



16189 - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circumstellar Medium

Cycle: 28, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>
Dr. Ori Dosovitz Fox (PI) (Contact)	Space Telescope Science Institute
Ms. K. Azalee Bostroem (CoI)	University of California - Davis
Prof. Alex V. Filippenko (CoI)	University of California - Berkeley
Prof. Ryan Foley (CoI)	University of California - Santa Cruz
Dr. Melissa Lynn Graham (CoI)	University of Washington
Dr. Patrick Kelly (CoI)	University of Minnesota - Twin Cities
Dr. Jon Mauerhan (CoI)	University of California - Berkeley
Dr. Francesco Taddia (CoI) (ESA Member)	Stockholm University

VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(2) ZTF21AAABWZX (3) OFFSETSTAR	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	5	09-May-2023 11:00:14.0	yes
Z2	(2) ZTF21AAABWZX (3) OFFSETSTAR	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	5	09-May-2023 11:00:17.0	yes

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
Z3	(2) ZTF21AAABWZX (3) OFFSETSTAR	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	4	09-May-2023 11:00:18.0	yes
02	(2) ZTF21AAABWZX (3) OFFSETSTAR	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	5	09-May-2023 11:00:20.0	yes
03	(2) ZTF21AAABWZX (3) OFFSETSTAR	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	5	09-May-2023 11:00:22.0	yes
Z1	(2) ZTF21AAABWZX (3) OFFSETSTAR	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	5	09-May-2023 11:00:25.0	yes

29 Total Orbits Used

ABSTRACT

Type Ia supernovae (SNe Ia) are well known for their use as precise cosmological distance indicators due to a standardizable peak luminosity resulting from a thermonuclear explosion. A growing subset of SNe Ia, however, show evidence for interaction with a dense circumstellar medium during the first year post-explosion, and sometimes longer (SNe Ia-CSM). The origin of this dense CSM is unknown and suggests either (a) the less typical single-degenerate progenitor scenario must be considered, or (b) the exploding star was not a thermonuclear explosion of a white dwarf at all (i.e., core collapse). The ultraviolet (UV) offers a unique opportunity to determine the true nature of the SNe Ia-CSM subclass. Unlike optical wavelengths, which can sometimes yield ambiguous classifications, the UV has distinguishing features due to its sensitivity to the composition of the optically thin ejecta that are illuminated by X-rays generated by shock interaction. Yet not a single UV spectrum exists for this subclass. Here we propose a non-disruptive ToO with HST/STIS to obtain 3 epochs (5 orbits each) of UV spectra of a SN Ia-CSM within 100 Mpc. This program will not only distinguish between the SN explosion mechanisms, but also trace CSM interaction, constrain the progenitor mass loss history, and identify late-time heating mechanisms of warm dust. Coinciding with Cycle 28's UV Initiative, this program offers new insights regarding both the progenitor and explosion characteristics of the SN Ia-CSM subclass.

OBSERVING DESCRIPTION

We propose to obtain 3 epochs (5 orbits each) of STIS-MAMA spectra of a single Type Ia-CSM supernova (SN Ia-CSM) within ~ 150 Mpc. The goal is to detect UV signatures that can distinguish between core-collapse and thermonuclear progenitor scenarios. These observations will also trace circumstellar interaction, constrain the progenitor mass loss, and identify late-time heating mechanisms for potential warm dust.

The initial spectrum will be triggered as a non-disruptive ToO, *although observations should be scheduled as soon as possible*. Earlier observations will be more sensitive to the key UV iron-group features of thermonuclear explosions. As the SN evolves, reprocessed X-rays from shock interaction will illuminate the ejecta, reaching deeper layers as the ejecta expand. The second epoch should therefore be obtained ~ 2 months following the first epoch. The third epoch should be scheduled ~ 9 months after the first epoch. Each epoch will include observations in both the G140 and G230L bandpasses.

We choose STIS over COS for several reasons. Most importantly, STIS offers spatially resolved spectra that exploit the intrinsically high resolution of HST over a large spectral range (accommodating both the C III] 1909 Ang and Mg II 2800 Ang lines). The long slit length will allow us to subtract contamination from zodiacal light, earthshine, the host galaxy, and H II regions. STIS also has superior sensitivity to COS in the NUV. While COS is optimized for isolated, faint point sources in the FUV with medium resolution, we would suffer from less wavelength coverage and require more integrations. We would also lose the advantages of the slit described above.

Impact of Gyros

This is a ToO. We have considered the impact of reduced gyro operations on our program. We will start with the assumption that gyro operations will be normal; our durations in this case should be 5, 5, and 5 orbits for Visits 1, 2, and 3 (respectively). Each visit requires 5 orbits because all exposures must be obtained at the same time given the rapid evolution of the SN light-curve.

If the trigger occurs, or visits are scheduled, following the loss of a gyro and shorter visits are necessary, we will likely be able to restructure our visits with 3 FUV exposures and 2 NUV exposures. However, given the time sensitivity of the observations (the FUV and NUV must be taken at similar epochs), the first two visits cannot be separated by more than a few days.

Proposal 16189 - STIS-SN1 (01) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circumstellar M...

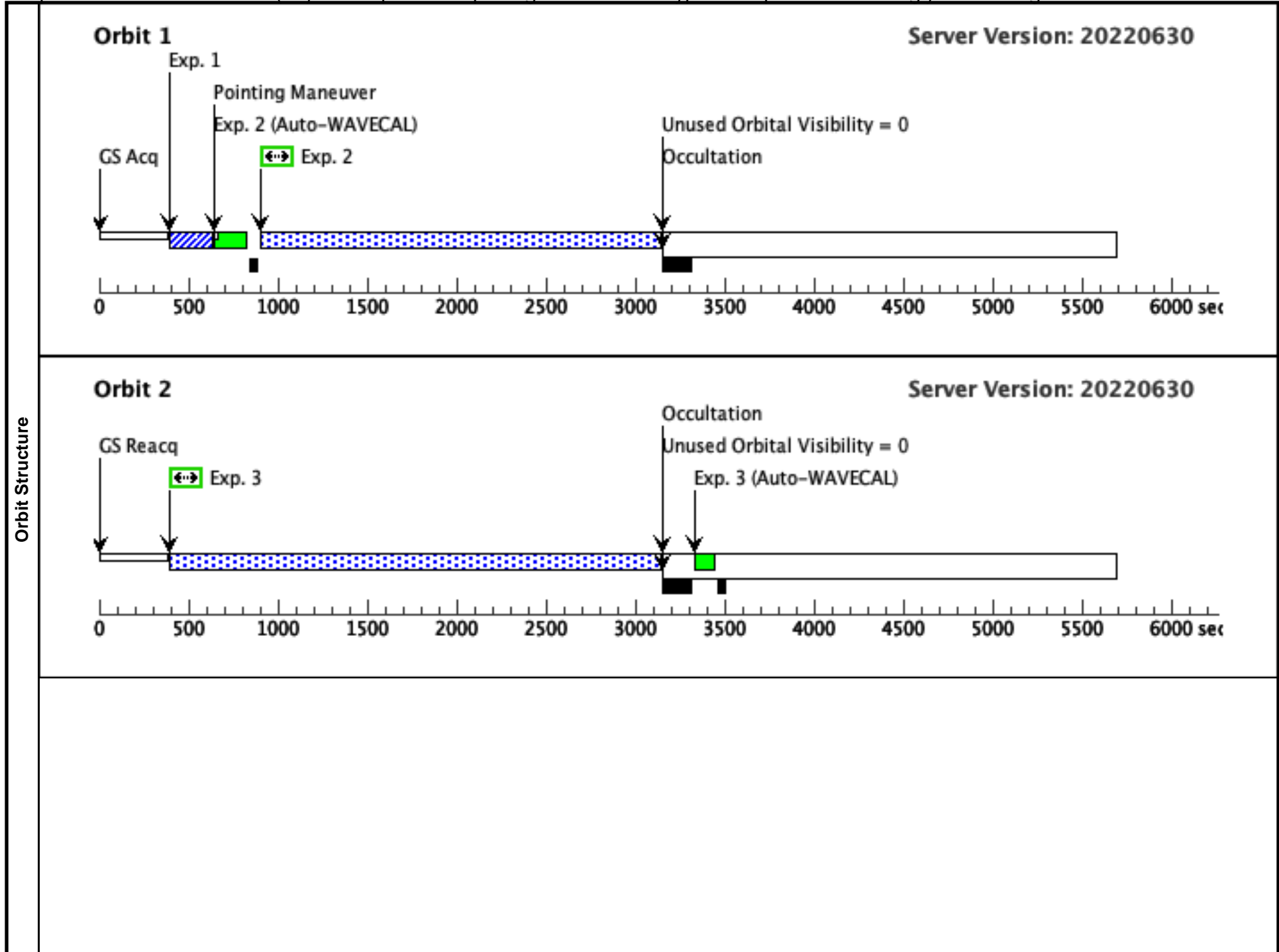
Tue May 09 15:00:26 GMT 2023

Visit	<p>Proposal 16189, STIS-SN1 (01), failed</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: STIS/NUV-MAMA, STIS/CCD, STIS/FUV-MAMA</p> <p>Special Requirements: ON HOLD ; TOO RESPONSE TIME 21.0D</p> <p>Comments: Likely to acquire on bright SN.</p> <p>On Hold Comments: Target-of-Opportunity.</p> <p>The initial spectrum will be triggered as a non-disruptive ToO, *although observations should be scheduled as soon as possible*.</p>					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(2)		ZTF21AAABWZX	Offset from OFFSETSTAR RA Offset: -0.535 Secs Dec Offset: -12.449 Arcsec		V=18	Offset Position (ZTF21AAABWZX)
	<p>Comments: Category=EXT-STAR Description=[SUPERNOVA, SUPERNOVA TYPE IA] Extended=NO</p>					
	(3)	OFFSETSTAR	RA: 15 43 11.9219 (235.7996746d) Dec: +17 48 59.61 (17.81656d) Equinox: J2000		V=16	Reference Frame: ICRS
	<p>Comments: http://vizier.u-strasbg.fr/viz-bin/VizieR-5?-info=XML&-out.add=.&-source=1/352/gedr3dis&-c=235.79967456886%2B17.81655760935&-c.rs=0.5 -3.155767575385198 mas/yr RA -5.888742957243794 mas/yr DEC Category=EXT-STAR Description=[F0-F2] Extended=NO</p>					

Proposal 16189 - STIS-SN1 (01) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circumstellar M...

