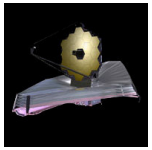

# 1566 - The Coma Dust and Volatiles of C/2017 K2 (Pan-STARRS)

Cycle: 1, Proposal Category: GO

**INVESTIGATORS**


| *Name* | *Institution* | *E-Mail* |
|---|---|---|
| **Dr. Chick Woodward (PI)** | **University of Minnesota - Twin Cities** | **chickw024@gmail.com** |
| Dr. Diane H. Wooden (CoI) | NASA Ames Research Center | diane.h.wooden@nasa.gov |
| Dr. David Emerson Harker (CoI) | University of California - San Diego | dharker@ucsd.edu |
| Dr. Michael S Kelley (CoI) | University of Maryland | msk@astro.umd.edu |
| Dr. Dominique Bockelee-Morvan (CoI) (ESA Member) | Observatoire de Paris | dominique.bockelee@obspm.fr |
| Dr. Stefanie N. Milam (CoI) | NASA Goddard Space Flight Center | stefanie.n.milam@nasa.gov |
| Dr. Nathan X. Roth (CoI) | Catholic University of America | nathaniel.x.roth@nasa.gov |


**OBSERVATIONS**

| *Folder* | *Observation* | *Label* | *Observing Template* | *Science Target* |
|---|---|---|---|---|
| PANSTARRS-C17K2 Spectra | | | | |
| | 1 | MIRI-IFUs-C17K2PS | MIRI Medium Resolution Spectroscopy | (1) PANSTARRS-C17K2 |
| | 2 | OFFSET-MIRI-IFUs-C17K2PS | MIRI Medium Resolution Spectroscopy | (4) OFFSET-PANSTARRS-C17K2 |
| | 3 | MIRI-IFUs-C17K2PS | MIRI Medium Resolution Spectroscopy | (1) PANSTARRS-C17K2 |
| | 4 | OFFSET-MIRI-IFUs-C17K2PS | MIRI Medium Resolution Spectroscopy | (4) OFFSET-PANSTARRS-C17K2 |
| | 5 | MIRI-IFUs-C17K2PS | MIRI Medium Resolution Spectroscopy | (1) PANSTARRS-C17K2 |
| | 6 | OFFSET-MIRI-IFUs-C17K2PS | MIRI Medium Resolution Spectroscopy | (4) OFFSET-PANSTARRS-C17K2 |
| | 7 | NIRSPEC-IFU-C17K2PS | NIRSpec IFU Spectroscopy | (1) PANSTARRS-C17K2 |
| | 8 | OFFSET-NIRSPEC-IFU-C17K2PS | NIRSpec IFU Spectroscopy | (4) OFFSET-PANSTARRS-C17K2 |

| *Folder* | *Observation* | *Label* | *Observing Template* | *Science Target* |
|---|---|---|---|---|
| PANSTARRS-C17K2 Imaging | | | | |
| | 11 | NIRCam-Nucleus | NIRCam Imaging | (5) IMAGE-PANSTARRS-C17K2-COPY |
| PANSTARRS-C17K2 Imaging Retry | | | | |
| | 28 | NIRCam-Nucleus-Retry | NIRCam Imaging | (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-C17K2PS | MIRI Medium Resolution Spectroscopy | (7) OFFSET-PANSTARRS-C17K2-UPDATED |
| | 14 | MIRI-IFUs-C17K2PS | MIRI Medium Resolution Spectroscopy | (6) PANSTARRS-C17K2-UPDATED |
| | 15 | OFFSET-MIRI-IFUs-C17K2PS | MIRI Medium Resolution Spectroscopy | (7) OFFSET-PANSTARRS-C17K2-UPDATED |
| | 16 | MIRI-IFUs-C17K2PS | MIRI Medium Resolution Spectroscopy | (6) PANSTARRS-C17K2-UPDATED |
| | 17 | OFFSET-MIRI-IFUs-C17K2PS | MIRI Medium Resolution Spectroscopy | (7) OFFSET-PANSTARRS-C17K2-UPDATED |
| | 18 | NIRSPEC-IFU-C17K2PS | NIRSpec IFU Spectroscopy | (6) PANSTARRS-C17K2-UPDATED |
| | 19 | OFFSET-NIRSPEC-IFU-C17K2PS | NIRSpec IFU Spectroscopy | (7) OFFSET-PANSTARRS-C17K2-UPDATED |
| PANSTARRS-C17K2 Spectra Redo 2 | | | | |
| | 26 | NIRSPEC-IFU-C17K2PS-REDO2 | NIRSpec IFU Spectroscopy | (6) PANSTARRS-C17K2-UPDATED |
| | 27 | OFFSET-NIRSPEC-IFU-C17K2PS-REDO2 | NIRSpec IFU Spectroscopy | (7) OFFSET-PANSTARRS-C17K2-UPDATED |

