



18353 - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

Cycle: 34, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

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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	(1) NGC-1277 WAVE	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	3	18-Aug-2026 14:00:15.0	yes
02	(1) NGC-1277 WAVE	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	3	18-Aug-2026 14:00:16.0	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>
03	(3) GAIA-DR3-239421925421815424 (4) NGC-1277-COS	COS/FUV COS/NUV	3	18-Aug-2026 14:00:17.0	yes
04	(3) GAIA-DR3-239421925421815424 (4) NGC-1277-COS	COS/FUV COS/NUV	3	18-Aug-2026 14:00:18.0	yes
05	(3) GAIA-DR3-239421925421815424 (4) NGC-1277-COS	COS/FUV COS/NUV	3	18-Aug-2026 14:00:19.0	yes

15 Total Orbits Used

ABSTRACT

The "UV upturn" (an unexpected rise in ultraviolet flux in massive early-type galaxies) remains one of the most enduring mysteries in stellar population. Despite decades of study, it is still unclear whether this emission originates from old, evolved stars (e.g. extreme horizontal branch stars) or trace amounts of recent star formation (<1% by mass). This degeneracy is perfectly encapsulated in the massive relic galaxy NGC1277. As a unique system that has evolved in isolation since $z \sim 2$ without accreting external gas or satellites, NGC1277 should be the definitive template for a purely passive stellar population. However, recent conflicting analyses of its SED and line-strengths have reached opposed conclusions: one favouring a 0.8% mass fraction of young stars, and the other a purely evolved, old UV-bright component. We propose HST STIS (NUV) and COS (FUV) spectroscopy to break this degeneracy. By measuring sensitive NUV absorption indices and FUV features, we will definitively identify the physical drivers of the UV flux. This observation will provide an unparalleled benchmark for stellar population models, determine if internal recycling can sustain star formation in the absence of mergers, and unlock the UV's potential as a probe of late-time assembly in the most massive galaxies in the Universe.

OBSERVING DESCRIPTION

This proposal aims at obtaining high quality spectra for NGC 1277 in the ultraviolet region, converging the FUV and NUV using a combination of STIS-MAMA and COS to achieve this.

NGC1277 is an extended faint source in the UV (GALEX NUV = 19.713 mag; GALEX FUV = 20.446 mag). We estimate the central surface brightness to be ~ 19 mag arcsec² in the NUV and ~ 19.8 mag arcsec² in the FUV. Therefore, we would like to maximize the light-collecting time available to us focussing on spectroscopy. We estimate that an exposure time of 11 ks yields S/N ~ 15 when integrating over the central 3" for the

STIS-MAMA observations with G230L grating, enough for our scientific needs. For the FUV observations, 20 ks are required to achieve S/N ~ 7 with the G140L grating (1105 setting). In this way, we will split our 15 HST orbits into 5 visits of 3 orbits each. 2 visits for STIS and 3 visits for COS.

visits 1 and 2: STIS-MAMA

orbit1: acquisition + FUV imaging + G230L exposure

orbit2: G230L exposure + G230L exposure

orbit3: G230L exposure + G230L exposure

visits 3,4 and 5: COS

orbit1: star acquisition + blind offset + NUV imaging + G140L exposure at 1105 AA FP-POS=1,2

orbit2: G140L exposure at 1105 AA FP-POS=3,4 + G140L exposure at 1105 AA FP-POS=1

orbit3: G140L exposure at 1105 AA FP-POS=2,3,4

Acquisition

For STIS, we will acquire images for the target directly. With the acquisition performed, we will center the slit and obtain long exposures using the grism obtained with COS.

For COS, because the target is quite faint we would like to acquire a nearby star then use the offset to get to the galaxy. obtaining NUV imaging to check if NGC 1277 is centered. Using GAIA DR3 we selected the star GAIA DR3 239421925421815424, a relatively bright star close to NGC 1277 (~1.5' away from NGC1277). Another relatively bright star could have been used but upon inspection in GALEX images we saw that we could not discern the origin of the emission between two stars, therefore the acquisition could be contaminated by this uncertainty. We then went GAIA DR3 239421925421815424, an F8V star (~6300 K) with G magnitude of 16.3154 mag without any apparent companion. This star is being flagged by the BOT only because it assumes the star is an O5V which produces a lot more UV radiation. That is, however, not the case.

We then perform a blind offset to NGC 1277 where science exposures will be performed. We determined the coordinates for NGC1277 both from SDSS AND ACS/WFC3 images from the HLA.

Imaging

For STIS will get imaging in the FUV to help us interpret the FUV spectra. We were able to fill the orbits allowing us to dedicate some time for the imaging without compromising the time required to get the spectra. Unfortunately STIS is less sensitive in the FUV. These exposures do not interfere with the scientific exposure but provide valuable information regarding the light distribution of the UV bright component something still unknown at these spatial scales. This is pending TTRB approval.

For COS, given that the aperture is smaller getting this exposure are even more important. 300s exposures will be obtained to determine the NUV light distribution. During the image exposures, the calibration lamp should be turned on in order to align the different images from different visits. This is pending TTRB approval.

Spectroscopy

For STIS, we use only the G230L grating. This will allow us to cover the UV and combine with ground-based data,

For COS, we will use G140L grating at 1105 Å finishing the full UV access to the source. We will use the FLASH option and all the FP-POS, as the Handbook suggests.