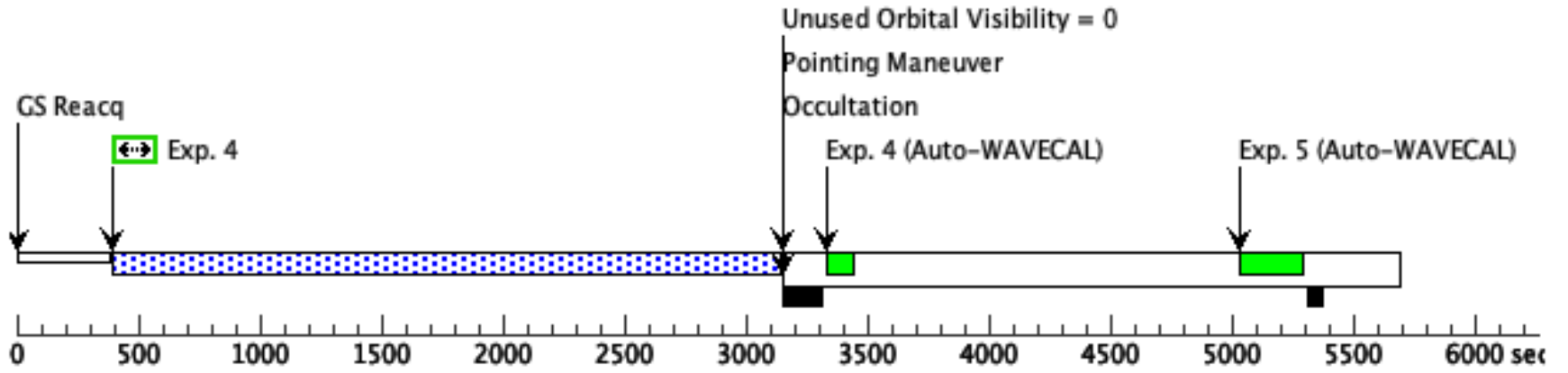
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ (STIS.ta.151 8294)	(3) OFFSETSTAR	STIS/CCD, ACQ, F28X50LP	MIRROR				3 Secs (3 Secs) [==>]	[1]
<p>Comments: Used sn2008j-20080216.205-ui.flm (day 32 spectrum) normalized to V=16. SN should be bright during initial acquisition.</p> <p>Latest ETC calculation here: STIS.ta.1518260</p>									
2	STIS/FUV E xp1 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=36 44			2500 Secs (2184 Secs) [==>2184.0 Secs]	[1]
<p>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</p> <p>The FUV/G140L is plagued by varying geo-coronal emission as HST orbits. The downside to this is that the varying Ly/alpha could affect the nearby Oxygen (1300 Ang), which would be a very useful discriminator in the case of a core-collapse event (see original proposal). To monitor the geo-coronal emission at a resolution < 1 orbit, the contact scientist recommended that we utilize the time-tag exposures with a buffer readout time of $t_{orbit}/2 = 3000/2 = 1500$.</p> <p>So if you set the buffer time for G140L time-tag to 300 s, that would accommodate global rates of up to about 6600 c/s while keeping the total number of buffer dumps near the limit of 30 dumps/visit that we prefer to keep to. Perhaps that represents a reasonable compromise between doing an excessive number of buffer dumps and still covering yourself at higher count rates? In the unlikely event the target came out brighter than this, you'd probably have to modify the G230L observation anyway so you could change the G140L back to ACCUM mode at the same time.</p> <p>The main downside of TIME-TAG vs ACCUM is that with TIME-TAG you're effectively limited to global rates (source + detector background) of under about 20,000 c/s, and you need to set a reasonable upper limit to the expected count rate to be able to estimate the needed buffer time. So for a very bright target, you might have to switch back to ACCUM observations. See section 11.1.3 of the STIS IHB for additional details about TIME-TAG mode.</p>									
3	STIS/FUV E xp2 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=36 44			2500 Secs (2736 Secs) [==>2736.0 Secs]	[2]
<p>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</p>									
4	STIS/FUV E xp3 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=36 44			2500 Secs (2694 Secs) [==>2694.0 Secs]	[3]
<p>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</p>									
5	STIS/NUV Exp1 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=68 6			2500 Secs (2713 Secs) [==>2713.0 Secs]	[4]
6	STIS/NUV Exp2 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=68 6			2500 Secs (2713 Secs) [==>2713.0 Secs]	[5]

Exposures



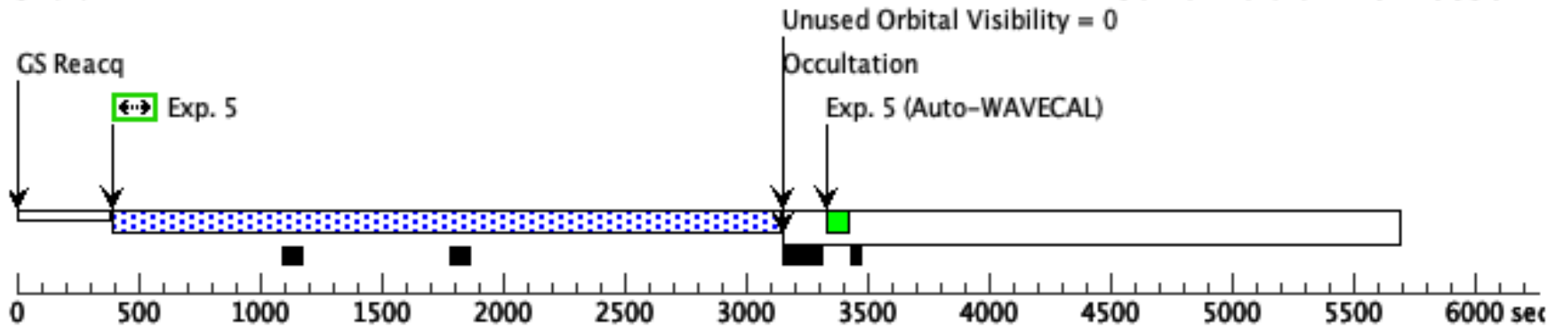
Orbit 3

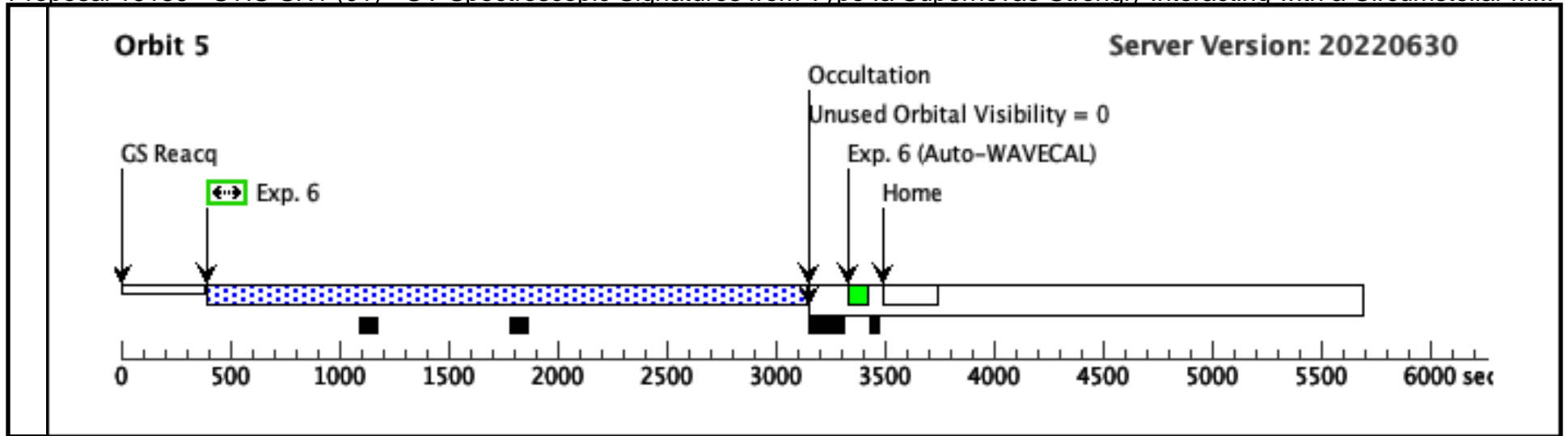
Server Version: 20220630



Orbit 4

Server Version: 20220630





Proposal 16189 - STIS-SN1_HOPR (Z2) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circumst...