**ABSTRACT**

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,

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.

**Solar System Targets**

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (1) | PANSTARRS-C17K2 | TYPE=COMET,Q=1.798801516922625,E=1.0004326<br>48857823,I=87.54501442428581<br>,O=88.26026333043211,W=236.1717099510239,T=19<br>-DEC-<br>2022:21:56:03,TTimeScale=TDB,EQUINOX=J2000,E<br>POCH=27-AUG-<br>2020:00:00:00,EpochTimeScale=TDB,R0=5.<br>,DT=0.<br>,A1=0.,A2=-4.23957490921E-8,A3=0.<br>,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA<br>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.*<br>*Extended=YES* | | | | |
| (4) | OFFSET-PANSTARRS-C17K2 | TYPE=COMET,Q=1.798801516922625,E=1.0004326<br>48857823,I=87.54501442428581<br>,O=88.26026333043211,W=236.1717099510239,T=19<br>-DEC-<br>2022:21:56:03,TTimeScale=TDB,EQUINOX=J2000,E<br>POCH=27-AUG-<br>2020:00:00:00,EpochTimeScale=TDB,R0=5.<br>,DT=0.<br>,A1=0.,A2=-4.23957490921E-8,A3=0.<br>,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA<br>T=0. | TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN | |
| *Comments: Extended=YES* | | | | |
| (5) | IMAGE-PANSTARRS-C17K2-COPY | TYPE=COMET,Q=1.798801516922625,E=1.0004326<br>48857823,I=87.54501442428581<br>,O=88.26026333043211,W=236.1717099510239,T=19<br>-DEC-<br>2022:21:56:03,TTimeScale=TDB,EQUINOX=J2000,E<br>POCH=27-AUG-<br>2020:00:00:00,EpochTimeScale=TDB,R0=5.<br>,DT=0.<br>,A1=0.,A2=-4.23957490921E-8,A3=0.<br>,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA<br>T=0. | | |
| *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.*<br>*Extended=YES* | | | | |
| (6) | PANSTARRS-C17K2-UPDATED | TYPE=COMET,Q=1.79847283776299,E=1.00044993<br>0386448,I=87.54671635743803<br>,O=88.25606731140094,W=236.1764754949283,T=19<br>-DEC-<br>2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,E<br>POCH=24-OCT-<br>2020:00:00:00,EpochTimeScale=TDB,R0=5.<br>,DT=0.<br>,A1=2.632422685623E-8,A2=-3.526120185852E-<br>8,A3=0.<br>,ALN=0.04083733261,NM=2.,NN=3.,NK=2.6,AMRA<br>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.*<br>*Extended=YES* | | | | |

| | | | |
|---|---|---|---|
| (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 -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. | TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN |
| *Comments: Extended=YES* | | | |
| (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. | |
| *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* | | | |

## Observation

**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."*

## Diagnostics

(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.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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. | | |

*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*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

## Template

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

## Dithers

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

## Spectral Elements

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 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 |