Proposal 18353 - STIS-MAMA-v01 (01) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

Visit	Proposal 18353, STIS-MAMA-v01 (01) Tue Aug 18 18:00:20 GMT 2026				
	Diagnostic Status: No Diagnostics Scientific Instruments: STIS/NUV-MAMA, STIS/CCD, STIS/FUV-MAMA Special Requirements: ORIENT 255D TO 295 D <i>Comments: This visits primarily aims to get NUV spectra of NGC 1277 using STIS-MAMA detectors. We will use a low-disperion grating and a rather wide slit to due to the internal velocity dispersion from teh object. We will also get FUV imaging as COS acquisition is only performed in the NUV. In this way we get both NUV and FUV photometric observations aiding the interpretation of the spectral signatures.</i>				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(1)	NGC-1277	RA: 03 19 51.4902 (49.9645425d) Dec: +41 34 24.94 (41.57359d) Equinox: J2000	Proper Motion RA: 0.602 mas/yr Proper Motion Dec: -2.792 mas/yr Parallax: 0.002493" Epoch of Position: 2000 Redshift: 0.016749	V=19.40+/-0.24 GALEX NUV = 19.713 mag; G ALEX FUV = 20.446 mag
Fixed Targets	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.				
	SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM. This object has been oberved with HST (ACS). We checked the coordinated and they match the object center. V-band magnitude is given in mag/arcsec2 converted from the RC3 catalogue (de Vaucouleurs+ 1991). GALEX magnitudes are integrated magnitudes from 2012GASC..C...0000S. Category=GALAXY Description=[ELLIPTICAL] Extended=YES				

Proposal 18353 - STIS-MAMA-v01 (01) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

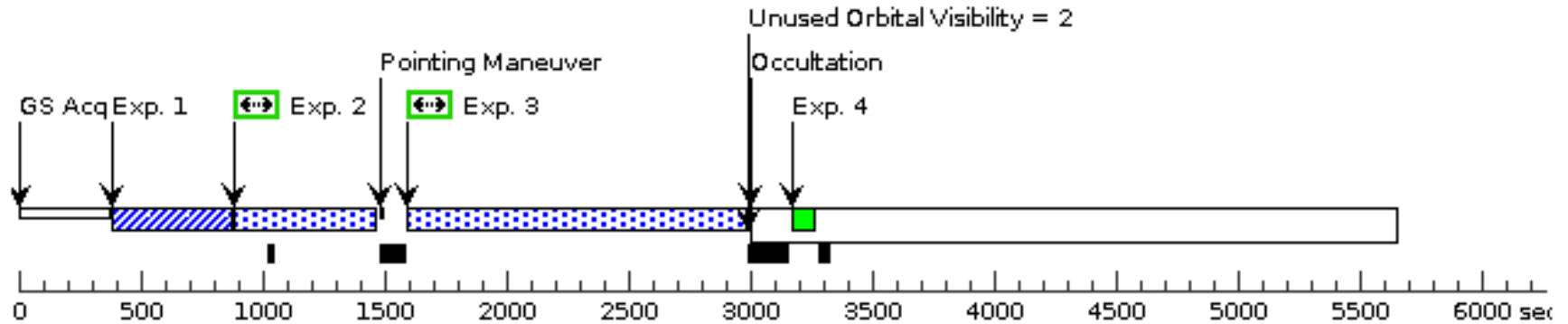
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Aquisition_ NGC1277 (STIS.ta.236 2458)	(1) NGC-1277	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=FLUX-CENTROID; CHECKBOX=11			60 Secs (60 Secs) [==>]	[1]
	Comments: Using the STIS Target Acquisition Simulator and an ACS image which has roughly the same pixel scale size as STIS ACQ (0.05 arcsec). According to the software, the minimum value for the CHECKBOX that stabilizes the centroid found is 11. For the ETC computation, we use the average surface brightness within 3 arcsec for NGC 1277 (17.7 mag/arcsec ²). We round the number to be 1 min exposure. Despite being a galaxy with a really concentrated brightness profile, the peak surface magnitude in the central region (~12mag/arcsec ²) does not saturate the detector.									
	2	FUVimg_N GC1277 (STIS.im.23 63647)	(1) NGC-1277	STIS/FUV-MAMA, ACCUM, 25MAMA	MIRROR				450 Secs (450 Secs) [==>]	[1]
	Comments: Given that COS does not allow for FUV imaging, we decided to get STIS exposures in the FUV to help us interpret the spectra without compromising the integration time required for the spectroscopic observations. Using the GALEX integrated magnitudes we estimated the average surface magnitude in the FUV to be 20.37 mag/arcsec ² in the inner 2 arcsecs where we expect to detect most of the FUV flux. Given that we have two visits, we will be able to get 2 image exposures for this source.									
	3	NUVspec_N GC1277 (STIS.sp.23 62461)	(1) NGC-1277	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=590; WAVECAL=NO			1180 Secs (1180 Secs) [==>]	[1]
	Comments: The spectroscopic observations have been planned using the GALEX integrated photometry and morphological parameters for the source. We estimate that to get good quality spectra we need 11ks for NUV observations. Summing the two visits, these will be 10 exposures.									
	4	NUVspec_WAVE	WAVE	STIS/NUV-MAMA, ACCUM, 31X0.05NDC	G230L 2376 A				[==>]	[1]
	Comments: We decided to do manual wavelength calibrations exposures because the AUTO WAVECAL was placing the WAVECALs in the middle of the orbit given that they could happen during occultation, maximising the available time for the science exposures.									
	5	NUVspec_N GC1277 (STIS.sp.23 62461)	(1) NGC-1277	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=590; WAVECAL=NO			1180 Secs (1180 Secs) [==>]	[2]
	Comments: The spectroscopic observations have been planned using the GALEX integrated photometry and morphological parameters for the source. We estimate that to get good quality spectra we need 11ks for NUV observations. Summing the two visits, these will be 10 exposures.									
	6	NUVspec_N GC1277 (STIS.sp.23 62461)	(1) NGC-1277	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=590; WAVECAL=NO			1180 Secs (1180 Secs) [==>]	[2]
	Comments: The spectroscopic observations have been planned using the GALEX integrated photometry and morphological parameters for the source. We estimate that to get good quality spectra we need 11ks for NUV observations. Summing the two visits, these will be 10 exposures.									
	7	NUVspec_WAVE	WAVE	STIS/NUV-MAMA, ACCUM, 31X0.05NDC	G230L 2376 A				[==>]	[2]
	Comments: We decided to do manual wavelength calibrations exposures because the AUTO WAVECAL was placing the WAVECALs in the middle of the orbit given that they could happen during occultation, maximising the available time for the science exposures.									
	8	NUVspec_N GC1277 (STIS.sp.23 62461)	(1) NGC-1277	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=590; WAVECAL=NO			1180 Secs (1180 Secs) [==>]	[3]
	Comments: The spectroscopic observations have been planned using the GALEX integrated photometry and morphological parameters for the source. We estimate that to get good quality spectra we need 11ks for NUV observations. Summing the two visits, these will be 10 exposures.									