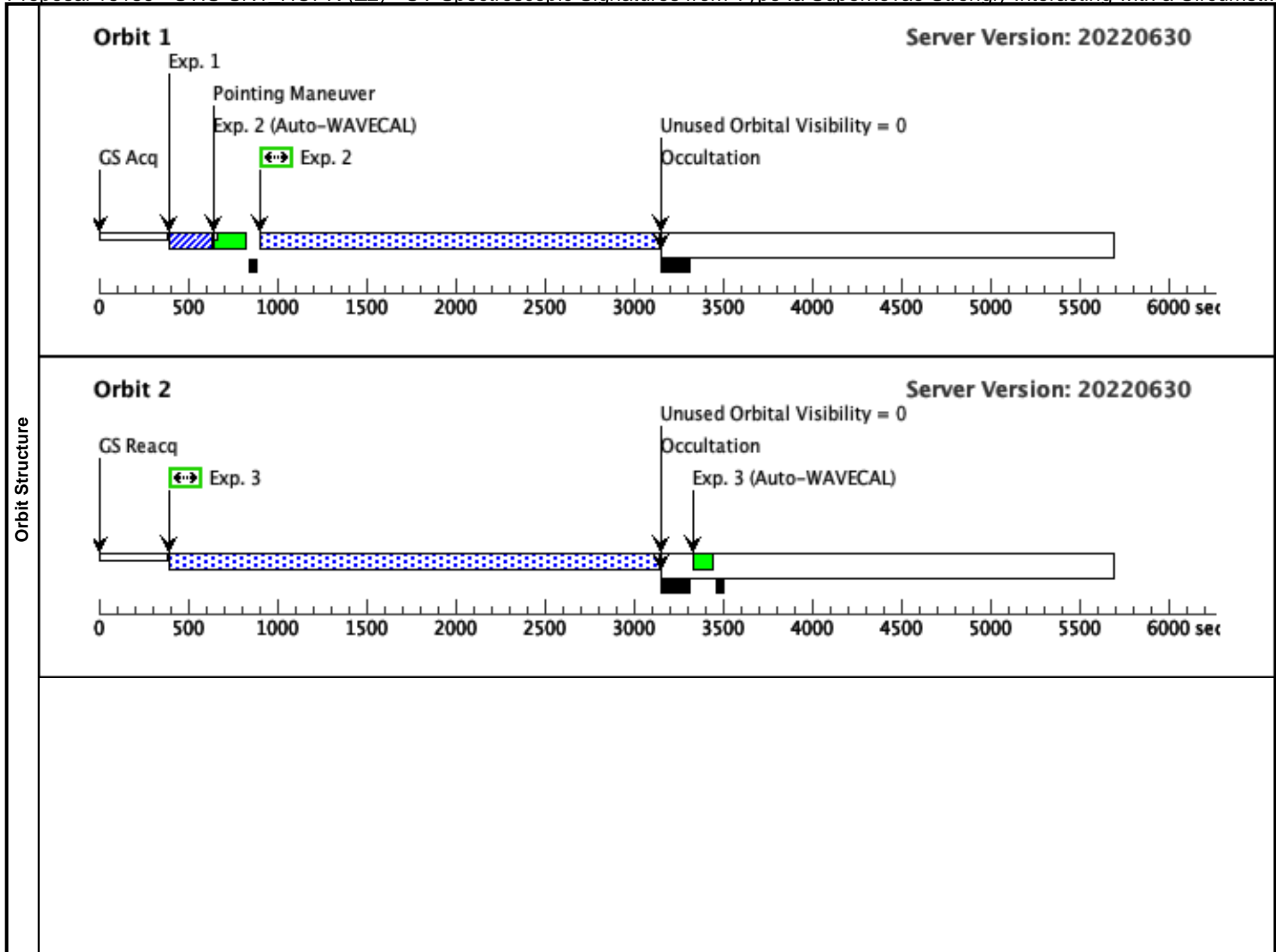
Tue May 09 15:00:26 GMT 2023

Visit	<p>Proposal 16189, STIS-SN1_HOPR (Z2), failed</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: STIS/NUV-MAMA, STIS/CCD, STIS/FUV-MAMA</p> <p>Special Requirements: ON HOLD ; TOO RESPONSE TIME 21.0D</p> <p>Comments: Likely to acquire on bright SN.</p> <p>On Hold Comments: Target-of-Opportunity.</p> <p>The initial spectrum will be triggered as a non-disruptive ToO, *although observations should be scheduled as soon as possible*.</p>																																		
	Fixed Targets	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(2)</td> <td>ZTF21AAABWZX</td> <td>Offset from OFFSETSTAR RA Offset: -0.535 Secs Dec Offset: -12.449 Arcsec</td> <td></td> <td>V=18</td> <td>Offset Position (ZTF21AAABWZX)</td> </tr> <tr> <td colspan="6"> <p>Comments: Category=EXT-STAR Description=[SUPERNOVA, SUPERNOVA TYPE IA] Extended=NO</p> </td> </tr> <tr> <td>(3)</td> <td>OFFSETSTAR</td> <td>RA: 15 43 11.9219 (235.7996746d) Dec: +17 48 59.61 (17.81656d) Equinox: J2000</td> <td></td> <td>V=16</td> <td>Reference Frame: ICRS</td> </tr> <tr> <td colspan="6"> <p>Comments: http://vizier.u-strasbg.fr/viz-bin/VizieR-5?-info=XML&-out.add=.&-source=1/352/gedr3dis&-c=235.79967456886%2B17.81655760935&-c.rs=0.5 -3.155767575385198 mas/yr RA -5.888742957243794 mas/yr DEC Category=EXT-STAR Description=[F0-F2] Extended=NO</p> </td> </tr> </tbody> </table>					#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(2)	ZTF21AAABWZX	Offset from OFFSETSTAR RA Offset: -0.535 Secs Dec Offset: -12.449 Arcsec		V=18	Offset Position (ZTF21AAABWZX)	<p>Comments: Category=EXT-STAR Description=[SUPERNOVA, SUPERNOVA TYPE IA] Extended=NO</p>						(3)	OFFSETSTAR	RA: 15 43 11.9219 (235.7996746d) Dec: +17 48 59.61 (17.81656d) Equinox: J2000		V=16	Reference Frame: ICRS	<p>Comments: http://vizier.u-strasbg.fr/viz-bin/VizieR-5?-info=XML&-out.add=.&-source=1/352/gedr3dis&-c=235.79967456886%2B17.81655760935&-c.rs=0.5 -3.155767575385198 mas/yr RA -5.888742957243794 mas/yr DEC Category=EXT-STAR Description=[F0-F2] Extended=NO</p>				
#		Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous																													
(2)	ZTF21AAABWZX	Offset from OFFSETSTAR RA Offset: -0.535 Secs Dec Offset: -12.449 Arcsec		V=18	Offset Position (ZTF21AAABWZX)																														
<p>Comments: Category=EXT-STAR Description=[SUPERNOVA, SUPERNOVA TYPE IA] Extended=NO</p>																																			
(3)	OFFSETSTAR	RA: 15 43 11.9219 (235.7996746d) Dec: +17 48 59.61 (17.81656d) Equinox: J2000		V=16	Reference Frame: ICRS																														
<p>Comments: http://vizier.u-strasbg.fr/viz-bin/VizieR-5?-info=XML&-out.add=.&-source=1/352/gedr3dis&-c=235.79967456886%2B17.81655760935&-c.rs=0.5 -3.155767575385198 mas/yr RA -5.888742957243794 mas/yr DEC Category=EXT-STAR Description=[F0-F2] Extended=NO</p>																																			

Proposal 16189 - STIS-SN1 HOPR (Z2) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circumst...

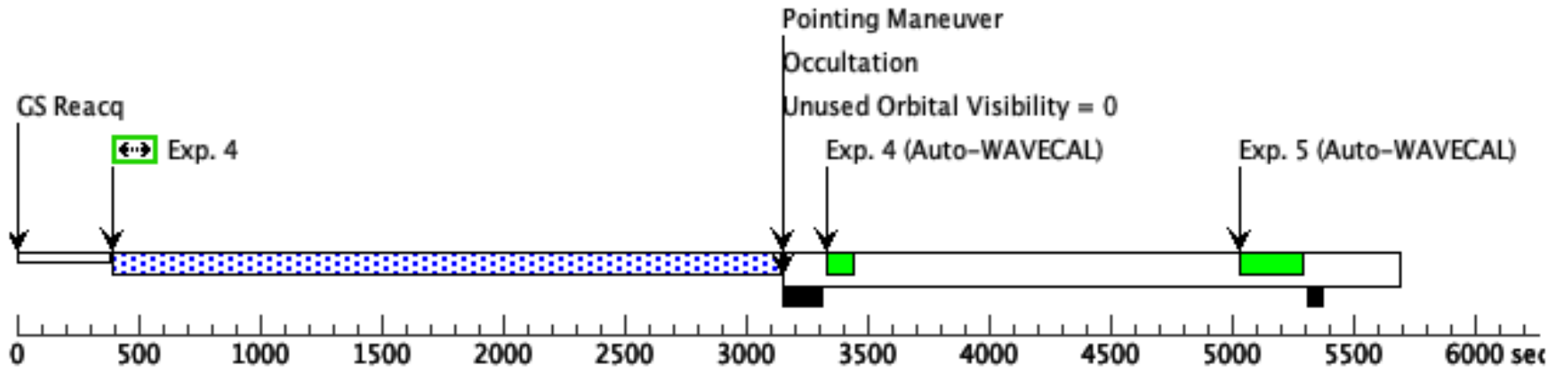
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ (STIS.ta.151 8294)	(3) OFFSETSTAR	STIS/CCD, ACQ, F28X50LP	MIRROR				3 Secs (3 Secs) [==>]	[1]
<p>Comments: Used sn2008j-20080216.205-ui.flm (day 32 spectrum) normalized to V=16. SN should be bright during initial acquisition.</p> <p>Latest ETC calculation here: STIS.ta.1518260</p>									
2	STIS/FUV E xp1 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=36 44			2500 Secs (2184 Secs) [==>2184.0 Secs]	[1]
<p>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</p> <p>The FUV/G140L is plagued by varying geo-coronal emission as HST orbits. The downside to this is that the varying Ly/alpha could affect the nearby Oxygen (1300 Ang), which would be a very useful discriminator in the case of a core-collapse event (see original proposal). To monitor the geo-coronal emission at a resolution < 1 orbit, the contact scientist recommended that we utilize the time-tag exposures with a buffer readout time of $t_{orbit}/2 = 3000/2 = 1500$.</p> <p>So if you set the buffer time for G140L time-tag to 300 s, that would accommodate global rates of up to about 6600 c/s while keeping the total number of buffer dumps near the limit of 30 dumps/visit that we prefer to keep to. Perhaps that represents a reasonable compromise between doing an excessive number of buffer dumps and still covering yourself at higher count rates? In the unlikely event the target came out brighter than this, you'd probably have to modify the G230L observation anyway so you could change the G140L back to ACCUM mode at the same time.</p> <p>The main downside of TIME-TAG vs ACCUM is that with TIME-TAG you're effectively limited to global rates (source + detector background) of under about 20,000 c/s, and you need to set a reasonable upper limit to the expected count rate to be able to estimate the needed buffer time. So for a very bright target, you might have to switch back to ACCUM observations. See section 11.1.3 of the STIS IHB for additional details about TIME-TAG mode.</p>									
3	STIS/FUV E xp2 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=36 44			2500 Secs (2736 Secs) [==>2736.0 Secs]	[2]
<p>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</p>									
4	STIS/FUV E xp3 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=36 44			2500 Secs (2694 Secs) [==>2694.0 Secs]	[3]
<p>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</p>									
5	STIS/NUV Exp1 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=68 6			2500 Secs (2713 Secs) [==>2713.0 Secs]	[4]
6	STIS/NUV Exp2 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=68 6			2500 Secs (2713 Secs) [==>2713.0 Secs]	[5]