## Special Requirements

DEFAULT WINDOW: ANGULAR RATE PANSTARRS-C17K2 FROM JWST LESS THAN 0.03

## Observation

**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 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."*

## Diagnostics

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

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (4) | OFFSET-PANSTARRS-C17K2 | TYPE=COMET,Q=1.798801516922625,E=1.000432648857823,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. | TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN | |

*Comments: Extended=YES*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

**Template**

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

**Dithers**

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

**Spectral Elements**

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 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 |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE OFFSET-PANSTARRS-C17K2 FROM JWST LESS THAN 0.03

## Observation

**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:[]

*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."*

## Diagnostics

(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.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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. | | |

*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*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

## Template

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

## Dithers

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

## Spectral Elements

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MEDIUM(B) | MRSLONG | | SLOWR1 | 30 | 1 | 1 | Dither 1 | 4 | 4 | 2866.79 | 50940.11 |
| 1 | MEDIUM(B) | MRSSHORT | | SLOWR1 | 30 | 1 | 1 | Dither 1 | 4 | 4 | 2866.79 | 50940.1 |

## Special Requirements

DEFAULT WINDOW: ANGULAR RATE PANSTARRS-C17K2 FROM JWST LESS THAN 0.03

## Observation

**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 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."*

## Diagnostics

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

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (4) | OFFSET-PANSTARRS-C17K2 | TYPE=COMET,Q=1.798801516922625,E=1.000432648857823,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. | TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN | |

*Comments: Extended=YES*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

**Template**

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

**Dithers**

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

**Spectral Elements**

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MEDIUM(B) | MRSLONG | | SLOWR1 | 30 | 1 | 1 | Dither 1 | 4 | 4 | 2866.79 | 50940.11 |
| 1 | MEDIUM(B) | MRSSHORT | | SLOWR1 | 30 | 1 | 1 | Dither 1 | 4 | 4 | 2866.79 | 50940.1 |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE OFFSET-PANSTARRS-C17K2 FROM JWST LESS THAN 0.03

## Observation

**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."*

## Diagnostics

(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.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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. | | |

*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*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

**Template**

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

**Dithers**

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

**Spectral Elements**

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 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 |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE PANSTARRS-C17K2 FROM JWST LESS THAN 0.03

## Observation

**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 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."*

## Diagnostics

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

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (4) | OFFSET-PANSTARRS-C17K2 | TYPE=COMET,Q=1.798801516922625,E=1.000432648857823,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. | TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN | |

*Comments: Extended=YES*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

**Template**

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

**Dithers**

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

**Spectral Elements**

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 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 |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE OFFSET-PANSTARRS-C17K2 FROM JWST LESS THAN 0.03

## Observation

**Proposal 1566, Observation 7: NIRSPEC-IFU-C17K2PS** Wed Aug 24 19:00:29 GMT 2022

**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.*

*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."*

## Diagnostics

(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.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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. | | |

*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*

## Template

| TA Method |
|---|
| NONE |

**Dithers**

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

**Spectral Elements**

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Leakcal | Dither | Autocal | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | G395M/F290LP | NRSRAPID | 15 | 2 | false | true | NONE | 4 | 8 | 1374.307 | |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE PANSTARRS-C17K2 FROM JWST LESS THAN 0.03

## Observation

**Proposal 1566, Observation 8: OFFSET-NIRSPEC-IFU-C17K2PS** Wed Aug 24 19:00:29 GMT 2022

**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."*

## Diagnostics

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

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (4) | OFFSET-PANSTARRS-C17K2 | TYPE=COMET,Q=1.798801516922625,E=1.000432648857823,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. | TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN | |

*Comments: Extended=YES*

## Template

| TA Method |
|---|
| NONE |

## Dithers

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

**Spectral Elements**

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Leakcal | Dither | Autocal | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | G395M/F290LP | NRSRAPID | 15 | 2 | false | true | NONE | 4 | 8 | 1374.307 | |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE OFFSET-PANSTARRS-C17K2 FROM JWST LESS THAN 0.03

