



# 11962 - Twinning: An Atmospheric Study of Twin Sub-Neptunes To Investigate Carbon Chemistry, Aerosol Formation, and Photochemistry

Cycle: 5, Proposal Category: GO

## INVESTIGATORS

<i>Name</i>	<i>Institution</i>
<b>Dr. Nicholas Scarsdale (PI)</b>	<b>University of California - Santa Cruz</b>
Dr. Lili Alderson (CoI)	Cornell University
Dr. Natalie Batalha (CoI)	University of California - Santa Cruz
Dr. Peter Gao (CoI)	Carnegie Institution of Washington
Prof. Xinting Yu (CoI)	University of Texas at San Antonio
Dr. Natasha Batalha (CoI)	NASA Ames Research Center
Dr. Anne Dattilo (CoI)	The Pennsylvania State University
Dr. Ian Crossfield (CoI)	University of Kansas Center for Research, Inc.
Prof. Jonathan Fortney (CoI)	University of California - Santa Cruz
Dr. Artyom Aguichine (CoI)	University of California - Santa Cruz
Dr. Aarynn L Carter (CoI)	Space Telescope Science Institute
Dr. Nicholas Wogan (CoI)	SETI Institute
Dr. Tyler Gordon (CoI)	University of California - Santa Cruz

## OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
Observation Folder				
	1	planet-b-nirspec-g395	NIRSpec Bright Object Time Series	(1) HD-63935
	3	planet-b-NIRISS	NIRISS Single-Object Slitless Spectroscopy	(1) HD-63935
	2	planet-c-nirspec-g395	NIRSpec Bright Object Time Series	(1) HD-63935
	4	planet-c-NIRISS	NIRISS Single-Object Slitless Spectroscopy	(1) HD-63935

## **ABSTRACT**

The understanding of the gaseous and aerosol chemistry of sub-Neptunes is a topic of intense scrutiny. However, this understanding is complicated by numerous confounding variables: planet densities, stellar types, ages, and more. Studies of similar planets in the same system allow us to fix these confounding variables and study effects like stellar irradiation in isolation. Here, we propose a detailed investigation of a pair of planets in the same system that have precisely measured masses and radii that are indistinguishable. This presents a unique opportunity to investigate the role that stellar irradiation plays in driving sub-Neptune carbon chemistry, aerosol formation, and photochemistry.

HD 63935 b and c are twin sub-Neptunes receiving different irradiation and hence with different equilibrium temperatures ( $\sim 900$  and  $\sim 650$ K). We show, via simulated observations of NIRSpec G395H, that we can measure carbon gases CH<sub>4</sub> and CO<sub>2</sub>, and correspondingly test models of thermochemical equilibrium. We simultaneously use NIRISS SOSS to measure the H<sub>2</sub>O abundances and identify muting by hazes in order to assess the dependence of this process on temperature. We hypothesize that spectral features in NIRISS will be muted in the cooler planet but not the warmer, corroborating recent empirical evidence that aerosols dominate in exoplanet atmospheres ranging from 400 to 700 K. Critically, our twin planets will allow us to perform a controlled experiment and attribute these chemical and aerosol effects to irradiation alone. This uniquely informs the role that irradiation plays in sculpting exoplanet atmospheres.

## **OBSERVING DESCRIPTION**

We will observe 2 planets around 1 star. We will observe each planet with the same observational mode and set-up for consistency. In total we will observe 4 individual transit events, where each planet's transit is observed twice, once in each mode, which provides adequate precision for the outlined science goals.

We will use NIRSpec in BOTS (Bright Object Time Series) mode, which requires the S1600A1 aperture with a fixed 1.6"x1.6" field of view (FoV). We will use the G395H/F290LP combination (2.87-5.27 microns) and SUB2048 subarray for all of our observations, with three groups per integration to avoid saturation. As our target is bright (J mag=7.3), we will conduct target acquisition for NIRSpec (TA) on an alternative target to avoid saturation. For TA we will utilize the Wide Aperture Target Acquisition (WATA) mode for a guide star within splitting distance. We have selected a source with valid 2MASS J magnitudes and Gaia DR2 proper motions to ensure it is suitable for accurate TA. We used VizieR and Aladin to validate our source, and the online STScI ETC to determine the set-up required. We will use the SUB32 subarray with the F110W filter and NRSRapid with 3 groups, giving SNR=52. We will double check our guide star with scheduling prior to conducting the observations to ensure success of the program.