Exposures



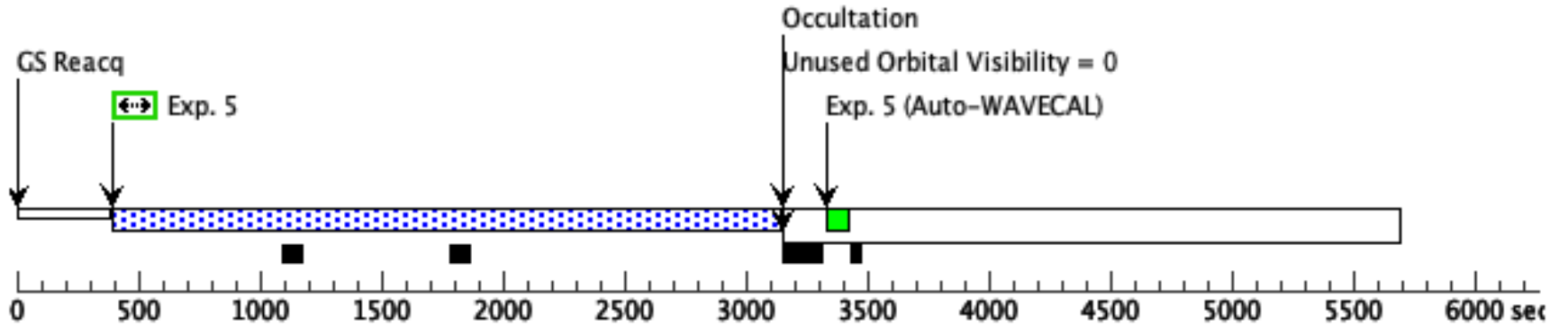
Orbit 3

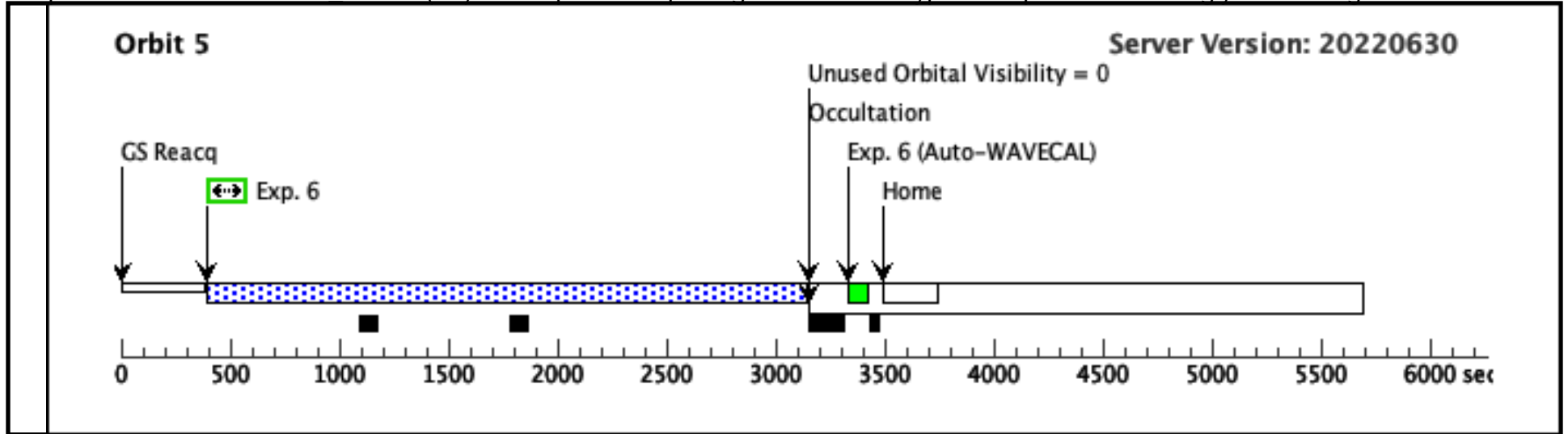
Server Version: 20220630



Orbit 4

Server Version: 20220630





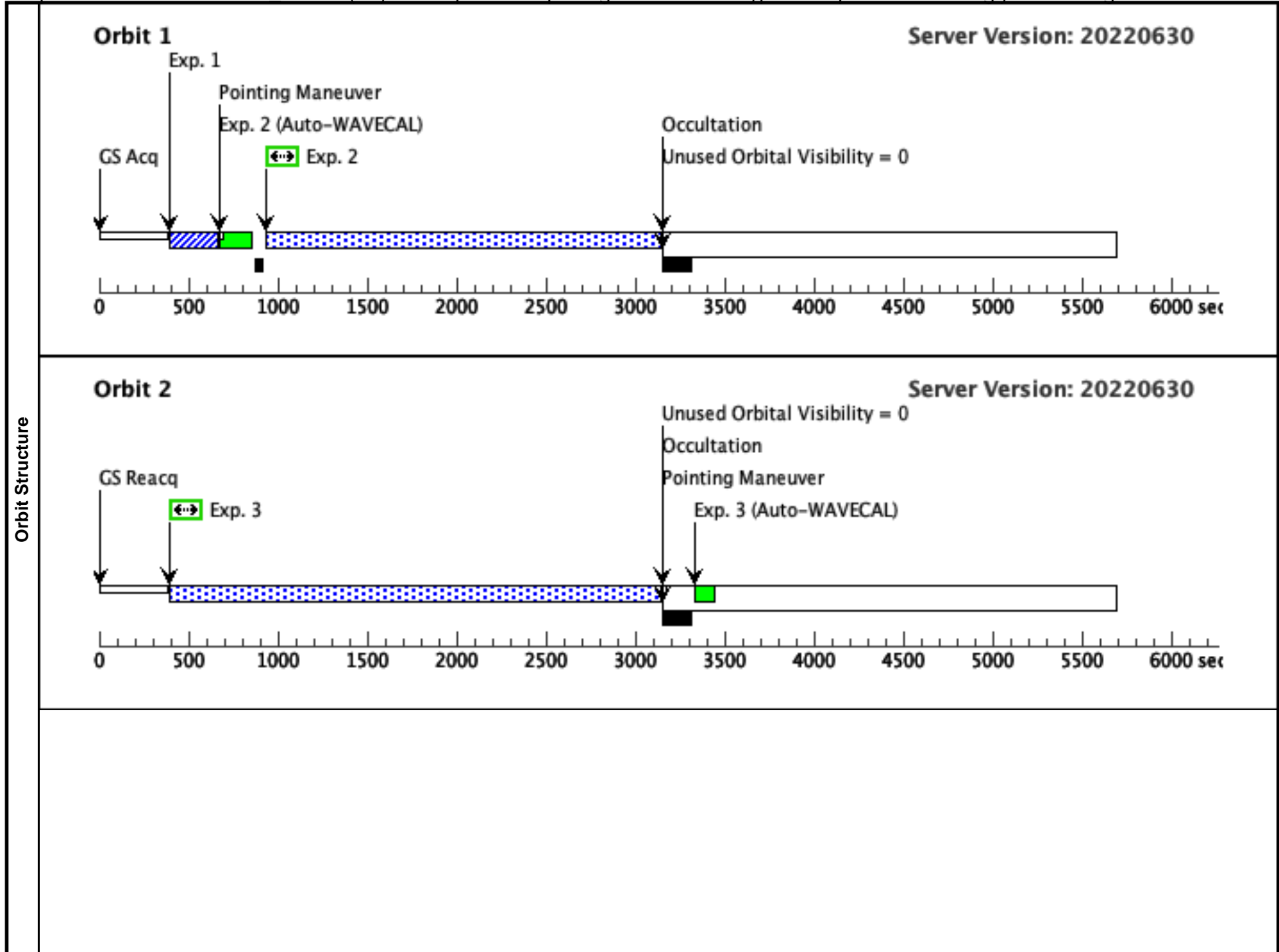
Proposal 16189 - STIS-SN1_HOPR (Z3) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circumst...