## Observation

**Proposal 1566, Observation 11: NIRCam-Nucleus** 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 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.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (5) | IMAGE-PANSTARRS-C17K2-COPY | TYPE=COMET,Q=1.798801516922625,E=1.000432648857823,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. | | |

*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*

## Template

| Module | Subarray |
|---|---|
| ALL | FULL |

## Dithers

| # | Primary Dither Type | Primary Dithers | Subpixel Dither Type | Dither Size | Subpixel Positions |
|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 4 | STANDARD | | 1 |

**Spectral Elements**

| # | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F164N+F150W2 | F405N+F444W | BRIGHT2 | 6 | 3 | 12 | 4 | 1631.989 | 50940.15 |

**Special Requirements**

Offset 60.0 arcsec, 30.0 arcsec

DEFAULT WINDOW: ANGULAR RATE IMAGE-PANSTARRS-C17K2-COPY FROM JWST LESS THAN 0.03

## Observation

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

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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. | | |

*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*

## Template

| Module | Subarray |
|---|---|
| ALL | FULL |

## Dithers

| # | Primary Dither Type | Primary Dithers | Subpixel Dither Type | Dither Size | Subpixel Positions |
|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 4 | STANDARD | | 1 |

**Spectral Elements**

| # | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F164N+F150W2 | F405N+F444W | BRIGHT2 | 6 | 3 | 12 | 4 | 1631.989 | 50940.15 |

**Special Requirements**

Offset 60.0 arcsec, 30.0 arcsec

DEFAULT WINDOW: ANGULAR RATE IMAGE-PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03

## Observation

**Proposal 1566, Observation 12: 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."*

## Diagnostics

(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.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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. | | |

*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*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

## Template

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

## Dithers

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

## Spectral Elements

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 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 |

## Special Requirements

DEFAULT WINDOW: ANGULAR RATE PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03

## Observation

**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 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."*

## Diagnostics

(Visit 13:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (7) | OFFSET-PANSTARRS-C17K2-UPDATED | TYPE=COMET,Q=1.79847283776299,E=1.000449930386448,I=87.54671635743803 ,O=88.25606731140094,W=236.1764754949283,T=19-DEC-2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,EPOCH=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,AMRAT=0. | TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN | |

*Comments: Extended=YES*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

**Template**

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

**Dithers**

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

**Spectral Elements**

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 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 |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE OFFSET-PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03

## Observation

**Proposal 1566, Observation 14: 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."*

## Diagnostics

(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.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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. | | |

*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*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

**Template**

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

**Dithers**

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

**Spectral Elements**

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MEDIUM(B) | MRSLONG | | SLOWR1 | 30 | 1 | 1 | Dither 1 | 4 | 4 | 2866.79 | 50940.11 |
| 1 | MEDIUM(B) | MRSSHORT | | SLOWR1 | 30 | 1 | 1 | Dither 1 | 4 | 4 | 2866.79 | 50940.1 |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03

## Observation

**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 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."*

## Diagnostics

(Visit 15:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (7) | OFFSET-PANSTARRS-C17K2-UPDATED | TYPE=COMET,Q=1.79847283776299,E=1.000449930386448,I=87.54671635743803 ,O=88.25606731140094,W=236.1764754949283,T=19-DEC-2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,EPOCH=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,AMRAT=0. | TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN | |

*Comments: Extended=YES*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

**Template**

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

**Dithers**

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

**Spectral Elements**

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MEDIUM(B) | MRSLONG | | SLOWR1 | 30 | 1 | 1 | Dither 1 | 4 | 4 | 2866.79 | 50940.11 |
| 1 | MEDIUM(B) | MRSSHORT | | SLOWR1 | 30 | 1 | 1 | Dither 1 | 4 | 4 | 2866.79 | 50940.1 |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE OFFSET-PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03