We will use NIRISS in the SOSS mode with the (only allowed) GR700XD disperser and the clear filter. We will make use of the new substripe204 configuration to enable observation of this bright ( $J=7.3$ ) host star with 6 groups per integration to maximize SNR while avoiding saturation. We restrict the PA range of our NIRISS SOSS observations to prevent background contamination that would interfere with our science objectives. For NIRISS, we can perform target acquisition on our science target, using SOSS AMI Faint, NIS Rapid readout, and 3 groups, yielding  $\text{SNR}=321$ .

This program is schedulable throughout cycle 5, and there are multiple opportunities throughout the year where our target star is visible to JWST, with multiple transit opportunities for each planet.

Each observation must be scheduled to cover the transit of the planet. We have set the phase constraints to allow for a range of 60 minutes for the JWST observation start window for ease of scheduling. For each of our observations we will obtain a minimum of  $(2 \times \text{Transit duration}) + 1.75$  hours. We anticipate needing to discard a maximum of 0.75 hours of data at the start of each observation due to detector settling effects which result in a ramp-like increase in the flux measured which would be unusable in our analysis. Our targets have transit times of 3.36 and 4.85 hours. In total, the time needed includes data prior to, during, and following the transit event to obtain an adequate baseline of the stellar flux. We will measure one transit of each of the two planets with a science time of 31.3 hours, and a total charged time of 49.9 hours including the observatory resets, overheads, slewing, and target acquisition.

Proposal 11962 - Targets - Twinning: An Atmospheric Study of Twin Sub-Neptunes To Investigate Carbon Chemistry, Aerosol Formati...

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HD-63935	RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000	Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. This object was generated by the targetselector and retrieved from the SIMBAD database.</i>
<i>Category=Star</i> <i>Description=[Exoplanet Systems, Exoplanets, G stars]</i> <i>Extended=NO</i>				
(2)	07514262+0923281-TASTAR	RA: 07 51 42.6250 (117.9276042d) Dec: +09 23 28.18 (9.39116d) Equinox: J2000	Proper Motion RA: -0.512 mas/yr Proper Motion Dec: -0.887 mas/yr Parallax: 0.1718" Epoch of Position: 2000	<i>Comments: This object was generated by the targetselector and retrieved from the 2MASS database.</i>
<i>Category=Star</i> <i>Description=[G stars]</i> <i>Extended=NO</i>				

Proposal 11962 - Observation 1 - Twinning: An Atmospheric Study of Twin Sub-Neptunes To Investigate Carbon Chemistry, Aerosol F...

Fri Mar 13 22:05:44 GMT 2026

<b>Observation</b>	<p><b>Proposal 11962, Observation 1: planet-b-nirspec-g395</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: NIRSpec Bright Object Time Series</p>																															
<b>Diagnostics</b>	<p>(planet-b-nirspec-g395 (Obs 1)) Warning (Form): Exposure Duration exceeds the limit of 10000.0 seconds. Above this limit it is possible that a High Gain Antenna move may occur during the exposure.</p> <p>(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>																															
<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>HD-63935</td> <td>RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000</td> <td>Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5</td> <td></td> </tr> </tbody> </table> <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p>Category=Star Description=[Exoplanet Systems, Exoplanets, G stars] Extended=NO</p>										#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous	(1)	HD-63935	RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000	Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5													
#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous																												
(1)	HD-63935	RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000	Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5																													
<b>Acquisition</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Target</th> <th>TA Method</th> <th>Subarray</th> <th>Filter</th> <th>Readout Pattern</th> <th>Groups/Int</th> <th>Integrations/Exp</th> <th>Total Integrations</th> <th>Total Exposure Time</th> <th>Optional ETC ID</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2 07514262+09232 81-TASTAR</td> <td>WATA</td> <td>SUB32</td> <td>F110W</td> <td>NRSRAPID</td> <td>3</td> <td>1</td> <td>1</td> <td>0.08</td> <td>275302</td> </tr> </tbody> </table>										#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID	1	2 07514262+09232 81-TASTAR	WATA	SUB32	F110W	NRSRAPID	3	1	1	0.08	275302
#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID																						
1	2 07514262+09232 81-TASTAR	WATA	SUB32	F110W	NRSRAPID	3	1	1	0.08	275302																						
<b>Template</b>	<p>Subarray SUB2048</p>																															
<b>Spectral Elements</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Grating/Filter</th> <th>Readout Pattern</th> <th>Groups/Int</th> <th>Integrations/Exp</th> <th>Exposures/Dith</th> <th>Total Dithers</th> <th>Total Integrations</th> <th>Total Exposure Time</th> <th>Optional ETC ID</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>G395H/F290LP</td> <td>NRSRAPID</td> <td>3</td> <td>8143</td> <td>1</td> <td>1</td> <td>8143</td> <td>29546.713</td> <td>169308</td> </tr> </tbody> </table>										#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID	1	G395H/F290LP	NRSRAPID	3	8143	1	1	8143	29546.713	169308		
#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID																							
1	G395H/F290LP	NRSRAPID	3	8143	1	1	8143	29546.713	169308																							
<b>Special Requirements</b>	<p>Phase 0.9764961796126813 to 0.9810957530739961 with period 9.058811 Days and zero-phase 2458494.4462 HJD</p> <p>Time Series Observation</p> <p>No Parallel Attachments</p>																															