Proposal 18353 - STIS-MAMA-v01 (01) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

9	NUVspec_N (1) NGC-1277 GC1277 (STIS.sp.23 62461)	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=59 0; WAVECAL=NO	1180 Secs (1180 Secs)	
					[==>]	[3]
					Comments: The spectroscopic observations have been planned using the GALEX inetrated photometry and morphological paramters for the source. We estimate that to get good quality spectra we need 11ks for NUV observations. Summing the two visits, these will be 10 exposures.	
10	NUVspec_ WAVE WAVE	STIS/NUV-MAMA, ACCUM, 31X0.05NDC	G230L 2376 A		[==>]	[3]
					Comments: We decided to do manual wavelegth calibrations exposures because the AUTO WAVECAL was placing the WAVECALs in ht emidle of the orbit given that they could happen during occultation, maximising the availabel time for the sience exposures.	

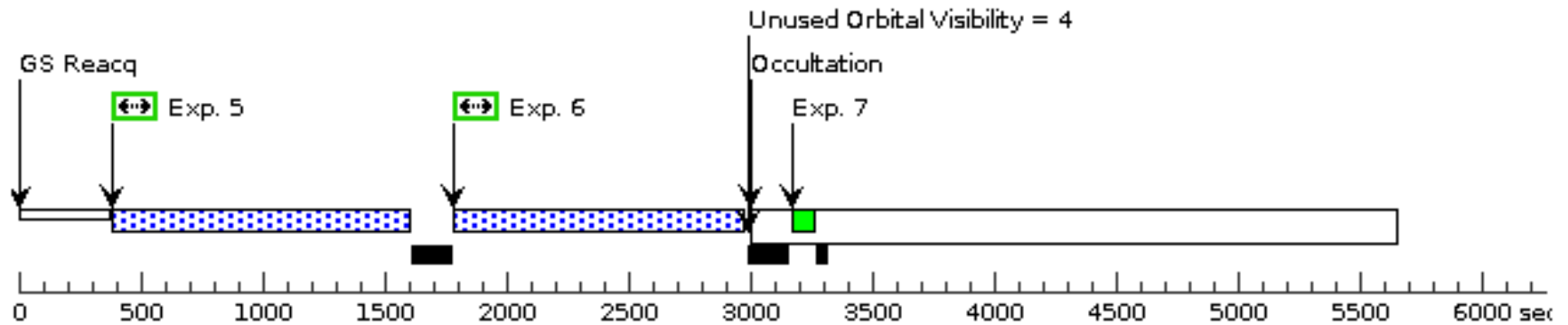
Orbit 1

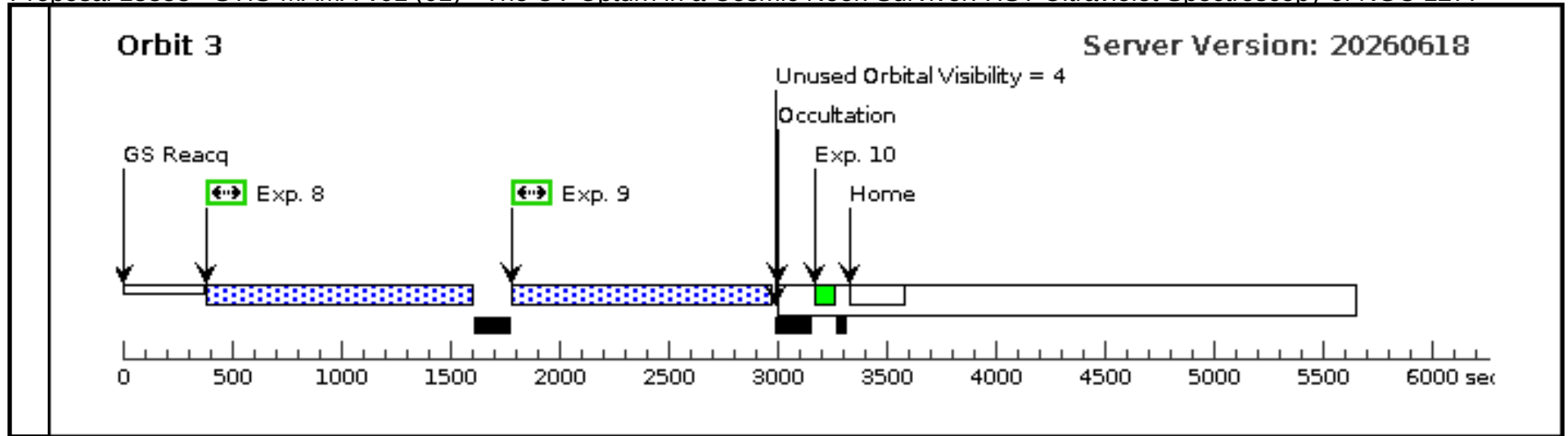
Server Version: 20260618



Orbit 2

Server Version: 20260618





Proposal 18353 - STIS-MAMA-v02 (02) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