## Observation

**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:[]

*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."*

## Diagnostics

(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.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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. | | |

*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*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

**Template**

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

**Dithers**

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

**Spectral Elements**

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 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 |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03

## Observation

**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 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."*

## Diagnostics

(Visit 17:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (7) | OFFSET-PANSTARRS-C17K2-UPDATED | TYPE=COMET,Q=1.79847283776299,E=1.000449930386448,I=87.54671635743803 ,O=88.25606731140094,W=236.1764754949283,T=19-DEC-2022:21:00:06,TTimeScale=TDB,EQUINOX=J2000,EPOCH=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,AMRAT=0. | TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN | |

*Comments: Extended=YES*

## Acquisition

| # | Target |
|---|---|
| 1 | NONE |

**Template**

| AcqFilter | Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|---|
| | ALL | NO | FULL |

**Dithers**

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

**Spectral Elements**

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 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 |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE OFFSET-PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03

## Observation

**Proposal 1566, Observation 18: NIRSPEC-IFU-C17K2PS** Wed Aug 24 19:00:29 GMT 2022

**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.*

*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."*

## Diagnostics

(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.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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. | | |

*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*

## Template

| TA Method |
|---|
| NONE |

**Dithers**

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

**Spectral Elements**

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Leakcal | Dither | Autocal | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | G395M/F290LP | NRSRAPID | 15 | 2 | false | true | NONE | 4 | 8 | 1374.307 | |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03

## Observation

**Proposal 1566, Observation 19: OFFSET-NIRSPEC-IFU-C17K2PS** Wed Aug 24 19:00:29 GMT 2022

**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."*

## Diagnostics

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

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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 -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. | TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN | |

*Comments: Extended=YES*

## Template

| TA Method |
|---|
| NONE |

## Dithers

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

**Spectral Elements**

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Leakcal | Dither | Autocal | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | G395M/F290LP | NRSRAPID | 15 | 2 | false | true | NONE | 4 | 8 | 1374.307 | |

**Special Requirements**

DEFAULT WINDOW: ANGULAR RATE OFFSET-PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03

## Observation

**Proposal 1566, Observation 26: NIRSPEC-IFU-C17K2PS-REDO2** Wed Aug 24 19:00:29 GMT 2022

**Diagnostic Status: Warning**

Observing Template: NIRSpec IFU Spectroscopy

Background Observations:[OFFSET-NIRSPEC-IFU-C17K2PS-REDO2 (Obs 27)]

## Diagnostics

(Visit 26:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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. | | |

*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*

## Template

| TA Method |
|---|
| NONE |

## Dithers

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

## Spectral Elements

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Leakcal | Dither | Autocal | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | G395M/F290LP | NRSRAPID | 15 | 2 | false | true | NONE | 4 | 8 | 1374.307 | |

| Special Requirements | |
|---|---|
| | Sequence Observations 26, 27, Non-interruptible<br><br>DEFAULT WINDOW: ANGULAR RATE PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03 |

## Observation

**Proposal 1566, Observation 27: OFFSET-NIRSPEC-IFU-C17K2PS-REDO2** Wed Aug 24 19:00:29 GMT 2022

**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."*

## Diagnostics

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

## Solar System Targets

| # | Name | Level 1 | Level 2 | Level 3 |
|---|---|---|---|---|
| (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 -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. | TYPE=POS_ANGLE,RAD=180,ANG=90,REF=SUN | |

*Comments: Extended=YES*

## Template

| TA Method |
|---|
| NONE |

## Dithers

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

**Spectral Elements**

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Leakcal | Dither | Autocal | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | G395M/F290LP | NRSRAPID | 15 | 2 | false | true | NONE | 4 | 8 | 1374.307 | |

**Special Requirements**

Sequence Observations 26, 27, Non-interruptible

DEFAULT WINDOW: ANGULAR RATE OFFSET-PANSTARRS-C17K2-UPDATED FROM JWST LESS THAN 0.03