=87.54501442428581 ,O=88.26026333043211,W=236.1717099510239,T=19 -DEC-2022:21:56:03,TTimeScale=TDB,EQUINOX=J2000,E POCH=27-AUG-2020:00:00:00,EpochTimeScale=TDB,R0=5. ,DT=0. ,A1=0.,A2=-4.23957490921E-8,A3=0. ,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0.		
S	)	Comments: The APT target description for the processing of the background frame (offset fro scientists B. Sargent and S. Brinkman.	e target (target #1) now as background checked and targe om target position) and the target frame as recommended i	et#4 is selected (OFFSET-PANSTARRS-C17PS), to enable by the assigned MIRI and NIRSPEC GO Instrument Supp	le proper pipeline port

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Proposal 1566 - Observation 3 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

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Spectral Elements	1	MEDIUM(B)	MRSLONG		SLOWR1	30	1	1	Dither 1	4	4	2866.79	50940.11
Ш	1	MEDIUM(B)	MRSSHORT		SLOWR1	30	1	1	Dither 1	4	4	2866.79	50940.1
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# Proposal 1566 - Observation 4 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 4: OFFSET-MIRI-IFUs-C17K2PS Wed Aug 24 19:00:29 GMT 2022 Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [] Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab. The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs. Special Requirements: (Non-Interruptible Observations) Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelength's. So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit. Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. Diagnostics

l v	, #	† Name	Level 1	Level 2	Level 3
Solar System Targets		4) OFFSET-PANSTARRS- C17K2  Comments: Extended=YES	TYPE=COMET,Q=1.798801516922625,E=1.0004326 48857823,I=87.54501442428581 ,O=88.26026333043211,W=236.1717099510239,T=19 -DEC-2022:21:56:03,TTimeScale=TDB,EQUINOX=J2000,E POCH=27-AUG-2020:00:00:00,EpochTimeScale=TDB,R0=5 ,DT=0 ,A1=0.,A2=-4.23957490921E-8,A3=0 ,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0.	TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN	
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10	) ⊬				

NONE

Proposal 1566 - Observation 4 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

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-	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
Spectral Elements	1	MEDIUM(B) MEDIUM(B)	MRSLONG MRSSHORT		SLOWR1 SLOWR1	30 30	1 1	1 1	Dither 1 Dither 1	4 4	4 4	2866.79 2866.79	50940.11 50940.1
Special Requirements	DEFAULT WI	NDOW: ANGU	LAR RATE OFF	SET-PANSTA	ARRS-C17K2 FR	OM JWST LESS	THAN 0.03						

# Proposal 1566 - Observation 5 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 5: MIRI-IFUs-C17K2PS Wed Aug 24 19:00:29 GMT 2022

Diagnostic Status: Error

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[]

Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab.

The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs.

Special Requirements: (Non-Interruptible Observations)

Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelengths.

So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit.

(MIRI-IFUs-C17K2PS (Obs 5)) Error (Form): This target requires similar background exposures that are linked in a non-interruptible sequence.

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

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	#	Name	Level 1	Level 2	Level 3
r System Targets	)	I) PANSTARRS-C17K2	TYPE=COMET,Q=1.798801516922625,E=1.0004326 48857823,I=87.54501442428581 ,O=88.26026333043211,W=236.1717099510239,T=19 -DEC- 2022:21:56:03,TTimeScale=TDB,EQUINOX=J2000,E POCH=27-AUG- 2020:00:00:00,EpochTimeScale=TDB,R0=5. ,DT=0. ,A1=0.,A2=-4.23957490921E-8,A3=0. ,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0.		
Sola	pr		target (target #1) now as background checked and targe m target position) and the target frame as recommended		

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Extended=YES

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Proposal 1566 - Observation 5 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

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<u>e</u>	1	LONG(C)	MRSLONG		SLOWR1	25	1	1	Dither 1	4	4	2388.992	50940.9
Ш	1	LONG(C)	MRSSHORT		SLOWR1	25	1	1	Dither 1	4	4	2388.992	50940.3
Spectral Elements													
Special Requirements	DEFAULT WI	INDOW: ANGU	LAR RATE PAN	ISTARRS-C17	'K2 FROM JWS'	Γ LESS THAN 0.0	03						

# Proposal 1566 - Observation 6 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 6: OFFSET-MIRI-IFUs-C17K2PS Wed Aug 24 19:00:29 GMT 2022 Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [] Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab. The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs. Special Requirements: (Non-Interruptible Observations) Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelength's. So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit. Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. Diagnostics Name Level 1 Level 2 Level 3 System Targets (4) **OFFSET-PANSTARRS-**TYPE=COMET,Q=1.798801516922625,E=1.0004326 TYPE=POS ANGLE,RAD=180,ANG=90,REF=SUN C17K2 48857823.I=87.54501442428581 .O=88.26026333043211.W=236.1717099510239.T=19 2022:21:56:03.TTimeScale=TDB.EOUINOX=J2000.E POCH=27-AUG-2020:00:00:00,EpochTimeScale=TDB,R0=5. DT=0. ,A1=0.,A2=-4.23957490921E-8,A3=0. Solar ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0. Comments: Extended=YES Acquisition **Target** 

NONE

Proposal 1566 - Observation 6 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

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he	1			4-Point			EXTEN	NDED SOURCE		NI	EGATIVE		
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len	1	LONG(C)	MRSLONG		SLOWR1	25	1	1	Dither 1	4	4	2388.992	50940.9
Ш	1	LONG(C)	MRSSHORT		SLOWR1	25	1	1	Dither 1	4	4	2388.992	50940.3
Spectral Elements													
Special Requirements	DEFAULT WI	INDOW: ANGU	LAR RATE OFF	SET-PANSTA	ARRS-C17K2 FR	OM JWST LESS	THAN 0.03						