Visit	Proposal 18353, STIS-MAMA-v02 (02) Tue Aug 18 18:00:20 GMT 2026				
	Diagnostic Status: No Diagnostics Scientific Instruments: STIS/NUV-MAMA, STIS/CCD, STIS/FUV-MAMA Special Requirements: SAME ORIENT AS 01 <i>Comments: This visits primarily aims to get NUV spectra of NGC 1277 using STIS-MAMA detectors. We will use a low-disperion grating and a rather wide slit to due to the internal velocity dispersion from teh object. We will also get FUV imaging as COS acquisition is only performed in the NUV. In this way we get both NUV and FUV photometric observations aiding the interpretation of the spectral signatures.</i>				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(1)	NGC-1277	RA: 03 19 51.4902 (49.9645425d) Dec: +41 34 24.94 (41.57359d) Equinox: J2000	Proper Motion RA: 0.602 mas/yr Proper Motion Dec: -2.792 mas/yr Parallax: 0.002493" Epoch of Position: 2000 Redshift: 0.016749	V=19.40+/-0.24 GALEX NUV = 19.713 mag; G ALEX FUV = 20.446 mag
Fixed Targets	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.				
	SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM. This object has been oberved with HST (ACS). We checked the coordinated and they match the object center. V-band magnitude is given in mag/arcsec2 converted from the RC3 catalogue (de Vaucouleurs+ 1991). GALEX magnitudes are integrated magnitudes from 2012GASC..C...0000S. Category=GALAXY Description=[ELLIPTICAL] Extended=YES				

Proposal 18353 - STIS-MAMA-v02 (02) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

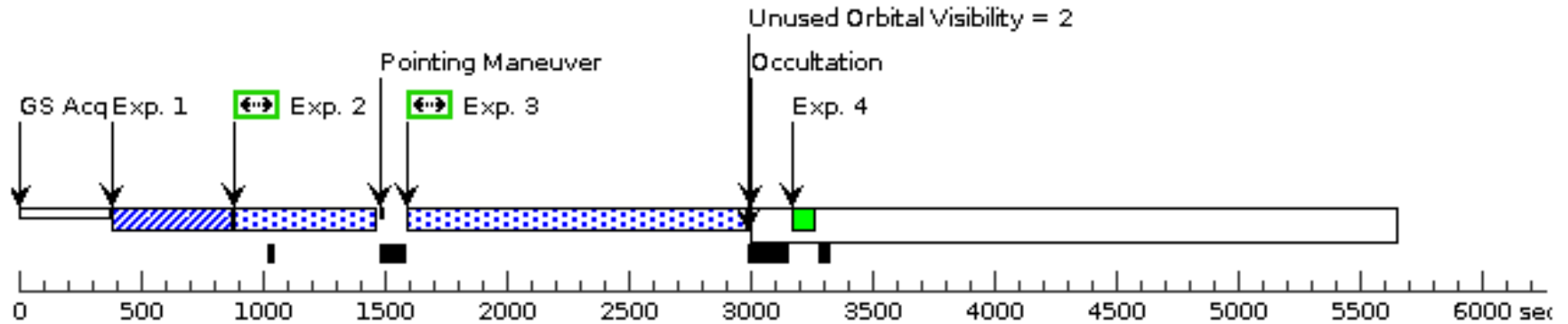
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Aquisition_ NGC1277 (STIS.ta.236 2458)	(1) NGC-1277	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=FLUX-CENTROID; CHECKBOX=11			60 Secs (60 Secs) [==>]	[1]
	Comments: Using the STIS Target Acquisition Simulator and an ACS image which has roughly the same pixel scale size as STIS ACQ (0.05 arcsec). According to the software, the minimum value for the CHECKBOX that stabilizes the centroid found is 11. For the ETC computation, we use the average surface brightness within 3 arcsec for NGC 1277 (17.7 mag/arcsec ²). We round the number to be 1 min exposure. Despite being a galaxy with a really concentrated brightness profile, the peak surface magnitude in the central region (~12mag/arcsec ²) does not saturate the detector.									
	2	FUVimg_N GC1277 (STIS.im.23 63647)	(1) NGC-1277	STIS/FUV-MAMA, ACCUM, 25MAMA	MIRROR				450 Secs (450 Secs) [==>]	[1]
	Comments: Given that COS does not allow for FUV imaging, we decided to get STIS exposures in the FUV to help us interpret the spectra without compromising the integration time required for the spectroscopic observations. Using the GALEX integrated magnitudes we estimated the average surface magnitude in the FUV to be 20.37 mag/arcsec ² in the inner 2 arcsecs where we expect to detect most of the FUV flux. Given that we have two visits, we will be able to get 2 image exposures for this source.									
	3	NUVspec_N GC1277 (STIS.sp.23 62461)	(1) NGC-1277	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=59 0; WAVECAL=NO			1180 Secs (1180 Secs) [==>]	[1]
	Comments: The spectroscopic observations have been planned using the GALEX integrated photometry and morphological parameters for the source. We estimate that to get good quality spectra we need 11ks for NUV observations. Summing the two visits, these will be 10 exposures.									
	4	NUVspec_WAVE	WAVE	STIS/NUV-MAMA, ACCUM, 31X0.05NDC	G230L 2376 A				[==>]	[1]
	Comments: We decided to do manual wavelength calibrations exposures because the AUTO WAVECAL was placing the WAVECALs in the middle of the orbit given that they could happen during occultation, maximising the available time for the science exposures.									
	5	NUVspec_N GC1277 (STIS.sp.23 62461)	(1) NGC-1277	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=59 0; WAVECAL=NO			1180 Secs (1180 Secs) [==>]	[2]
	Comments: The spectroscopic observations have been planned using the GALEX integrated photometry and morphological parameters for the source. We estimate that to get good quality spectra we need 11ks for NUV observations. Summing the two visits, these will be 10 exposures.									
	6	NUVspec_N GC1277 (STIS.sp.23 62461)	(1) NGC-1277	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=59 0; WAVECAL=NO			1180 Secs (1180 Secs) [==>]	[2]
	Comments: The spectroscopic observations have been planned using the GALEX integrated photometry and morphological parameters for the source. We estimate that to get good quality spectra we need 11ks for NUV observations. Summing the two visits, these will be 10 exposures.									
	7	NUVspec_WAVE	WAVE	STIS/NUV-MAMA, ACCUM, 31X0.05NDC	G230L 2376 A				[==>]	[2]
	Comments: We decided to do manual wavelength calibrations exposures because the AUTO WAVECAL was placing the WAVECALs in the middle of the orbit given that they could happen during occultation, maximising the available time for the science exposures.									
	8	NUVspec_N GC1277 (STIS.sp.23 62461)	(1) NGC-1277	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=59 0; WAVECAL=NO			1180 Secs (1180 Secs) [==>]	[3]
	Comments: The spectroscopic observations have been planned using the GALEX integrated photometry and morphological parameters for the source. We estimate that to get good quality spectra we need 11ks for NUV observations. Summing the two visits, these will be 10 exposures.									