Proposal 11962 - Observation 3 - Twinning: An Atmospheric Study of Twin Sub-Neptunes To Investigate Carbon Chemistry, Aerosol F...

Fri Mar 13 22:05:44 GMT 2026

<b>Observation</b>	<p><b>Proposal 11962, Observation 3: planet-b-NIRISS</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: NIRISS Single-Object Slitless Spectroscopy</p>																																													
<b>Diagnostics</b>	<p>(planet-b-NIRISS (Obs 3)) Warning (Form): Exposure Duration exceeds the limit of 10000.0 seconds. Above this limit it is possible that a High Gain Antenna move may occur during the exposure.</p> <p>(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(Visit 3:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.</p>																																													
<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>HD-63935</td> <td>RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000</td> <td>Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5</td> <td></td> </tr> </tbody> </table> <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p>Category=Star Description=[Exoplanet Systems, Exoplanets, G stars] Extended=NO</p>										#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous	(1)	HD-63935	RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000	Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5																											
#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous																																										
(1)	HD-63935	RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000	Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5																																											
<b>Acquisition</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Target</th> <th>Acquisition Mode</th> <th>Filter</th> <th>Readout Pattern</th> <th>Groups/Int</th> <th>Integrations/Exp</th> <th>Total Integrations</th> <th>Total Exposure Time</th> <th>Optional ETC ID</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>SAME</td> <td>SOSSFAINT</td> <td>F480M</td> <td>NISRAPID</td> <td>3</td> <td>1</td> <td>1</td> <td>0.202</td> <td>275302</td> </tr> </tbody> </table>										#	Target	Acquisition Mode	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID	1	SAME	SOSSFAINT	F480M	NISRAPID	3	1	1	0.202	275302																
#	Target	Acquisition Mode	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID																																					
1	SAME	SOSSFAINT	F480M	NISRAPID	3	1	1	0.202	275302																																					
<b>Template</b>	<table border="1"> <thead> <tr> <th>Subarray</th> <th>Include Short First Exposure and F277W Exposure?</th> </tr> </thead> <tbody> <tr> <td>SUB204STRIPE_SOSS</td> <td>true</td> </tr> </tbody> </table>										Subarray	Include Short First Exposure and F277W Exposure?	SUB204STRIPE_SOSS	true																																
Subarray	Include Short First Exposure and F277W Exposure?																																													
SUB204STRIPE_SOSS	true																																													
<b>Spectral Elements</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Readout Pattern</th> <th>Groups/Int</th> <th>Integrations/Exp</th> <th>Exposures/Dith</th> <th>Total Dithers</th> <th>Total Integrations</th> <th>Total Exposure Time</th> <th>Optional ETC ID</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>NISRAPID</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>11.461</td> <td></td> </tr> <tr> <td>2</td> <td>NISRAPID</td> <td>6</td> <td>748</td> <td>1</td> <td>1</td> <td>748</td> <td>29621.398</td> <td>261130</td> </tr> <tr> <td>3</td> <td>NISRAPID</td> <td>6</td> <td>10</td> <td>1</td> <td>1</td> <td>10</td> <td>396.008</td> <td></td> </tr> </tbody> </table>										#	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID	1	NISRAPID	1	1	1	1	1	11.461		2	NISRAPID	6	748	1	1	748	29621.398	261130	3	NISRAPID	6	10	1	1	10	396.008	
#	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID																																						
1	NISRAPID	1	1	1	1	1	11.461																																							
2	NISRAPID	6	748	1	1	748	29621.398	261130																																						
3	NISRAPID	6	10	1	1	10	396.008																																							
<b>Special Requirements</b>	<p>Phase 0.9764961796126813 to 0.9810957530739961 with period 9.058811 Days and zero-phase 2458494.4462 HJD</p> <p>Aperture PA Range 81 to 90 Degrees (V3 80.43873283 to 89.43873283)</p> <p>Aperture PA Range 274 to 285 Degrees (V3 273.43873283 to 284.43873283)</p> <p>Aperture PA Range 295 to 301 Degrees (V3 294.43873283 to 300.43873283)</p> <p>Time Series Observation</p> <p>No Parallel Attachments</p>																																													