# Proposal 1566 - Observation 7 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 7: NIRSPEC-IFU-C17K2PS

Diagnostic Status: Error

Observing Template: NIRSpec IFU Spectroscopy

Background Observations:[]

Comments: We have modified the NIRSPEC APT observations responding to technical review comments by the assigned NIRSPEC GO support scientist Stephan Brinkman. Specifically: [1] the detector read pattern is now set to NSRAPID (Visit 7, 8), which can be used for full frame data and for bright sources (following recommendations in the flow diagram in the NIRSpec Detector Recommended Strategies JDox); [2] the NIRSPEC IFU AORs (Visit 7, 8) now use a 4 point dither; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame (offset from target position) and the target frame; [4] an error in the NIRSPEC OFFSET observation definition (Visit 8) is corrected and the observation integration time now matches the parameters of the NIRSPEC target (Visit 7); [5] the number of groups is now set at 15 (up from 5); [6] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab.

Wed Aug 24 19:00:29 GMT 2022

The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration times may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs.

Special Requirements (Tab[s])

Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelengths.

So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit."

(NIRSPEC-IFU-C17K2PS (Obs 7)) Error (Form): This target requires similar background exposures that are linked in a non-interruptible sequence.

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

Diagnostic

Г	#	# Name	Level 1	Level 2	Level 3	
Tolos Cyctom Tor		(1) PANSTARRS-C17K2  Comments: The APT target description for the processing of the background frame (offset fiscientists B. Sargent and S. Brinkman.  Extended=YES	TYPE=COMET,Q=1.79880151692 48857823,1=87.54501442428581 ,O=88.26026333043211,W=236.17 -DEC- 2022:21:56:03,TTimeScale=TDB,I POCH=27-AUG- 2020:00:00:00,EpochTimeScale=T ,DT=0, ,A1=0.,A2=-4.23957490921E-8,A2,ALN=0.04083733261,NM=2.,NN T=0.  the target (target #1) now as backgrous target position) and the target fractions.	717099510239,T=19 EQUINOX=J2000,E DB,R0=5.	NSTARRS-C17PS), to enable proper pipeline RSPEC GO Instrument Support	
1000	<u> 1</u>	TA Method				
1 3	[ N	NONE				
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Proposal 1566 - Observation 7 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

ľS	#		Dither Type		Size		Starting Point		Number of Poin	ts	Points	
Dithers	1		4-POINT-DITHE	ER								
nts	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Ex p	Leakcal	Dither	Autocal	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
Spectral Elements	1	G395M/F290LP	NRSRAPID	15	2	false	true	NONE	4	8	1374.307	
Special Requirements	DEFAULT WIN	DOW: ANGULAI	R RATE PANSTA	RRS-C17K2 FRO	M JWST LESS TI	HAN 0.03						

# Proposal 1566 - Observation 8 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 8: OFFSET-NIRSPEC-IFU-C17K2PS

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Background Observation For: []

Comments: We have modified the NIRSPEC APT observations responding to technical review comments by the assigned NIRSPEC GO support scientist Stephan Brinkman. Specifically: [1] the detector read pattern is now set to NSRAPID (Visit 7, 8), which can be used for full frame data and for bright sources (following recommendations in the flow diagram in the NIRSpec Detector Recommended Strategies JDox); [2] the NIRSPEC IFU AORS (Visit 7, 8) now use a 4 point dither; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame (offset from target position) and the target frame; [4] an error in the NIRSPEC OFFSET observation definition (Visit 8) is corrected and the observation integration time now matches the parameters of the NIRSPEC target (Visit 7); [5] the number of groups is now set at 15 (up from 5); [6] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab.

The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration times may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs.

Special Requirements (Tab[s])

Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelengths.

So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage, Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit."

(Visit 8:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

١	9	# Name	Level 1	Level 2	Level 3
	Joial Jystelli I alyet	(4) OFFSET-PANSTARRS-C17K2  Comments: Extended=YES	TYPE=COMET,Q=1.798801516922625,E=1.0004326 48857823,I=87.54501442428581 ,O=88.26026333043211,W=236.1717099510239,T=19 -DEC-2022:21:56:03,TTimeScale=TDB,EQUINOX=J2000,E POCH=27-AUG-2020:00:00:00,EpochTimeScale=TDB,R0=5 ,DT=0 ,A1=0.,A2=-4.23957490921E-8,A3=0 ,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0.		

Wed Aug 24 19:00:29 GMT 2022

#### TA Method

**Diagnostics** 

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lδ	π	Dither Type	Size	Starting Point	Number of Points	Points	
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_		<b>Dither Type</b> 4-POINT-DITHER	Size	Starting Point	Number of Points	Points	

Proposal 1566 - Observation 8 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Elements	#	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Ex	Leakcal	Dither	Autocal	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
<u>ا</u> ۾	1	1	G395M/F290LP	NRSRAPID	15	2	false	true	NONE	4	8	1374.307	
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Spectral													
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Requirements	I	DEFAULT WINI	OOW: ANGULAF	R RATE OFFSET-	PANSTARRS-C1	7K2 FROM JWS'.	TLESS THAN 0.0	)3					
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### Proposal 1566 - Observation 11 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 11: NIRCam-Nucleus Wed Aug 24 19:00:29 GMT 202

**Diagnostic Status: Warning** 

Observing Template: NIRCam Imaging

Comments: NIRCam Imaging for nucleus detection in two narrowband filters (F164N+F150W; F405N+F444W), ideally right after the IFU observations constructed in the APT by a special requirements constrain (11 after 8), such tha the comet program can be executed in a block to avoid slew tax. The science objective is to get images of the nucleus (and information on tails and trails is secondary bonus science).