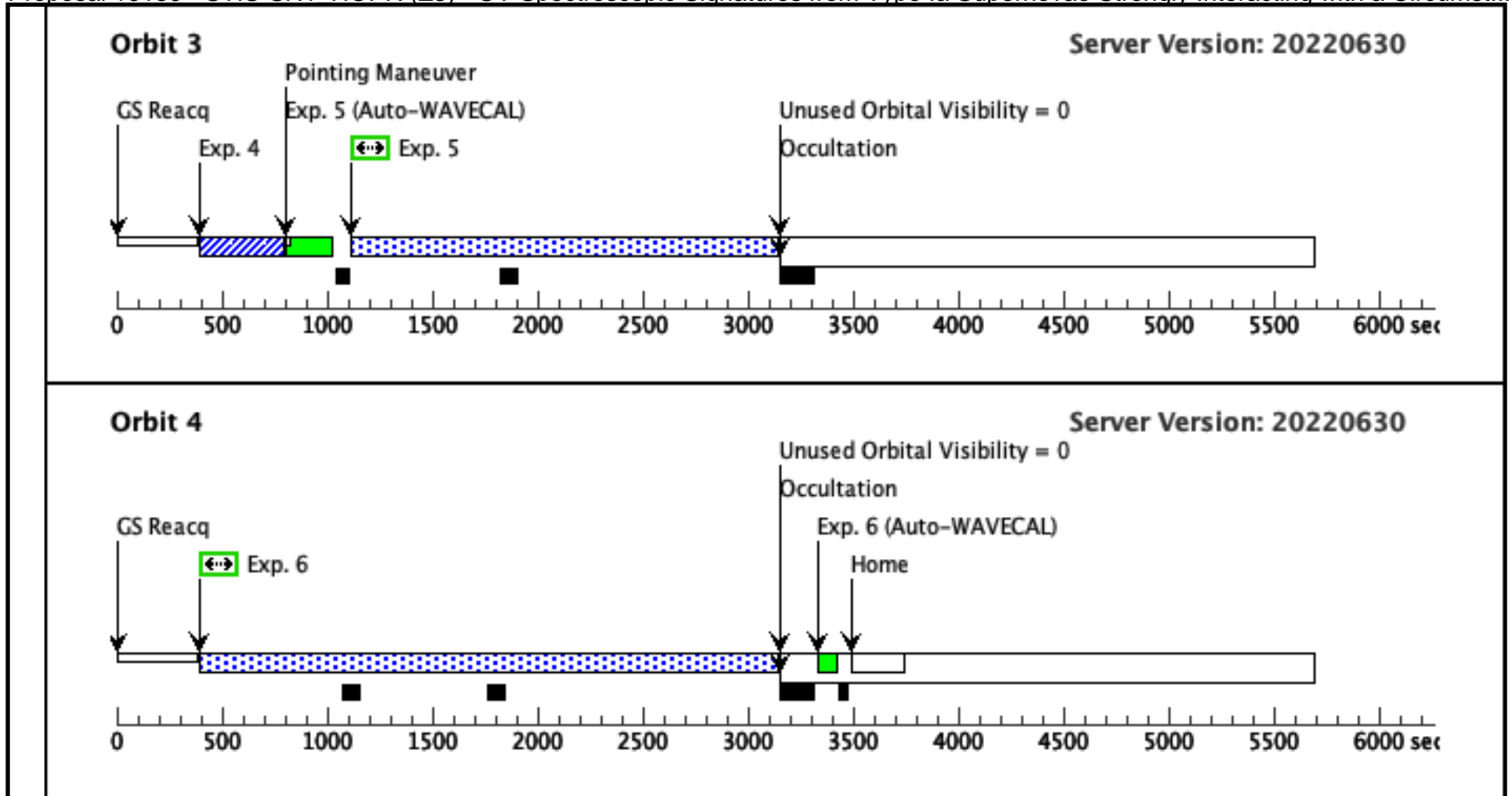
Tue May 09 15:00:26 GMT 2023

Visit	<p>Proposal 16189, STIS-SN1_HOPR (Z3)</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: STIS/NUV-MAMA, STIS/CCD, STIS/FUV-MAMA</p> <p>Special Requirements: ON HOLD ; TOO RESPONSE TIME 21.0D</p> <p>Comments: Likely to acquire on bright SN.</p> <p>On Hold Comments: Target-of-Opportunity.</p> <p>The initial spectrum will be triggered as a non-disruptive ToO, *although observations should be scheduled as soon as possible*.</p>					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(2)		ZTF21AAABWZX	Offset from OFFSETSTAR RA Offset: -0.535 Secs Dec Offset: -12.449 Arcsec		V=18	Offset Position (ZTF21AAABWZX)
	<p>Comments: Category=EXT-STAR Description=[SUPERNOVA, SUPERNOVA TYPE IA] Extended=NO</p>					
	(3)	OFFSETSTAR	RA: 15 43 11.9219 (235.7996746d) Dec: +17 48 59.61 (17.81656d) Equinox: J2000		V=16	Reference Frame: ICRS
	<p>Comments: http://vizier.u-strasbg.fr/viz-bin/VizieR-5?-info=XML&-out.add=.&-source=1/352/gedr3dis&-c=235.79967456886%2B17.81655760935&-c.rs=0.5 -3.155767575385198 mas/yr RA -5.888742957243794 mas/yr DEC Category=EXT-STAR Description=[F0-F2] Extended=NO</p>					

Proposal 16189 - STIS-SN1 HOPR (Z3) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circumst...

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
Exposures	1	ACQ (3) OFFSETSTAR (STIS.ta.151 8294)	STIS/CCD, ACQ, F28X50LP	MIRROR				10 Secs (10 Secs) [==>]	[1]	
	<i>Comments: Used sn2008j-20080216.205-ui.flm (day 32 spectrum) normalized to V=16. SN should be bright during initial acquisition.</i>									
	<i>Latest ETC calculation here: STIS.ta.1518260</i>									
	2	STIS/FUV E xp1 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=36 44			2500 Secs (2156 Secs) [==>2156.0 Secs]	[1]
	<i>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</i>									
	<i>The FUV/G140L is plagued by varying geo-coronal emission as HST orbits. The downside to this is that the varying Ly/alpha could affect the nearby Oxygen (1300 Ang), which would be a very useful discriminator in the case of a core-collapse event (see original proposal). To monitor the geo-coronal emission at a resolution < 1 orbit, the contact scientist recommended that we utilize the time-tag exposures with a buffer readout time of $t_{orbit}/2 = 3000/2 = 1500$.</i>									
<i>So if you set the buffer time for G140L time-tag to 300 s, that would accommodate global rates of up to about 6600 c/s while keeping the total number of buffer dumps near the limit of 30 dumps/visit that we prefer to keep to. Perhaps that represents a reasonable compromise between doing an excessive number of buffer dumps and still covering yourself at higher count rates? In the unlikely event the target came out brighter than this, you'd probably have to modify the G230L observation anyway so you could change the G140L back to ACCUM mode at the same time.</i>										
<i>The main downside of TIME-TAG vs ACCUM is that with TIME-TAG you're effectively limited to global rates (source + detector background) of under about 20,000 c/s, and you need to set a reasonable upper limit to the expected count rate to be able to estimate the needed buffer time. So for a very bright target, you might have to switch back to ACCUM observations. See section 11.1.3 of the STIS IHB for additional details about TIME-TAG mode.</i>										
3	STIS/FUV E xp2 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=36 44			2500 Secs (2736 Secs) [==>2736.0 Secs]	[2]	
<i>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</i>										
4	ACQ (STIS.ta.151 8294)	(3) OFFSETSTAR	STIS/CCD, ACQ, F28X50LP	MIRROR				10 Secs (10 Secs) [==>]	[3]	
<i>Comments: Used sn2008j-20080216.205-ui.flm (day 32 spectrum) normalized to V=16. SN should be bright during initial acquisition.</i>										
<i>Latest ETC calculation here: STIS.ta.1518260</i>										
5	STIS/NUV Exp1 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=68 6			2500 Secs (1989 Secs) [==>1989.0 Secs]	[3]	
6	STIS/NUV Exp2 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=68 6			2500 Secs (2736 Secs) [==>2736.0 Secs]	[4]	





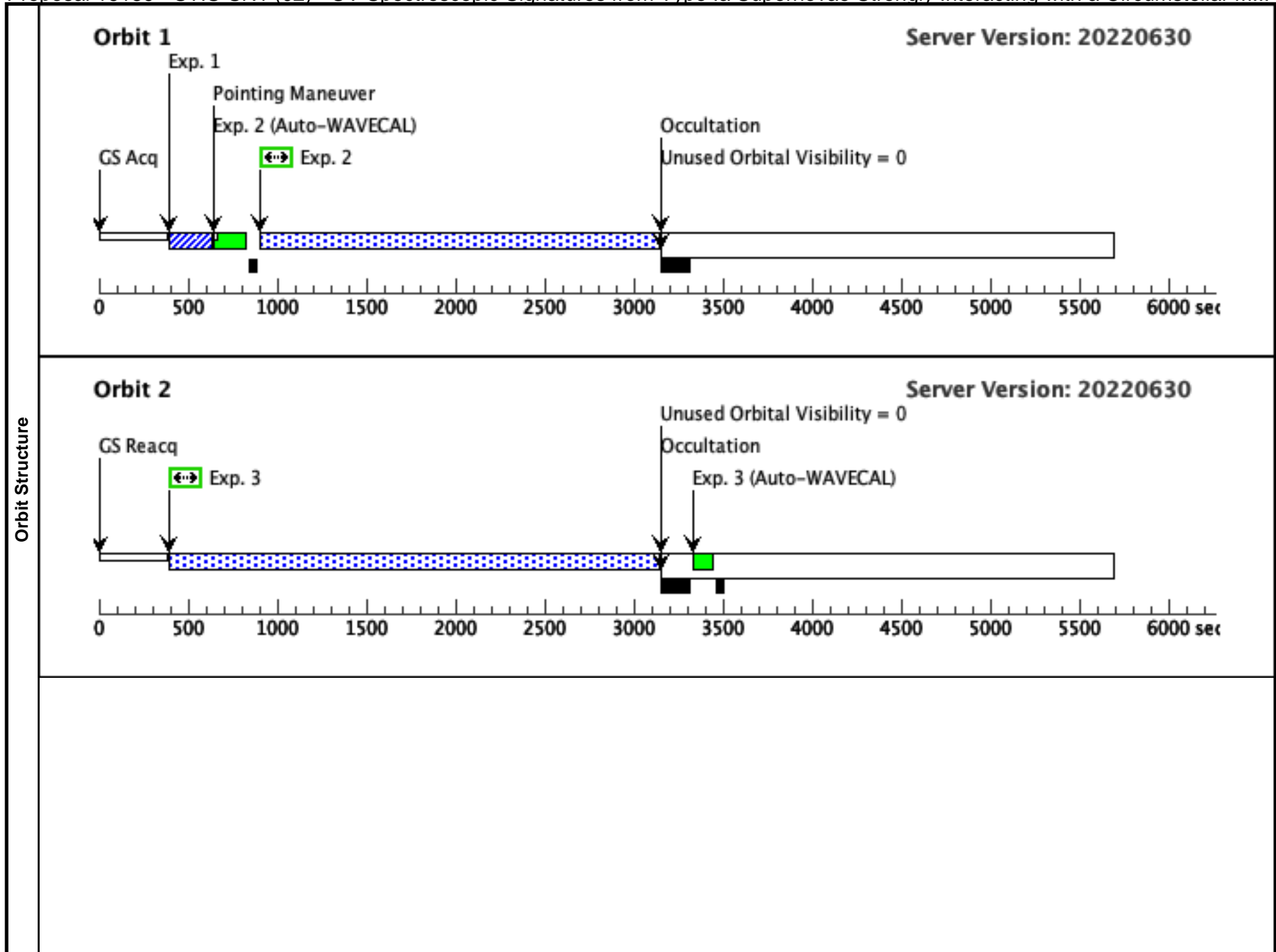
Proposal 16189 - STIS-SN1 (02) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circumstellar M...