Proposal 18353 - STIS-MAMA-v02 (02) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

9	NUVspec_N (1) NGC-1277 GC1277 (STIS.sp.23 62461)	STIS/NUV-MAMA, TIME-TAG, 52X0.5	G230L 2376 A	BUFFER-TIME=59 0; WAVECAL=NO	1180 Secs (1180 Secs)	
					[==>]	[3]
					Comments: The spectroscopic observations have been planned using the GALEX inetrated photometry and morphological paramters for the source. We estimate that to get good quality spectra we need 11ks for NUV observations. Summing the two visits, these will be 10 exposures.	
10	NUVspec_ WAVE WAVE	STIS/NUV-MAMA, ACCUM, 31X0.05NDC	G230L 2376 A		[==>]	[3]
					Comments: We decided to do manual wavelegth calibrations exposures because the AUTO WAVECAL was placing the WAVECALs in ht emidle of the orbit given that they could happen during occultation, maximising the availabel time for the sience exposures.	

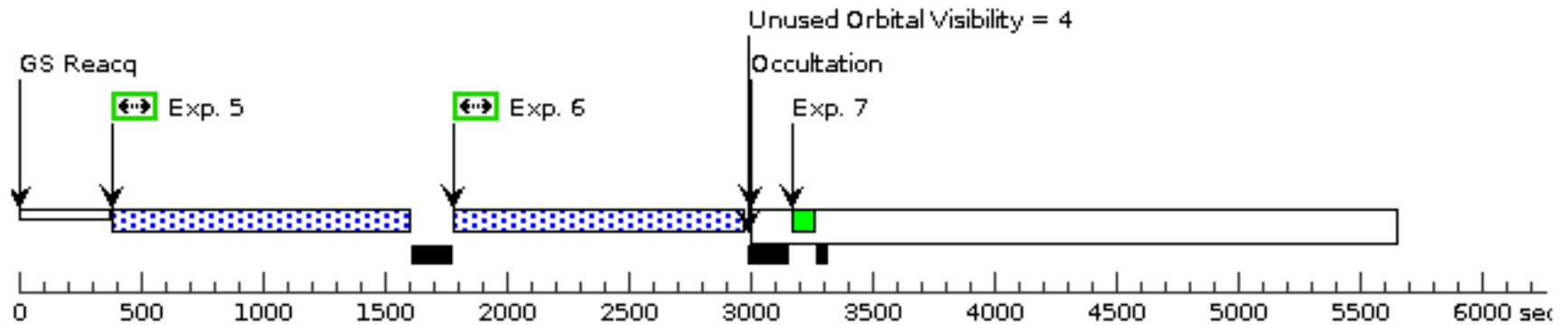
Orbit 1

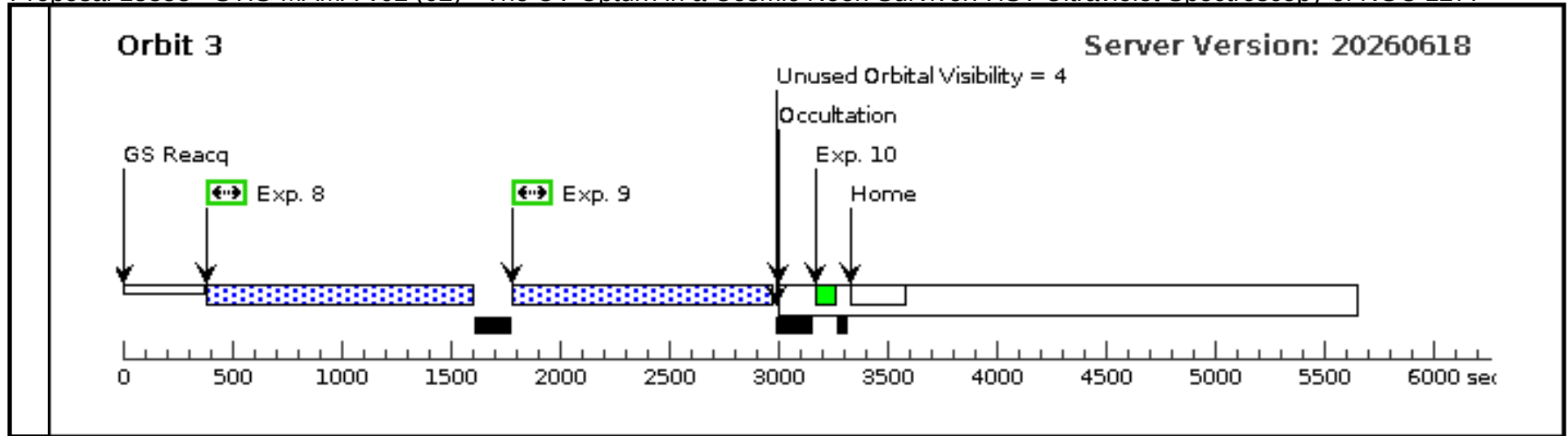
Server Version: 20260618



Orbit 2

Server Version: 20260618





Proposal 18353 - COS-v01 (03) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

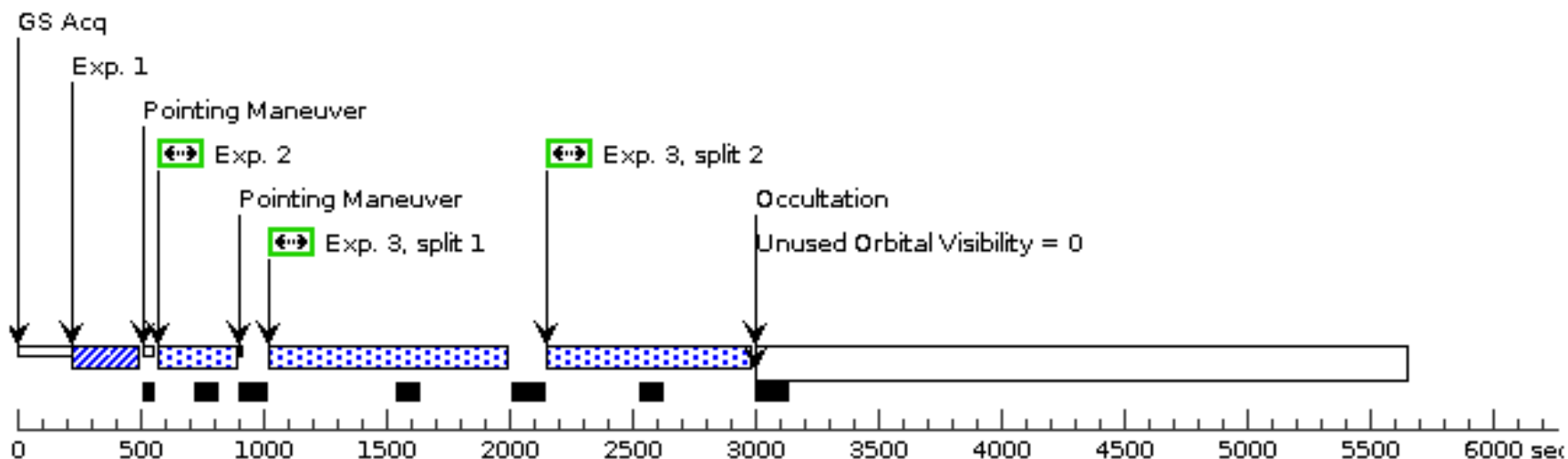
Visit	Proposal 18353, COS-v01 (03)					Tue Aug 18 18:00:20 GMT 2026
	Diagnostic Status: Warning Scientific Instruments: COS/FUV, COS/NUV Special Requirements: (none) Comments: This visit primarily focusses on getting FUV spectra for the galaxy NGC 1277. The acquisition strategy is a bit more intricate than for STIS due to the