Based on 11 October 202 at 16:30 final review by J. Stansberry we have altered/revised the NIRCam imaging APT:

[1] During the CY1 window the comets rates have motions about 27.9 milliarcsec/sec, hence we have adjust individual integration time to be of the order 135 sec, and doing multiple integrations at each dither pattern (BRIGHT2, NGroups=6, NITs=3, Dither=4).

[2] We have changed the dither pattern to INTRAMODULEBOX with 4 primary dithers, this is required to keep data volume threshold below limit when we use ALL modules (latter necessary for background estimation).

[3] We added a special requirements constraint that 11 follow 8 (to avoid slewing taxes) to block schedule NIRCam observations with the spectroscopic IFU observations as there is only a single visibilty window in Cycle1 for the comet.

[4] We added a special requirement constraint to place the comet nucleus in B3 with an X/Y offest

We've re-run SMART accounting after these changes and the total charge time is 11.70hrs.

OLDER CHANGES: We have modified the NIRCam APT observation: [1] adding a special requirement to properly offset such that the comet nucleus does not land in the detector gaps (which Blair Porterfield approved on 2021 April 28); [2] creating a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation.

**Diagnostics** 

(Visit 11:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

ı		# Name	· I	Level 1	Level 2	Level 3
	ar System Targets	(-)	2-COPY 4 ,, - 2 F 2 ,, - 2 ,,	TYPE=COMET,Q=1.798801516922625,E=1.0004326 48857823,I=87.54501442428581 O=88.26026333043211,W=236.1717099510239,T=19 DEC- 2022:21:56:03,TTimeScale=TDB,EQUINOX=J2000,E POCH=27-AUG- 2020:00:00:00,EpochTimeScale=TDB,R0=5. DT=0. A1=0.,A2=-4.23957490921E-8,A3=0. ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA Γ=0.		
ľ	<del>_</del>	Comments: 2021 Aug	23 Upon recommendation	from MIRI Instrument Scientist (Reth Sargent) email of	2021 Jul 20 modified the proposal APT to fix potential	nineline error problem (" raise error exception in APT

Comments: 2021.Aug.23 Upon recommendation from MIRI Instrument Scientist (Beth Sargent) email of 2021.Jul.20, modified the proposal APT to fix potential pipeline error problem ("..raise error exception in APT because the NIRCam imaging observations did not include a dedicated background observation.."). Followed instructions: Copied science target and renamed it Image-PANSTARRS\*, which is now Target #5, then in the Observations folder, corrected the PANSTARRS NIRCAM Nucleus observation to use target#5.

Extended=YES

te E	Module	Subarray
<u>a</u>	ALL	FULL

rs.	#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	<b>Subpixel Positions</b>
he	1	INTRAMODULEBOX	4	STANDARD		1
ΙĦ						

Proposal 1566 - Observation 11 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

nts	# Short Filter		Long Filter Readout Pattern		Groups/Int Integrations/Exp		<b>Total Integrations</b> Total Dithers		Total Exposure Time	ETC Wkbk.Calc ID
Spectral Elements	1	F164N+F150W2	F405N+F444W	BRIGHT2	6	3	12	4	1631.989	50940.15
Special Requirements Sp	Offset 60.0 arcsec, 3 DEFAULT WINDO		E IMAGE-PANSTAI	RRS-C17K2-COPY F	ROM JWST LESS TI	IAN 0.03				

### Proposal 1566 - Observation 28 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 28: NIRCam-Nucleus-Retry

Wed Aug 24 19:00:29 GMT 2022

**Diagnostic Status: Warning** 

Observing Template: NIRCam Imaging

Comments: NIRCam Imaging for nucleus detection in two narrowband filters (F164N+F150W; F405N+F444W), ideally right after the IFU observations constructed in the APT by a special requirements constrain (11 after 8), such tha the comet program can be executed in a block to avoid slew tax. The science objective is to get images of the nucleus (and information on tails and trails is secondary bonus science).

Based on 11 October 202 at 16:30 final review by J. Stansberry we have altered/revised the NIRCam imaging APT:

[1] During the CYI window the comets rates have motions about 27.9 milliarcsec/sec, hence we have adjust individual integration time to be of the order 135 sec, and doing multiple integrations at each dither pattern (BRIGHT2, NGroups=6, NITs=3, Dither=4).

[2] We have changed the dither pattern to INTRAMODULEBOX with 4 primary dithers, this is required to keep data volume threshold below limit when we use ALL modules (latter necessary for background estimation).

[3] We added a special requirements constraint that 11 follow 8 (to avoid slewing taxes) to block schedule NIRCam observations with the spectroscopic IFÚ observations as there is only a single visibilty window in Cycle1 for the comet.

[4] We added a special requirement constraint to place the comet nucleus in B3 with an X/Y offest

We've re-run SMART accounting after these changes and the total charge time is 11.70hrs.

OLDER CHANGES: We have modified the NIRCam APT observation: [1] adding a special requirement to properly offset such that the comet nucleus does not land in the detector gaps (which Blair Porterfield approved on 2021 April 28); [2] creating a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation.