Tue May 09 15:00:26 GMT 2023

Visit	<p>Proposal 16189, STIS-SN1 (02), completed</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: STIS/NUV-MAMA, STIS/CCD, STIS/FUV-MAMA</p> <p>Special Requirements: AFTER Z1 BY 50 D TO 80 D; ON HOLD ; TOO RESPONSE TIME 21.0D</p> <p>Comments: Likely to acquire on bright SN.</p> <p>On Hold Comments: Target-of-Opportunity.</p> <p>The initial spectrum will be triggered as a non-disruptive ToO, *although observations should be scheduled as soon as possible*.</p>					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(2)		ZTF21AAABWZX	Offset from OFFSETSTAR RA Offset: -0.535 Secs Dec Offset: -12.449 Arcsec		V=18	Offset Position (ZTF21AAABWZX)
	<p>Comments: Category=EXT-STAR Description=[SUPERNOVA, SUPERNOVA TYPE IA] Extended=NO</p>					
	(3)	OFFSETSTAR	RA: 15 43 11.9219 (235.7996746d) Dec: +17 48 59.61 (17.81656d) Equinox: J2000		V=16	Reference Frame: ICRS
	<p>Comments: http://vizier.u-strasbg.fr/viz-bin/VizieR-5?-info=XML&-out.add=.&-source=1/352/gedr3dis&-c=235.79967456886%2B17.81655760935&-c.rs=0.5 -3.155767575385198 mas/yr RA -5.888742957243794 mas/yr DEC Category=EXT-STAR Description=[F0-F2] Extended=NO</p>					

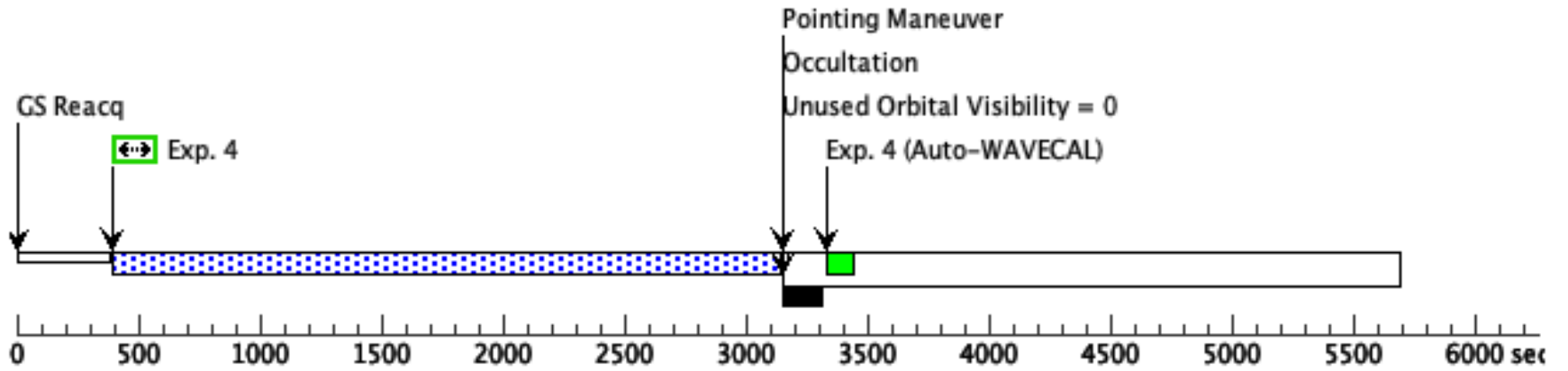
Proposal 16189 - STIS-SN1 (02) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circumstellar M...

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	ACQ1 (STIS.ta.151 8294)	(3) OFFSETSTAR	STIS/CCD, ACQ, F28X50LP	MIRROR					3 Secs (3 Secs) [==>]	[1]
	<i>Comments: Used sn2008j-20080216.205-ui.flm (day 32 spectrum) normalized to V=16. SN should be bright during initial acquisition.</i>										
	2	STIS/FUV E xp1 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A		BUFFER-TIME=36 44			2500 Secs (2184 Secs) [==>2184.0 Secs]	[1]
	<i>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</i>										
	3	STIS/FUV E xp2 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A		BUFFER-TIME=36 44			2500 Secs (2736 Secs) [==>2736.0 Secs]	[2]
	<i>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</i>										
	4	STIS/FUV E xp3 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A		BUFFER-TIME=36 44			2500 Secs (2694 Secs) [==>2694.0 Secs]	[3]
<i>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</i>											
5	ACQ2 (STIS.ta.151 8294)	(3) OFFSETSTAR	STIS/CCD, ACQ, F28X50LP	MIRROR					3 Secs (3 Secs) [==>]	[4]	
<i>Comments: Used sn2008j-20080216.205-ui.flm (day 32 spectrum) normalized to V=16. SN should be bright during initial acquisition.</i>											
6	STIS/NUV Exp1 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A		BUFFER-TIME=68 6			750 Secs (2017 Secs) [==>2017 Secs]	[4]	
7	STIS/NUV Exp2 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A		BUFFER-TIME=68 6			750 Secs (2713 Secs) [==>2713.0 Secs]	[5]	



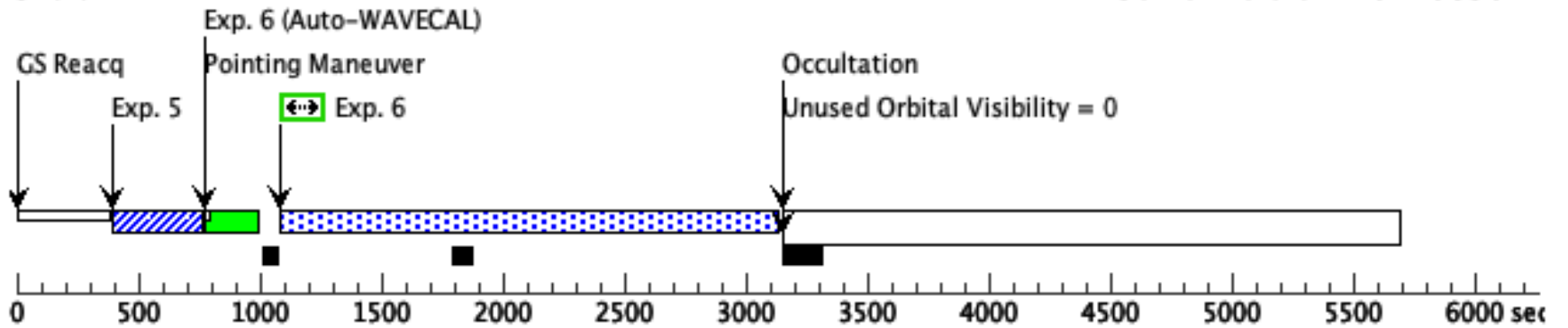
Orbit 3

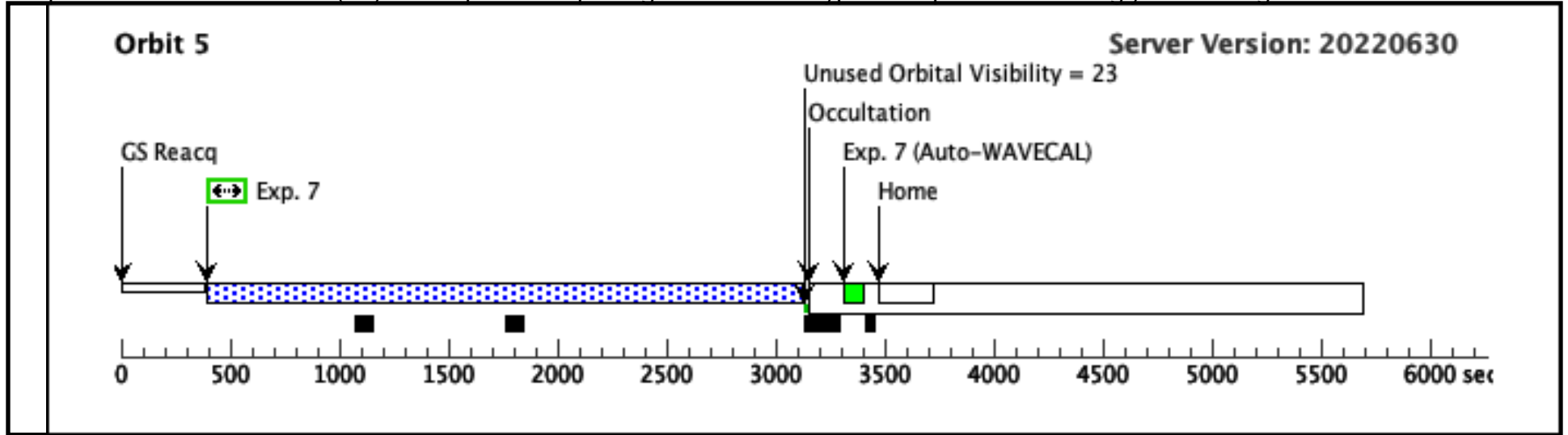
Server Version: 20220630



Orbit 4

Server Version: 20220630





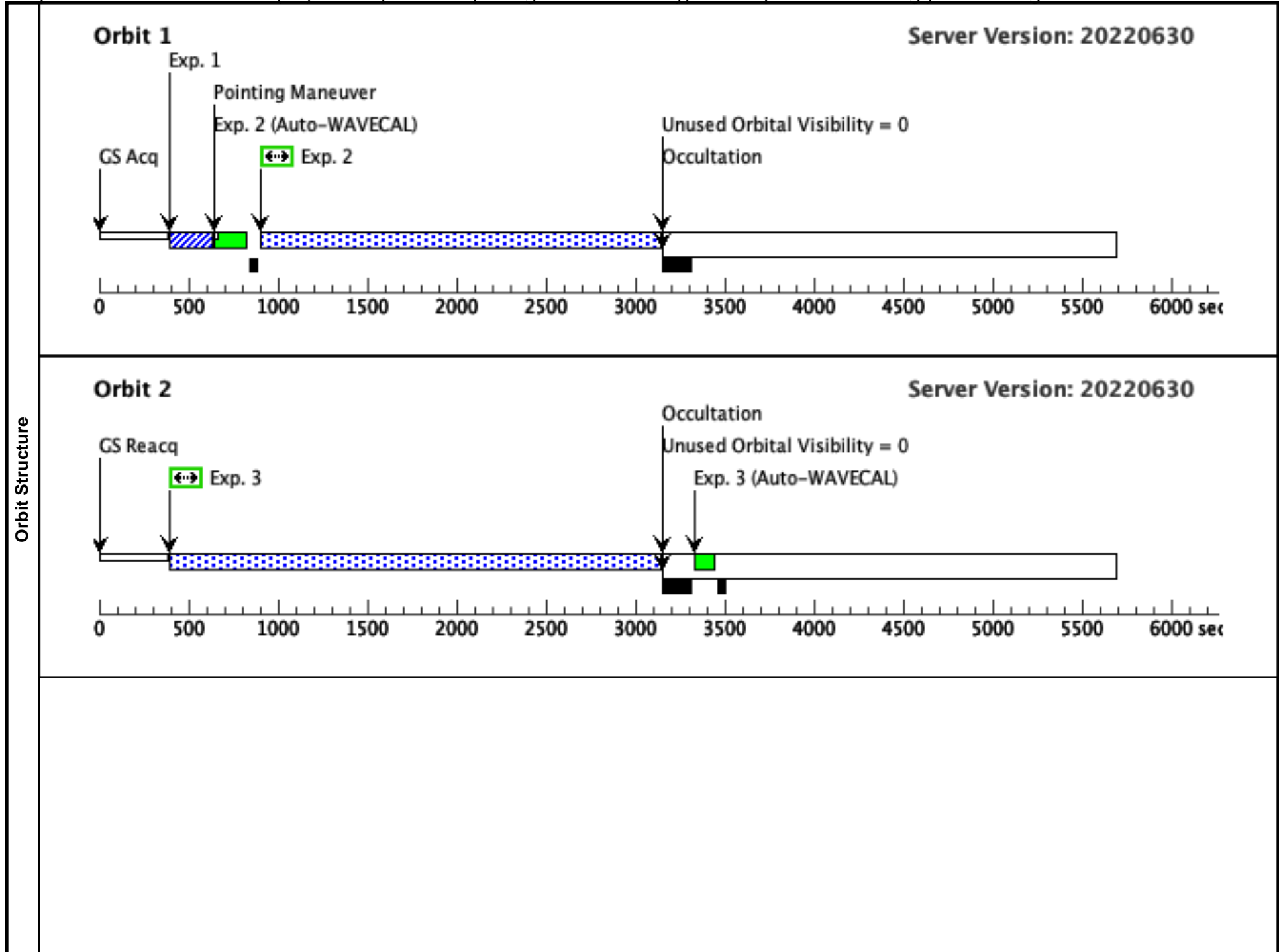
Proposal 16189 - STIS-SN1 (03) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circumstellar M...