faintness of the source. We first acquire a star, then move the telescope to be centered in our galaxy, performing a NUV image to chech if it was properly centered. We then move on to get the spectra. These have been organized into two exposures using FP-POS=ALL, resulting in eight sub exposures two of them grouped in the first orbit and the next ones the two subsequent orbits.					
Diagnostics	(COS-v01 (03)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS (Exposure 3 (COS-v01 (03))) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (Exposure 4 (COS-v01 (03))) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details.					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(3)	GAIA-DR3-239421925421815424	RA: 03 19 50.2714 (49.9594642d) Dec: +41 32 55.31 (41.54870d)	Proper Motion RA: -0.595 mas/yr Proper Motion Dec: -0.316 mas/yr	V=16.28 Gaia Gmag 16.315447 mag	Reference Frame: ICRS
		Alt Name1: NGC-1277-STAR	Equinox: J2000	Parallax: 0.2500" Epoch of Position: 2016.0		
		Comments: This object was generated by the targetselector and retrieved from the 2MASS database. Category=STAR Description=[G III-I] Extended=NO				
		(4)	NGC-1277-COS	Offset from GAIA-DR3-239421925421815424 RA Offset: 1.2187999999998311 Secs Dec Offset: 89.62999999999965 Arcsec	V=19.40 GALEX NUV = 19.713 mag; G ALEX FUV = 20.446 mag	Offset Position (NGC-1277-COS)
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM. Category=GALAXY Description=[ELLIPTICAL] Extended=YES					