**Diagnostics** 

(Visit 28:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

	#	Name	Level 1	Level 2	Level 3
olar System Targets	(8)	IMAGE-PANSTARRS- C17K2-UPDATED	TYPE=COMET,Q=1.79847283776299,E=1.00044993 0386448,I=87.54671635743803 ,O=88.25606731140094,W=236.1764754949283,T=19 -DEC-2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,E POCH=24-OCT-2020:00:00:00,EpochTimeScale=TDB,R0=5 ,DT=0 ,A1=2.632422685623E-8,A2=-3.526120185852E-8,A3=0 ,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0.		
ഗ്	Comments: T	he APT target description for the	target (target #1) now as background checked and targe	t#4 is selected (OFFSET-PANSTARRS-C17PS), to enab	ele proper pipeline

Comments: The APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeling processing of the background frame (offset from target position) and the target frame as recommended by the assigned MIRI and NIRSPEC GO Instrument Support scientists B. Sargent and S. Brinkman.

Extended=YES

<b>e</b>	Module	Subarray
plate	ALL	FULL
ΙĔ		
ē		

rs	# Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
the	1 INTRAMODULEBOX	4	STANDARD		1
Ιă					

Proposal 1566 - Observation 28 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

nts	# Short Filter		Filter Long Filter Readout Pattern		Groups/Int	Groups/Int Integrations/Exp		<b>Total Dithers</b>	Total Dithers Total Exposure Time	
Spectral Elements	1	F164N+F150W2	F405N+F444W	BRIGHT2	6	3	12	4	1631.989	50940.15
Requirements Spe	Offset 60.0 arcsec, 3 DEFAULT WINDO		E IMAGE-PANSTAI	RRS-C17K2-UPDATI	ED FROM JWST LES	SS THAN 0.03				
Special Re										

# Proposal 1566 - Observation 12 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 12: MIRI-IFUs-C17K2PS

Diagnostic Status: Error

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[]

Diagnostics

Acquisition

Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab.

The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs.

Special Requirements: (Non-Interruptible Observations)

Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelengths.

So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit.

(MIRI-IFUs-C17K2PS (Obs 12)) Error (Form): This target requires similar background exposures that are linked in a non-interruptible sequence.

(Visit 12:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

	#	Name	Level 1	Level 2	Level 3
	π (6)	***			Level 5
ß	(6)	PANSTARRS-C17K2- UPDATED	TYPE=COMET,Q=1.79847283776299,E=1.00044993 0386448,I=87.54671635743803		
get		UIDAILD	O=88.25606731140094,W=236.1764754949283,T=19		
D			-DEC-		
ā			2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,E		
l '⊂			POCH=24-OCT-		
stem			2020:00:00:00,EpochTimeScale=TDB,R0=5. .DT=0.		
ξ			,A1=2.632422685623E-8,A2=-3.526120185852E-		
જિ			8,A3=0.		
<u>∵</u>			,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA		
Ιë			T=0.		
တိ	Comm	ents: The APT target description for t	he target (target #1) now as background checked and targ	et#4 is selected (OFFSET-PANSTARRS-C17PS), to enab	le proper pipeline
			rom target position) and the target frame as recommended	by the assigned MIRI and NIRSPEC GO Instrument Supp	port
		sts B. Sargent and S. Brinkman. led=YES			

Wed Aug 24 19:00:29 GMT 2022

NONE

**Target** 

Proposal 1566 - Observation 12 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

	AcqFilter				Channel	ia voiamo	Simult	aneous Imaging			ager Subarray		
Template	_			ALL			NO			FU	JLL		
rs	#			Dither T	уре		Optimized For			Di	rection		
Dithers	1	4-Point						EXTENDED SOURCE			NEGATIVE		
nents	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
<u>e</u>	1	SHORT(A)	MRSLONG		SLOWR1	45	1	1	Dither 1	4	4	4300.186	50940.7
Spectral Elements	1	SHORT(A)	MRSSHORT		SLOWR1	45	1	1	Dither 1	4	4	4300.186	50940.2
Special Requirements	DEFAULT WI	NDOW: ANGU	LAR RATE PAN	ISTARRS-C17	K2-UPDATED I	FROM JWST LES	SS THAN 0.03						

Proposal 1566 - Observation 13 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS) Proposal 1566, Observation 13: OFFSET-MIRI-IFUs-C17K2PS Wed Aug 24 19:00:29 GMT 2022 Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [] Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab. The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs. Special Requirements: (Non-Interruptible Observations) Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelength's. So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit. Visit 13:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. Diagnostics Name Level 1 Level 2 Level 3 System Targets (7) **OFFSET-PANSTARRS-**TYPE=COMET,Q=1.79847283776299,E=1.00044993 TYPE=POS ANGLE,RAD=180,ANG=90,REF=SUN C17K2-UPDATED 0386448.I=87.54671635743803 .O=88.25606731140094.W=236.1764754949283.T=19 2022:21:00:06.TTimeScale=TDB.EOUINOX=J2000.E POCH=24-OCT-2020:00:00:00,EpochTimeScale=TDB,R0=5. .DT=0. A1=2.632422685623E-8,A2=-3.526120185852E-Solar 8.A3=0.,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0Comments: Extended=YES Acquisition Target

NONE

Proposal 1566 - Observation 13 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

	AcqFilter				Channel		Simult	aneous Imaging			ager Subarray		
Template	•			ALL			NO				JLL .		
ร	#			Dither T	ype		Optimi	ized For		Di	rection		
Dithers	1			4-Point			EXTE	NDED SOURCE		NE	EGATIVE		
nents	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
<u>e</u>	1	SHORT(A)	MRSLONG		SLOWR1	45	1	1	Dither 1	4	4	4300.186	50940.7
Spectral Elements	1	SHORT(A)	MRSSHORT		SLOWR1	45	1	1	Dither 1	4	4	4300.186	50940.2
Special Requirements	DEFAULT WI	NDOW: ANGU	LAR RATE OFF	SET-PANSTA	RRS-C17K2-UP	DATED FROM J	WST LESS THAN	N 0.03					

# Proposal 1566 - Observation 14 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 14: MIRI-IFUs-C17K2PS

Diagnostic Status: Error

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[]

Diagnostics

Extended=YES

Acquisition

Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab.