Proposal 11962 - Observation 2 - Twinning: An Atmospheric Study of Twin Sub-Neptunes To Investigate Carbon Chemistry, Aerosol F...

Fri Mar 13 22:05:44 GMT 2026

<b>Observation</b>	<p><b>Proposal 11962, Observation 2: planet-c-nirspec-g395</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: NIRSpec Bright Object Time Series</p>																															
<b>Diagnostics</b>	<p>(planet-c-nirspec-g395 (Obs 2)) Warning (Form): Exposure Duration exceeds the limit of 10000.0 seconds. Above this limit it is possible that a High Gain Antenna move may occur during the exposure.</p> <p>(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>																															
<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>HD-63935</td> <td>RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000</td> <td>Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5</td> <td></td> </tr> </tbody> </table> <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p>Category=Star Description=[Exoplanet Systems, Exoplanets, G stars] Extended=NO</p>										#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous	(1)	HD-63935	RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000	Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5													
#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous																												
(1)	HD-63935	RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000	Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5																													
<b>Acquisition</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Target</th> <th>TA Method</th> <th>Subarray</th> <th>Filter</th> <th>Readout Pattern</th> <th>Groups/Int</th> <th>Integrations/Exp</th> <th>Total Integrations</th> <th>Total Exposure Time</th> <th>Optional ETC ID</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2 07514262+09232 81-TASTAR</td> <td>WATA</td> <td>SUB32</td> <td>F110W</td> <td>NRSRAPID</td> <td>3</td> <td>1</td> <td>1</td> <td>0.08</td> <td>275302</td> </tr> </tbody> </table>										#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID	1	2 07514262+09232 81-TASTAR	WATA	SUB32	F110W	NRSRAPID	3	1	1	0.08	275302
#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID																						
1	2 07514262+09232 81-TASTAR	WATA	SUB32	F110W	NRSRAPID	3	1	1	0.08	275302																						
<b>Template</b>	<p>Subarray</p> <p>SUB2048</p>																															
<b>Spectral Elements</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Grating/Filter</th> <th>Readout Pattern</th> <th>Groups/Int</th> <th>Integrations/Exp</th> <th>Exposures/Dith</th> <th>Total Dithers</th> <th>Total Integrations</th> <th>Total Exposure Time</th> <th>Optional ETC ID</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>G395H/F290LP</td> <td>NRSRAPID</td> <td>3</td> <td>11117</td> <td>1</td> <td>1</td> <td>11117</td> <td>40337.812</td> <td>169308</td> </tr> </tbody> </table>										#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID	1	G395H/F290LP	NRSRAPID	3	11117	1	1	11117	40337.812	169308		
#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID																							
1	G395H/F290LP	NRSRAPID	3	11117	1	1	11117	40337.812	169308																							
<b>Special Requirements</b>	<p>Phase 0.9861098536528006 to 0.9880566849123692 with period 21.4023 Days and zero-phase 2459231.828048 HJD</p> <p>Time Series Observation</p> <p>No Parallel Attachments</p>																															

Proposal 11962 - Observation 4 - Twinning: An Atmospheric Study of Twin Sub-Neptunes To Investigate Carbon Chemistry, Aerosol F...