Proposal 18353 - COS-v01 (03) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	STAR-ACQ UISITION- OFFSET (COS.ta.236 3312)	(3) GAIA-DR3-2394 21925421815424	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				30 Secs (30 Secs) [==>]	[1]
	Comments: We got a star to anchor the positioning of NGC1277 given that it is a faint target. This is a star observed in GAIA with a spectral type F8V 6250 K. COS ETC requires 30s to acquire the target. These star i s being falgged and a Health/Safety but only because in the GSC2 it assumes the star is an O5V. As previously said, this is not true and observations are safe to be conducted using COS.									
	2	(COS.im.23 63331)	(4) NGC-1277-COS	COS/NUV, TIME-TAG, PSA	MIRRORA	BUFFER-TIME=15 0; FLASH=YES			300 Secs (305 Secs) [==>305.0 Secs]	[1]
	Comments: After the star acquisition and offset applied, we get NUV image for NGC1277 to help aid the interpretaion of the spectroscopic observations. We estiamte 300s to be enough to check if the galaxy is well cen tered in the apperture. We decide to use the FLASH=YES option to get a fixed point in the detector allowing us to sum all the exposures getting an even better image.									
	3	(COS.sp.236 3339)	(4) NGC-1277-COS	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=ALL; BUFFER-TIME=34 8; FLASH=YES; LIFETIME-POS=L P11; SEGMENT=A			700 Secs (2944 Secs) [==>780.0 Secs (Split 1)] [==>780.0 Secs (Split 2)] [==>692.0 Secs (Split 3)] [==>692.0 Secs (Split 4)]	[1] [2]
	Comments: This is the exposures to get the FUV spectrum once the object has been properly placed in the apperture. We estiamte we need 17ks for this. We organized for each of the three visits two exposures using all FP-POS, resulting in 24 sub exposures. This exposure streches accross two orbits. We decide to use the FLASH=YES to allow for time-resolved wavelegth calibration.									
	4	(COS.sp.236 3339)	(4) NGC-1277-COS	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=ALL; BUFFER-TIME=37 3; FLASH=YES; LIFETIME-POS=L P11; SEGMENT=A			750 Secs (2935 Secs) [==>742.0 Secs (Split 1)] [==>731.0 Secs (Split 2)] [==>731.0 Secs (Split 3)] [==>731.0 Secs (Split 4)]	[2] [3]
	Comments: This is the exposures to get the FUV spectrum once the object has been properly placed in the apperture. We estiamte we need 17ks for this. We organized for each of the three visits two exposures using all FP-POS, resulting in 24 sub exposures. This exposure streches accross two orbits. We decide to use the FLASH=YES to allow for time-resolved wavelegth calibration.									