The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs.

Special Requirements: (Non-Interruptible Observations)

Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelengths.

So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit.

(MIRI-IFUs-C17K2PS (Obs 14)) Error (Form): This target requires similar background exposures that are linked in a non-interruptible sequence.

(Visit 14:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

	#	Name	Level 1	Level 2	Level 3
olar System Targets	(6)	PANSTARRS-C17K2- UPDATED	TYPE=COMET,Q=1.79847283776299,E=1.00044993 0386448,I=87.54671635743803 ,O=88.25606731140094,W=236.1764754949283,T=19 -DEC-2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,E POCH=24-OCT-2020:00:00:00,EpochTimeScale=TDB,R0=5. ,DT=0. ,A1=2.632422685623E-8,A2=-3.526120185852E-8,A3=0. ,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0.		
Įŏ	processing of		e target (target #1) now as background checked and targe om target position) and the target frame as recommended t		

Wed Aug 24 19:00:29 GMT 2022

#	Target
1	NONE

30

Proposal 1566 - Observation 14 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

ıţe	AcqFilter			Primary	Channel		Simult	aneous Imaging		Im	ager Subarray		
lemplate				ALL			NO			FU	TLL .		
ပ	#			Dither T	ype		Optimi	ized For		Di	rection		
Dithers	1			4-Point			EXTEN	NDED SOURCE		NI	EGATIVE		
nents	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc II
<u>e</u>	1	MEDIUM(B)	MRSLONG		SLOWR1	30	1	1	Dither 1	4	4	2866.79	50940.11
Spectral Elements	1	MEDIUM(B)	MRSSHORT		SLOWR1	30	1	1	Dither 1	4	4	2866.79	50940.1
Special Requirements	DEFAULT WI	INDOW: ANGU	LAR RATE PAN	NSTARRS-C17	K2-UPDATED I	FROM JWST LES	SS THAN 0.03						

Proposal 1566 - Observation 15 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS) Proposal 1566, Observation 15: OFFSET-MIRI-IFUs-C17K2PS Wed Aug 24 19:00:29 GMT 2022 Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [] Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab. The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs. Special Requirements: (Non-Interruptible Observations) Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelength's. So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit. Visit 15:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. Diagnostics Name Level 1 Level 2 Level 3 System Targets (7) **OFFSET-PANSTARRS-**TYPE=COMET,Q=1.79847283776299,E=1.00044993 TYPE=POS ANGLE,RAD=180,ANG=90,REF=SUN C17K2-UPDATED 0386448.I=87.54671635743803 .O=88.25606731140094.W=236.1764754949283.T=19 2022:21:00:06.TTimeScale=TDB.EOUINOX=J2000.E POCH=24-OCT-2020:00:00:00,EpochTimeScale=TDB,R0=5. .DT=0. A1=2.632422685623E-8,A2=-3.526120185852E-Solar 8.A3=0.,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0Comments: Extended=YES Acquisition Target

NONE

Proposal 1566 - Observation 15 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

te	AcqFilter			Primary	Channel		Simult	aneous Imaging		Im	ager Subarray		
Template				ALL			NO			FU	TLL		
rs	#			Dither T	уре		Optimi	zed For		Di	rection		
Dithers	1			4-Point			EXTEN	NDED SOURCE		NE	EGATIVE		
nents	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
len	1	MEDIUM(B)	MRSLONG		SLOWR1	30	1	1	Dither 1	4	4	2866.79	50940.11
Spectral Elements	1	MEDIUM(B)	MRSSHORT		SLOWR1	30	1	1	Dither 1	4	4	2866.79	50940.1
Special Requirements	DEFAULT WI	NDOW: ANGU	LAR RATE OFF	SET-PANSTA	RRS-C17K2-UP	DATED FROM J	WST LESS THAN	N 0.03					

# Proposal 1566 - Observation 16 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 16: MIRI-IFUs-C17K2PS Wed Aug 24 19:00:29 GMT 2022

Diagnostic Status: Error

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[]

Diagnostics

Acquisition

Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab.

The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs.

Special Requirements: (Non-Interruptible Observations)

Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelengths.

So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit.

(MIRI-IFUs-C17K2PS (Obs 16)) Error (Form): This target requires similar background exposures that are linked in a non-interruptible sequence.