Tue May 09 15:00:26 GMT 2023

Visit	<p>Proposal 16189, STIS-SN1 (03), completed</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: STIS/NUV-MAMA, STIS/CCD, STIS/FUV-MAMA</p> <p>Special Requirements: AFTER 02 BY 200 D TO 240 D; ON HOLD ; TOO RESPONSE TIME 21.0D</p> <p>Comments: Likely to acquire on bright SN.</p> <p>On Hold Comments: Target-of-Opportunity.</p> <p>The initial spectrum will be triggered as a non-disruptive ToO, *although observations should be scheduled as soon as possible*.</p>					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(2)		ZTF21AAABWZX	Offset from OFFSETSTAR RA Offset: -0.535 Secs Dec Offset: -12.449 Arcsec		V=18	Offset Position (ZTF21AAABWZX)
	<p>Comments: Category=EXT-STAR Description=[SUPERNOVA, SUPERNOVA TYPE IA] Extended=NO</p>					
	(3)	OFFSETSTAR	RA: 15 43 11.9219 (235.7996746d) Dec: +17 48 59.61 (17.81656d) Equinox: J2000		V=16	Reference Frame: ICRS
	<p>Comments: http://vizier.u-strasbg.fr/viz-bin/VizieR-5?-info=XML&-out.add=.&-source=1/352/gedr3dis&-c=235.79967456886%2B17.81655760935&-c.rs=0.5 -3.155767575385198 mas/yr RA -5.888742957243794 mas/yr DEC Category=EXT-STAR Description=[F0-F2] Extended=NO</p>					

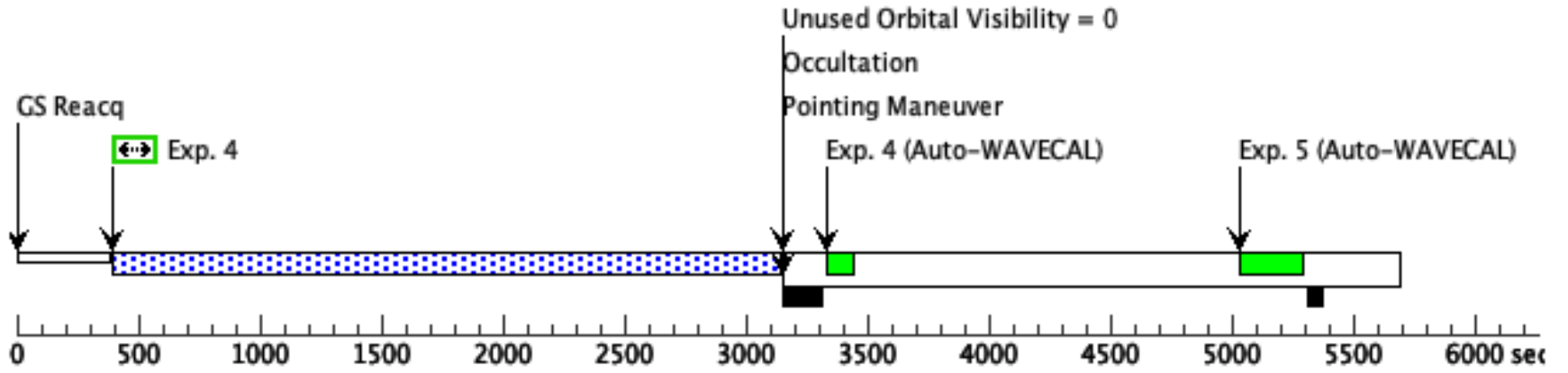
Proposal 16189 - STIS-SN1 (03) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circumstellar M...

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	ACQ (STIS.ta.151 8294)	(3) OFFSETSTAR	STIS/CCD, ACQ, F28X50LP	MIRROR					3 Secs (3 Secs)	
										[==>]	[1]
	<i>Comments: Used sn2008j-20080216.205-ui.flm (day 32 spectrum) normalized to V=16. SN should be bright during initial acquisition.</i>										
	2	STIS/FUV E xp1 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A		BUFFER-TIME=36 44			2500 Secs (2184 Secs)	
										[==>2184.0 Secs]	[1]
<i>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</i>											
3	STIS/FUV E xp2 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A		BUFFER-TIME=36 44			2500 Secs (2736 Secs)		
									[==>2736.0 Secs]	[2]	
<i>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</i>											
4	STIS/FUV E xp3 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A		BUFFER-TIME=36 44			2500 Secs (2694 Secs)		
									[==>2694.0 Secs]	[3]	
<i>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</i>											
5	STIS/NUV Exp1 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A		BUFFER-TIME=68 6			750 Secs (2713 Secs)		
									[==>2713.0 Secs]	[4]	
6	STIS/NUV Exp2 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A		BUFFER-TIME=68 6			750 Secs (2713 Secs)		
									[==>2713.0 Secs]	[5]	



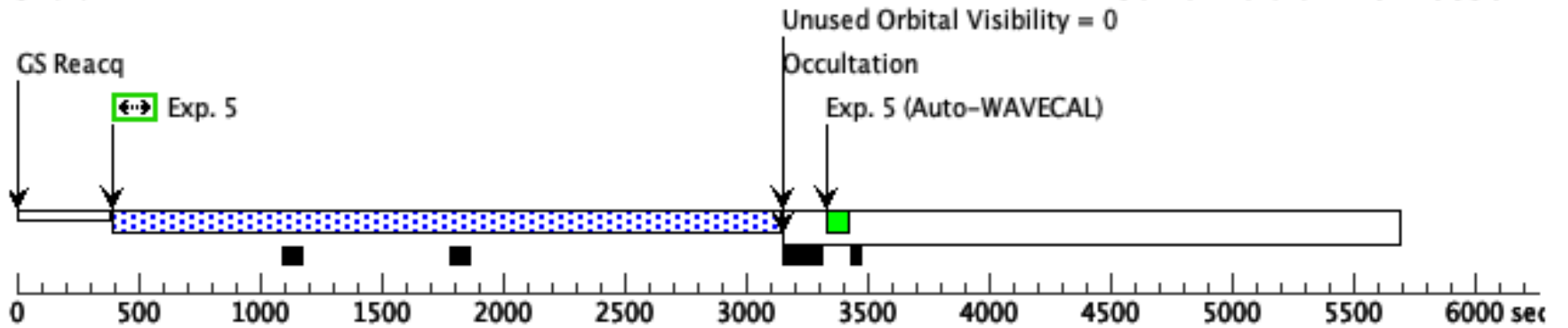
Orbit 3

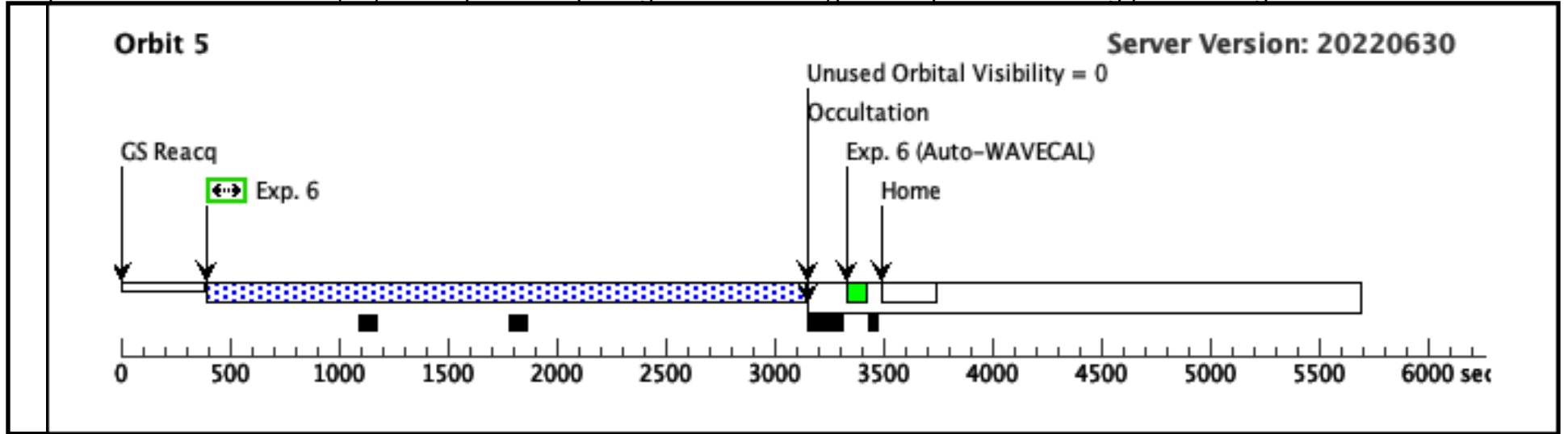
Server Version: 20220630



Orbit 4

Server Version: 20220630





Proposal 16189 - STIS-SN1_HOPR01 (Z1) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circu...