Fri Mar 13 22:05:44 GMT 2026

<b>Observation</b>	<p><b>Proposal 11962, Observation 4: planet-c-NIRISS</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: NIRISS Single-Object Slitless Spectroscopy</p>																																													
<b>Diagnostics</b>	<p>(planet-c-NIRISS (Obs 4)) Warning (Form): Exposure Duration exceeds the limit of 10000.0 seconds. Above this limit it is possible that a High Gain Antenna move may occur during the exposure.</p> <p>(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>																																													
<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>HD-63935</td> <td>RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000</td> <td>Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5</td> <td></td> </tr> </tbody> </table> <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p>Category=Star Description=[Exoplanet Systems, Exoplanets, G stars] Extended=NO</p>										#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous	(1)	HD-63935	RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000	Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5																											
#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous																																										
(1)	HD-63935	RA: 07 51 41.9140 (117.9246417d) Dec: +09 23 6.87 (9.38524d) Equinox: J2000	Proper Motion RA: -0.005317580064311174 sec of time/yr Proper Motion Dec: -0.18851200004519342 arcsec/yr Epoch of Position: 2015.5																																											
<b>Acquisition</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Target</th> <th>Acquisition Mode</th> <th>Filter</th> <th>Readout Pattern</th> <th>Groups/Int</th> <th>Integrations/Exp</th> <th>Total Integrations</th> <th>Total Exposure Time</th> <th>Optional ETC ID</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>SAME</td> <td>SOSSFAINT</td> <td>F480M</td> <td>NISRAPID</td> <td>3</td> <td>1</td> <td>1</td> <td>0.202</td> <td>275302</td> </tr> </tbody> </table>										#	Target	Acquisition Mode	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID	1	SAME	SOSSFAINT	F480M	NISRAPID	3	1	1	0.202	275302																
#	Target	Acquisition Mode	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID																																					
1	SAME	SOSSFAINT	F480M	NISRAPID	3	1	1	0.202	275302																																					
<b>Template</b>	<table border="1"> <thead> <tr> <th>Subarray</th> <th>Include Short First Exposure and F277W Exposure?</th> </tr> </thead> <tbody> <tr> <td>SUB204STRIPE_SOSS</td> <td>true</td> </tr> </tbody> </table>										Subarray	Include Short First Exposure and F277W Exposure?	SUB204STRIPE_SOSS	true																																
Subarray	Include Short First Exposure and F277W Exposure?																																													
SUB204STRIPE_SOSS	true																																													
<b>Spectral Elements</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Readout Pattern</th> <th>Groups/Int</th> <th>Integrations/Exp</th> <th>Exposures/Dith</th> <th>Total Dithers</th> <th>Total Integrations</th> <th>Total Exposure Time</th> <th>Optional ETC ID</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>NISRAPID</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>11.461</td> <td></td> </tr> <tr> <td>2</td> <td>NISRAPID</td> <td>6</td> <td>1020</td> <td>1</td> <td>1</td> <td>1020</td> <td>40392.816</td> <td>261130</td> </tr> <tr> <td>3</td> <td>NISRAPID</td> <td>6</td> <td>10</td> <td>1</td> <td>1</td> <td>10</td> <td>396.008</td> <td></td> </tr> </tbody> </table>										#	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID	1	NISRAPID	1	1	1	1	1	11.461		2	NISRAPID	6	1020	1	1	1020	40392.816	261130	3	NISRAPID	6	10	1	1	10	396.008	
#	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID																																						
1	NISRAPID	1	1	1	1	1	11.461																																							
2	NISRAPID	6	1020	1	1	1020	40392.816	261130																																						
3	NISRAPID	6	10	1	1	10	396.008																																							
<b>Special Requirements</b>	<p>Phase 0.9861098536528006 to 0.9880566849123692 with period 21.4023 Days and zero-phase 2459231.828048 HJD</p> <p>Aperture PA Range 81 to 90 Degrees (V3 80.43873283 to 89.43873283)</p> <p>Aperture PA Range 274 to 285 Degrees (V3 273.43873283 to 284.43873283)</p> <p>Aperture PA Range 295 to 301 Degrees (V3 294.43873283 to 300.43873283)</p> <p>Time Series Observation</p> <p>No Parallel Attachments</p>																																													