(Visit 16:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

# Name		_				
UPDATED  0386448,I=87.54671635743803 ,O=88.25606731140094,W=236.1764754949283,T=19 -DEC- 2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,E POCH=24-OCT- 2020:00:00:00:00,EpochTimeScale=TDB,R0=5. ,DT=0. ,A1=2.632422685623E-8,A2=-3.526120185852E- 8,A3=0. ,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0.		#	# Name Level 1	Level 2	Level 3	
Comments: The APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARS-C17PS), to enable proper pipeline	Solar System Targets		(6) PANSTARRS-C17K2-UPDATED TYPE=COMET,Q=1.79847283776299.0386448,1=87.54671635743803, O=88.25606731140094,W=236.17647-DEC-2022:21:00:06,TTimeScale=TDB,EQUPOCH=24-OCT-2020:00:00:00,EpochTimeScale=TDB,DT=0, A1=2.632422685623E-8,A2=-3.526128,A3=0, ALN=0.04083733261,NM=2.,NN=3., T=0.  Comments: The APT target description for the target (target #1) now as background of the comments and the comment of the comment	9,E=1.00044993 754949283,T=19 JINOX=J2000,E ,R0=5. 20185852E- ,NK=2.6,AMRA checked and target#4 is selected (OFFSET-PAN)	(STARRS-C17PS), to enable proper pipeline	
Comments: The AP1 target description for the Target (target #1) now as background checked and target#4 is selected (OFFSE1-PANSTARRS-C17PS), to enable pr processing of the background frame (offset from target position) and the target frame as recommended by the assigned MIRI and NIRSPEC GO Instrument Support scientists B. Sargent and S. Brinkman.  Extended = YES	Solar		T=0.  Comments: The APT target description for the target (target #1) now as background c processing of the background frame (offset from target position) and the target frame c scientists B. Sargent and S. Brinkman.	checked and target#4 is selected (OFFSET-PAN)		

	#	Target
•	1	NONE

Proposal 1566 - Observation 16 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

	AcqFilter	0.0001	valion 10			ia voiatilo	S OI C/2017				ager Subarray		
Template	Acqritter			-	Channel		NO	aneous Imaging					
۱ <u>ĕ</u>				ALL			NO			FU	JLL		
e l													
l s	#			Dither T	уре		Optimi	zed For		Di	rection		
اع	1			4-Point			EXTEN	IDED SOURCE		NI	EGATIVE		
Dithers													
_	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
e L	1	LONG(C)	MRSLONG		SLOWR1	25	1	1	Dither 1	4	4	2388.992	50940.9
	1	LONG(C)	MRSSHORT		SLOWR1	25	1	1	Dither 1	4	4	2388.992	50940.3
Spectral Elements													
Special Requirements	DEFAULT WI	NDOW: ANGU	LAR RATE PAN	ISTARRS-C17	K2-UPDATED I	FROM JWST LES	SS THAN 0.03						

# Proposal 1566 - Observation 17 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 17: OFFSET-MIRI-IFUs-C17K2PS Wed Aug 24 19:00:29 GMT 2022 Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [] Comments: We have modified the MIRI APT observations responding to technical review comments by the assigned MIRI GO Instrument Support scientist Beth Sargent. Specifically: [1] the responsibility for updating the orbital parameters is acknowledged as a PI requirement (including any non-gravitational parameters) as the scheduling window for the target is established in the JWST event-driven planning matrix. The ephemeris and orbital elements will be obtained from the JPL Horizons database which is frequently update. The expected positional error will be well established by the start of Cycle 1 and is within the JWST blind pointing tolerances; [2] a new target (#5; which is a copy of target#1 and renamed) is now associated with the NIRCam observation (Visit 11) such that the APT and pipeline processed will not error as the NIRCam observations do not require a background observation; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame and the target frame; [4] No MRS simultaneous imagery is confirmed; [5] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab. The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration time) may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs. Special Requirements: (Non-Interruptible Observations) Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelength's. So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit. Visit 17:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. Diagnostics Name Level 1 Level 2 Level 3 System Targets (7) **OFFSET-PANSTARRS-**TYPE=COMET,Q=1.79847283776299,E=1.00044993 TYPE=POS ANGLE,RAD=180,ANG=90,REF=SUN C17K2-UPDATED 0386448.I=87.54671635743803 .O=88.25606731140094.W=236.1764754949283.T=19 2022:21:00:06.TTimeScale=TDB.EOUINOX=J2000.E POCH=24-OCT-2020:00:00:00,EpochTimeScale=TDB,R0=5. .DT=0. .A1=2.632422685623E-8,A2=-3.526120185852E-Solar 8.A3=0.,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA T=0Comments: Extended=YES Acquisition Target NONE

Proposal 1566 - Observation 17 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

ţ	AcqFilter			Primary	Channel		Simult	aneous Imaging		Im	ager Subarray		
empiate				ALL			NO			FU	JLL		
ัง	#			Dither T	ype		Optimi	zed For		Di	rection		
Dithers	1			4-Point			EXTEN	IDED SOURCE		NE	EGATIVE		
nents	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc II
<u> </u>	1	LONG(C)	MRSLONG		SLOWR1	25	1	1	Dither 1	4	4	2388.992	50940.9
Spectral Elements	1	LONG(C)	MRSSHORT		SLOWR1	25	1	1	Dither 1	4	4	2388.992	50940.3
opecial Requirements	DEFAULT WI	INDOW: ANGU	LAR RATE OFF	SET-PANSTA	RRS-C17K2-UP	DATED FROM J	WST LESS THAN	V 0.03					

# Proposal 1566 - Observation 18 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 18: NIRSPEC-IFU-C17K2PS

Diagnostic Status: Error

Observing Template: NIRSpec IFU Spectroscopy

Background Observations:[]

Comments: We have modified the NIRSPEC APT observations responding to technical review comments by the assigned NIRSPEC GO support scientist Stephan Brinkman. Specifically: [1] the detector read pattern is now set to NSRAPID (Visit 7, 8), which can be used for full frame data and for bright sources (following recommendations in the flow diagram in the NIRSpec Detector Recommended Strategies JDox); [2] the NIRSPEC IFU AORs (Visit 7, 8) now use a 4 point dither; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame (offset from target position) and the target frame; [4] an error in the NIRSPEC OFFSET observation definition (Visit 8) is corrected and the observation integration time now matches the parameters of the NIRSPEC target (Visit 7); [5] the number of groups is now set at 15 (up from 5); [6] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab.