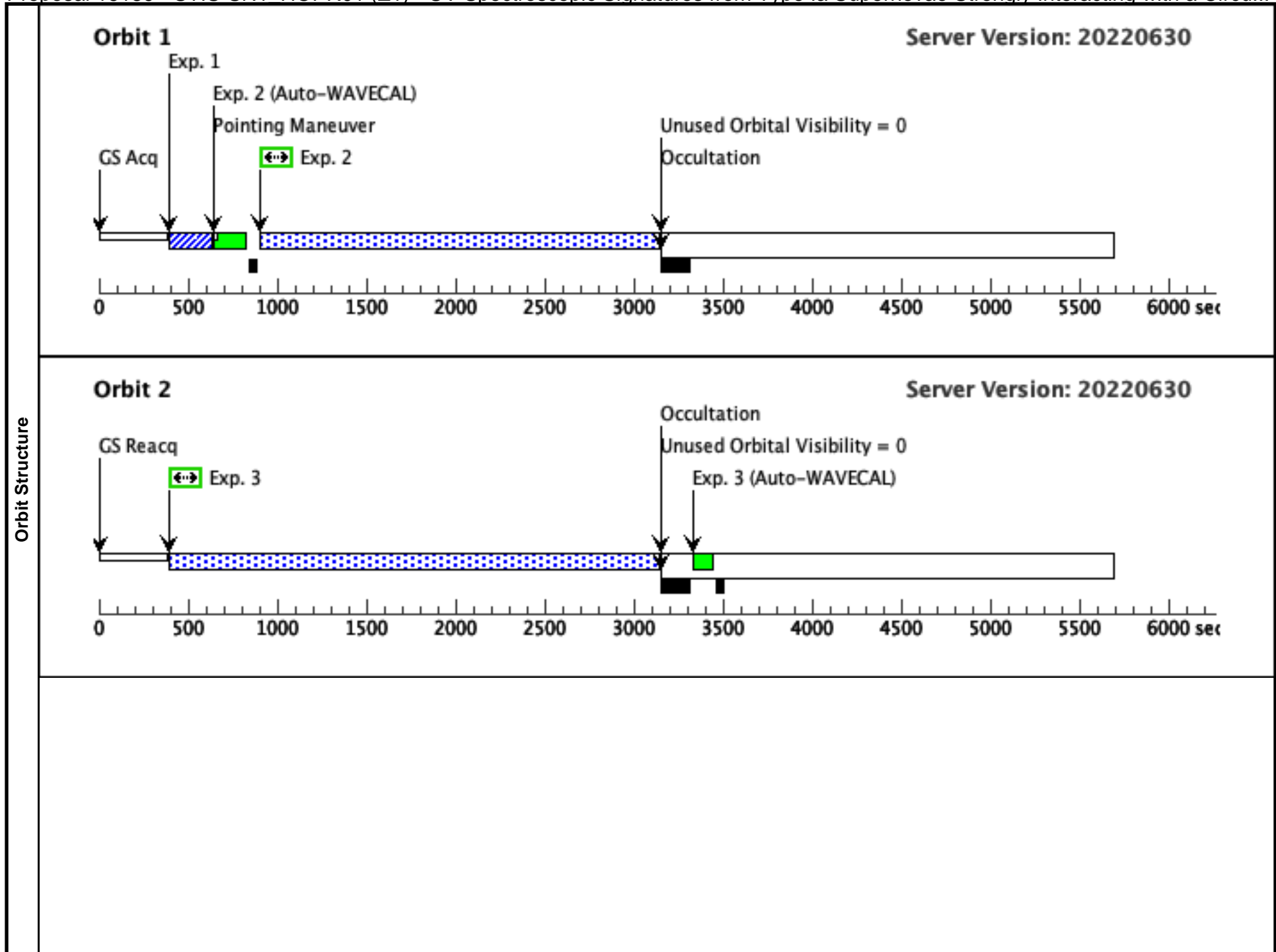
Tue May 09 15:00:26 GMT 2023

Visit	<p>Proposal 16189, STIS-SN1_HOPR01 (Z1), failed</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: STIS/NUV-MAMA, STIS/CCD, STIS/FUV-MAMA</p> <p>Special Requirements: ON HOLD ; TOO RESPONSE TIME 21.0D</p> <p>Comments: Likely to acquire on bright SN.</p> <p>On Hold Comments: Target-of-Opportunity.</p> <p>The initial spectrum will be triggered as a non-disruptive ToO, *although observations should be scheduled as soon as possible*.</p>					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(2)		ZTF21AAABWZX	Offset from OFFSETSTAR RA Offset: -0.535 Secs Dec Offset: -12.449 Arcsec		V=18	Offset Position (ZTF21AAABWZX)
	<p>Comments: Category=EXT-STAR Description=[SUPERNOVA, SUPERNOVA TYPE IA] Extended=NO</p>					
(3)	OFFSETSTAR	RA: 15 43 11.9219 (235.7996746d) Dec: +17 48 59.61 (17.81656d) Equinox: J2000		V=16	Reference Frame: ICRS	
	<p>Comments: http://vizier.u-strasbg.fr/viz-bin/VizieR-5?-info=XML&-out.add=.&-source=1/352/gedr3dis&-c=235.79967456886%2B17.81655760935&-c.rs=0.5 -3.155767575385198 mas/yr RA -5.888742957243794 mas/yr DEC Category=EXT-STAR Description=[F0-F2] Extended=NO</p>					

Proposal 16189 - STIS-SN1 HOPR01 (Z1) - UV Spectroscopic Signatures from Type Ia Supernovae Strongly Interacting with a Circu...

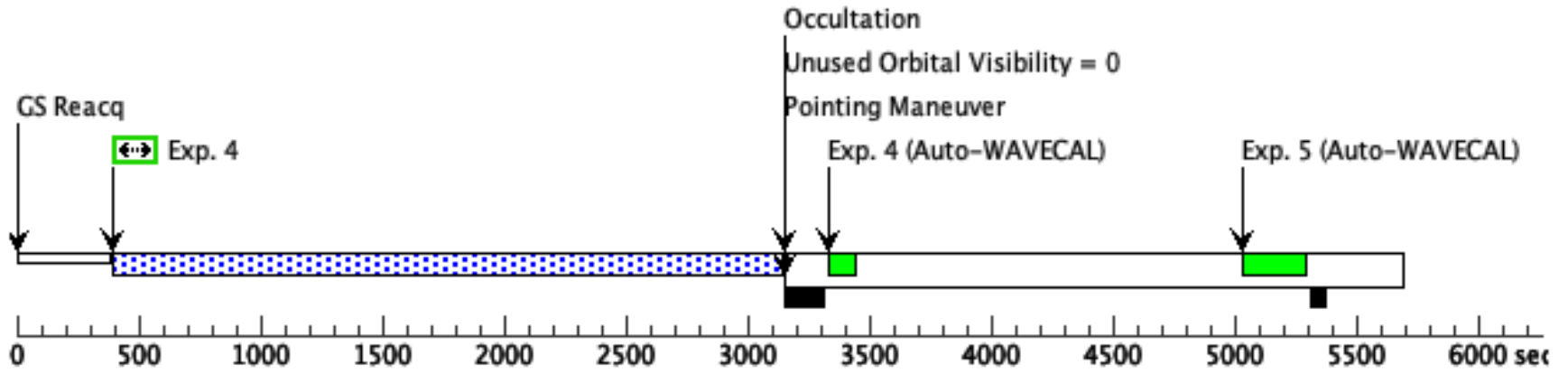
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ (STIS.ta.151 8294)	(3) OFFSETSTAR	STIS/CCD, ACQ, F28X50LP	MIRROR				3 Secs (3 Secs) [==>]	[1]
<p>Comments: Used sn2008j-20080216.205-ui.flm (day 32 spectrum) normalized to V=16. SN should be bright during initial acquisition.</p> <p>Latest ETC calculation here: STIS.ta.1518260</p>									
2	STIS/FUV E xp1 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=36 44			2500 Secs (2184 Secs) [==>2184.0 Secs]	[1]
<p>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</p> <p>The FUV/G140L is plagued by varying geo-coronal emission as HST orbits. The downside to this is that the varying Ly/alpha could affect the nearby Oxygen (1300 Ang), which would be a very useful discriminator in the case of a core-collapse event (see original proposal). To monitor the geo-coronal emission at a resolution < 1 orbit, the contact scientist recommended that we utilize the time-tag exposures with a buffer readout time of $t_{orbit}/2 = 3000/2 = 1500$.</p> <p>So if you set the buffer time for G140L time-tag to 300 s, that would accommodate global rates of up to about 6600 c/s while keeping the total number of buffer dumps near the limit of 30 dumps/visit that we prefer to keep to. Perhaps that represents a reasonable compromise between doing an excessive number of buffer dumps and still covering yourself at higher count rates? In the unlikely event the target came out brighter than this, you'd probably have to modify the G230L observation anyway so you could change the G140L back to ACCUM mode at the same time.</p> <p>The main down side of TIME-TAG vs ACCUM is that with TIME-TAG you're effectively limited to global rates (source + detector background) of under about 20,000 c/s, and you need to set a reasonable upper limit to the expected count rate to be able to estimate the needed buffer time. So for a very bright target, you might have to switch back to ACCUM observations. See section 11.1.3 of the STIS IHB for additional details about TIME-TAG mode.</p>									
3	STIS/FUV E xp2 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=36 44			2500 Secs (2736 Secs) [==>2736.0 Secs]	[2]
<p>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</p>									
4	STIS/FUV E xp3 (STIS.sp.15 18310)	(2) ZTF21AAABWZ X	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=36 44			2500 Secs (2694 Secs) [==>2694.0 Secs]	[3]
<p>Comments: Assuming 98S-like spectrum on day 14 (sn1998s-19980316.000-hst.fits).</p>									
5	STIS/NUV Exp1 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=68 6			2500 Secs (2713 Secs) [==>2713.0 Secs]	[4]
6	STIS/NUV Exp2 (STIS.sp.15 18309)	(2) ZTF21AAABWZ X	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=68 6			2500 Secs (2713 Secs) [==>2713.0 Secs]	[5]

Exposures



Orbit 3

Server Version: 20220630



Orbit 4

Server Version: 20220630