Wed Aug 24 19:00:29 GMT 2022

The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration times may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs.

Special Requirements (Tab[s])

Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelengths.

So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit."

(NIRSPEC-IFU-C17K2PS (Obs 18)) Error (Form): This target requires similar background exposures that are linked in a non-interruptible sequence.

(Visit 18:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

s Diagnostic

#	# Name	Level 1	Level 2	Level 3
lar System Targets	(6) PANSTARRS-C17 UPDATED	0386448,Ï=87.546716357- ,O=88.25606731140094,V- -DEC- 2022:21:00:06,TTimeScal POCH=24-OCT- 2020:00:00:00,EpochTime ,DT=0. ,A1=2.632422685623E-8, 8,A3=0.	V=236.1764754949283,T=19 e=TDB,EQUINOX=J2000,E eScale=TDB,R0=5.	
ο Ι.	C TI ADT I		I I I I I I I I I I I I I I I I I I I	GT L D D G G L T D G )

Comments: The APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame (offset from target position) and the target frame as recommended by the assigned MIRI and NIRSPEC GO Instrument Support scientists B. Sargent and S. Brinkman.

Extended=YES

NONE NONE

Proposal 1566 - Observation 18 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

ľS	#		Dither Type		Size		Starting Point		Number of Poin	ts	Points	
Dithers	1		4-POINT-DITHE	ER								
nts	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Ex p	Leakcal	Dither	Autocal	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
Spectral Elements	1	G395M/F290LP	NRSRAPID	15	2	false	true	NONE	4	8	1374.307	
Special Requirements	DEFAULT WIN	DOW: ANGULAI	R RATE PANSTA	RRS-C17K2-UPE	ATED FROM JW	ST LESS THAN	0.03					

# Proposal 1566 - Observation 19 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 19: OFFSET-NIRSPEC-IFU-C17K2PS

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Background Observation For: []

Comments: We have modified the NIRSPEC APT observations responding to technical review comments by the assigned NIRSPEC GO support scientist Stephan Brinkman. Specifically: [1] the detector read pattern is now set to NSRAPID (Visit 7, 8), which can be used for full frame data and for bright sources (following recommendations in the flow diagram in the NIRSpec Detector Recommended Strategies JDox); [2] the NIRSPEC IFU AORs (Visit 7, 8) now use a 4 point dither; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame (offset from target position) and the target frame; [4] an error in the NIRSPEC OFFSET observation definition (Visit 8) is corrected and the observation integration time now matches the parameters of the NIRSPEC target (Visit 7); [5] the number of groups is now set at 15 (up from 5); [6] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab.

Wed Aug 24 19:00:29 GMT 2022

Level 3

**Points** 

The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration times may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs.

Special Requirements (Tab[s])

Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelengths.

So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage. Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit."

(Visit 19:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Diaç				
	#	Name	Level 1	Level 2
rgets	(7)	OFFSET-PANSTARRS- C17K2-UPDATED	TYPE=COMET,Q=1.79847283776299,E=1.00044993 0386448,I=87.54671635743803 O=88 25606731140094 W=236 1764754949283 T=19	TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN

-DEC-2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,E

POCH=24-OCT-2020:00:00:00,EpochTimeScale=TDB,R0=5. .DT=0.

,A1=2.632422685623E-8,A2=-3.526120185852E-8,A3=0. ,ALN=0.04083733261,NM=2..NN=3..NK=2.6,AMRA

T=0.

Comments: Extended=YES

TA Method
NONE

nostics

System

Solar

1 6		VI			
Ś	#	Dither Type	Size	Starting Point	Number of Point

1 4-POINT-DITHER

#### 40

Proposal 1566 - Observation 19 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Elements	#			Readout Pattern	Groups/Int	Integrations/Ex p	Leakcal	Dither	Autocal	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
eme	1		G395M/F290LP	NRSRAPID	15	2	false	true	NONE	4	8	1374.307	
Spectral													
Spe	-												
nts	D	EFAULT WINI	OOW: ANGULAF	R RATE OFFSET-	PANSTARRS-C1	17K2-UPDATED I	FROM JWST LES	SS THAN 0.03					
Requirements													
Z iz													
cial													
Special	-												

Pro	oposal 1566	S - Observa	tion 26 - Th	ne Coma D	oust and Vol	atiles of	C/2017 K2	Pan-STAR	RS)			
L	Proposal 1566, 0	Observation 26: N	IRSPEC-IFU-C	17K2PS-REDO2	2						Wed Aug 24 19	:00:29 GMT 2022
aë I	Diagnostic Statu	s: Warning										
<u> </u>	Observing Temp	late: NIRSpec IFU	Spectroscopy									
Observation	Background Obs	ervations:[OFFSE	T-NIRSPEC-IFU-	C17K2PS-REDC	O2 (Obs 27)]							
Diagnostics	(Visit 26:1) Warn	ning (Form): Overl	heads are provisio	nal until the Visit	t Planner has been ru	ın.						
	# N:	ame	Level	1			Level 2		]	Level 3		
Template Solar System Targets	Comments: The Aprocessing of the	ANSTARRS-C17F PDATED  APT target descrip background frament and S. Brinkm.	0386- ,O=8: -DEC 2022: POCI 2020: ,DT= ,A1=: 8,A3: ,ALN T=0.	148,I=87.546716; 3.2560673114009; 2.1:00:06,TTimeS H=24-OCT- 00:00:00,EpochT 0. 2.632422685623E=0. =0.04083733261 t (target #1) now	04,W=236.17647549 Scale=TDB,EQUIN CimeScale=TDB,R09 E-8,A2=-3.52612018 ,NM=2.,NN=3.,NK	049283,T=19 OX=J2000,E =5. 35852E- =2.6,AMRA oked and tare.	et#4 is selected (OF by the assigned MII	FSET-PANSTARK II and NIRSPEC (	RS-C17PS), to enable GO Instrument Suppo	proper pipeline ort		
_												
Dithers	1		<b>Dither Type</b> 4-POINT-DITH	ER	Size		Starting Poir	t	Number of Poin	nts	Points	
_	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Ex p	Leakcal	Dither	Autocal	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
Spectral Elements	1	G395M/F290LP	NRSRAPID	15	2	false	true	NONE	4	8	1374.307	

<u> Pr</u>	oposal 1566 - Observation 26 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)
nts	Sequence Observations 26, 27, Non-interruptible
	DEFAULT WINDOW: ANGULAR RATE PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03
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Reguire	
<u>                                    </u>	
becial	
Ϊ́	

# Proposal 1566 - Observation 27 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Proposal 1566, Observation 27: OFFSET-NIRSPEC-IFU-C17K2PS-REDO2

Wed Aug 24 19:00:29 GMT 2022

Level 3

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Background Observation For: [NIRSPEC-IFU-C17K2PS-REDO2 (Obs 26)]

Comments: We have modified the NIRSPEC APT observations responding to technical review comments by the assigned NIRSPEC GO support scientist Stephan Brinkman. Specifically: [1] the detector read pattern is now set to NSRAPID (Visit 7, 8), which can be used for full frame data and for bright sources (following recommendations in the flow diagram in the NIRSpec Detector Recommended Strategies JDox); [2] the NIRSPEC IFU AORS (Visit 7, 8) now use a 4 point dither; [3] the APT target description for the target (target #1) now as background checked and target#4 is selected (OFFSET-PANSTARRS-C17PS), to enable proper pipeline processing of the background frame (offset from target position) and the target frame; [4] an error in the NIRSPEC OFFSET observation definition (Visit 8) is corrected and the observation integration time now matches the parameters of the NIRSPEC target (Visit 7); [5] the number of groups is now set at 15 (up from 5); [6] a descriptive comment (taken from the proposal text with some additional clarifying statements for non-solar system experienced observers, are now in the comments section describing why the MIRI+NIRSPEC observations (and associated backgrounds) must be a non-interruptible sequence is now provided in the comments tab.

The Visit Planner was rerun for the SMART accounting and the totality of the entire program is 11.96hrs (which is under the 12.50 awarded). After additional consultation with the MIRI and NIRSPEC GO support scientist, further adjustments (small changes in integration times may occur such that the implemented program allocates observations that full the envelope execution time to that awarded to the program of 12.50hrs.

Special Requirements (Tab[s])

Comets are very different from other types of sideral targets for a multitude of reasons, but one item to note is that comets can be variable on times scales of a few hours to days at a given heliocentric distance and are certainly variable as a function of heliocentric distance. They also can undergo outburst (stochastic events). This variability affects what materials are entrained in the coma (which we are sampling on our observations). Hence it is imperative that both the NIRSpec and MIRI observations happen as a linked set of observations (as was pointed out in the proposal approved by the TAC) to link science objectives (like gas production) at NIR wavelengths (to solid state mineral thermal emission) at MIRI wavelengths.

So, linkage is science critical to achieve that stated objected [pulled from the Observing Description section of the original proposal) of "[The] proposed observational campaign is designed to produce a 2.8 to 28 micron spectral-spatial data cubes to map the distribution of volatiles, organic materials and dust in the inner coma (of order 4000 sq. km) of comet C/2017 K2 (Pan-STARRS) pre-perihelion, near close Earth (~1.8au) passage, Both NIRSpec IFU (G395M/F290LP - 3-micron organics, CO and CO fundamental bands) and MIRI IFU (all channels/sub-bands -encompassing water hot bands, organics, and major dust emission features) will be used to observe the comet during a single target visit."

(Visit 27:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

8.A3=0.

T=0.

#### **Diagnostics** Level 1 Name Level 2 System Targets (7) OFFSET-PANSTARRS-TYPE=COMET.O=1.79847283776299.E=1.00044993 TYPE=POS ANGLE.RAD=180.ANG=90.REF=SUN C17K2-UPDATED 0386448.I=87.54671635743803 .O=88.25606731140094.W=236.1764754949283.T=19 -DEC-2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,E POCH=24-OCT-2020:00:00:00.EpochTimeScale=TDB.R0=5. .DT=0..A1=2.632422685623E-8.A2=-3.526120185852E-

ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA

Comments: Extended=YES

TA Method Template

Solar

NONE

rs	#	Dither Type	Size	Starting Point	<b>Number of Points</b>	Points	
올	1	4-POINT-DITHER	·			·	
Dit							

Proposal 1566 - Observation 27 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

nts	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Ex p	Leakcal	Dither	Autocal	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
Spectral Elements	1	G395M/F290LP	NRSRAPID	15	2	false	true	NONE	4	8	1374.307	
Special Requirements	_	ations 26, 27, Non	_	PANSTARRS-CI	7K2-UPDATED	FROM JWST LES	SS THAN 0.03					