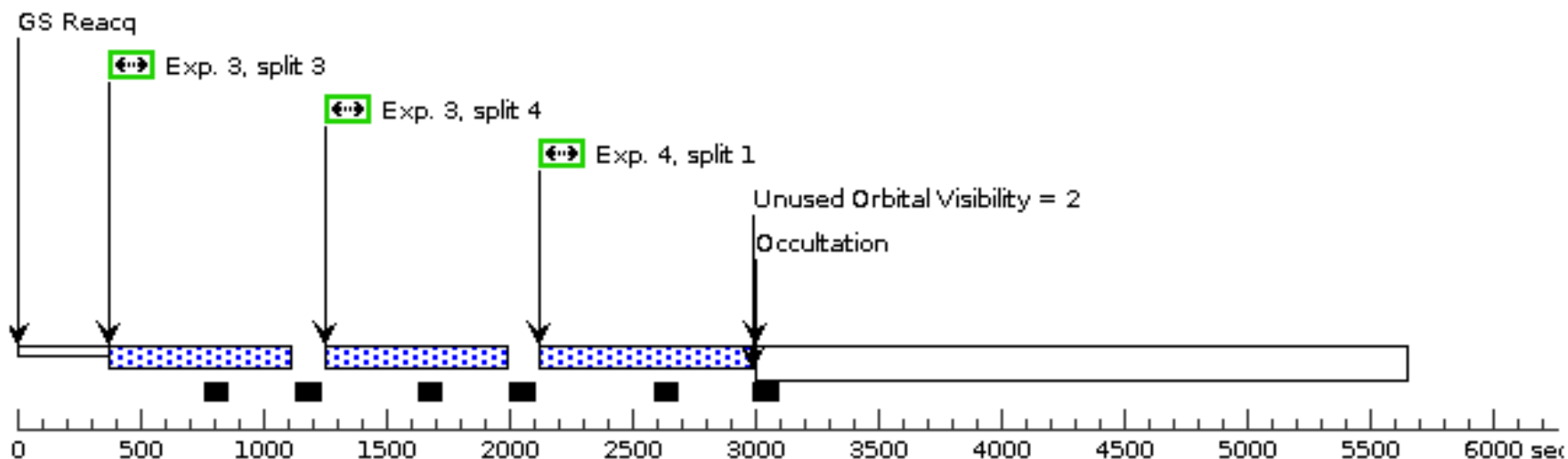
Orbit 1

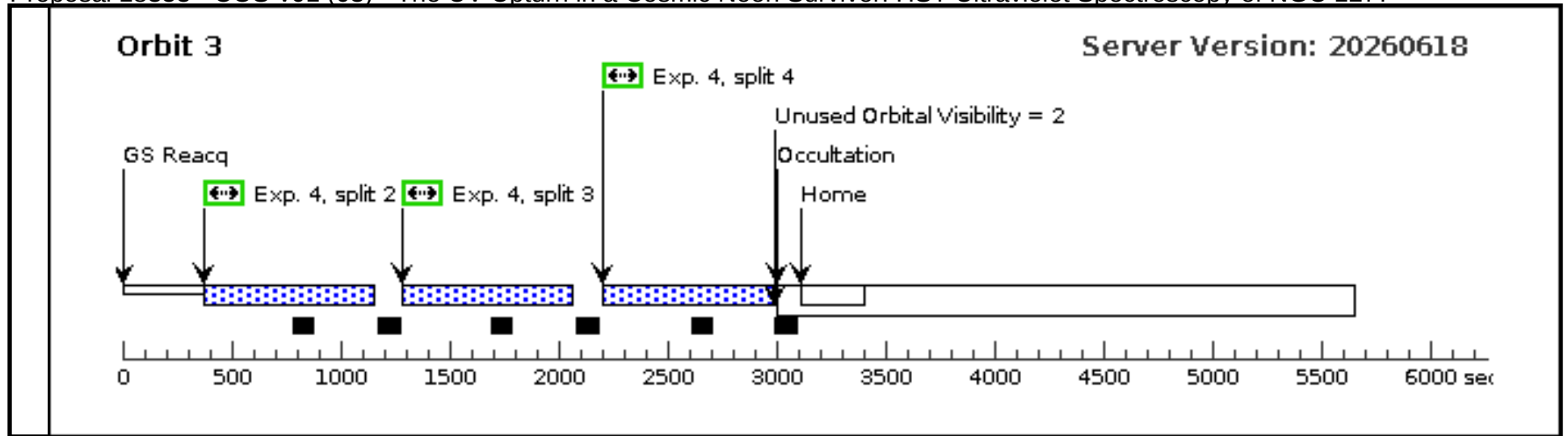
Server Version: 20260618



Orbit 2

Server Version: 20260618





Proposal 18353 - COS-v02 (04) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

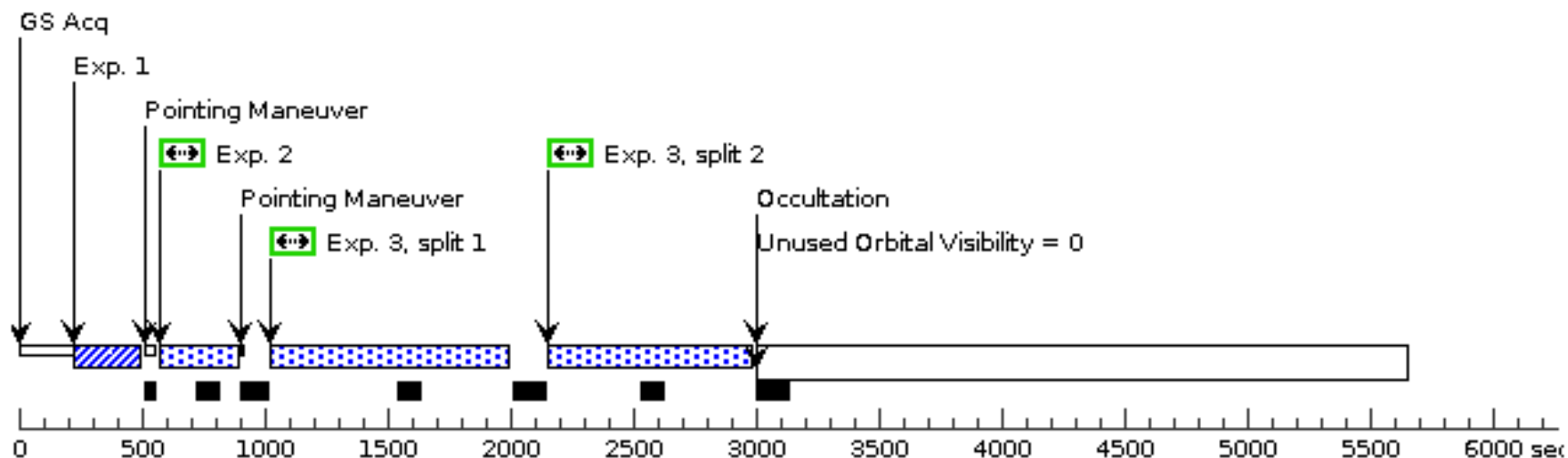
Visit	Proposal 18353, COS-v02 (04)					Tue Aug 18 18:00:20 GMT 2026
	Diagnostic Status: Warning					
	Scientific Instruments: COS/FUV, COS/NUV					
	Special Requirements: SAME ORIENT AS 03					
	Comments: This visit primarily focusses on getting FUV spectra for the galaxy NGC 1277. The acquisition strategy is a bit more intricate than for STIS due to the faintness of the source. We first acquire a star, then move the telescope to be centered in our galaxy, performing a NUV image to check if it was properly centered. We then move on to get the spectra. These have been organized into two exposures using FP-POS=ALL, resulting in eight sub exposures two of them grouped in the first orbit and the next ones the two subsequent orbits.					
Diagnostics	(COS-v02 (04)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS					
	(Exposure 3 (COS-v02 (04))) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details.					
	(Exposure 4 (COS-v02 (04))) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details.					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(3)	GAIA-DR3-239421925421815424	RA: 03 19 50.2714 (49.9594642d)	Proper Motion RA: -0.595 mas/yr	V=16.28	Reference Frame: ICRS
		Alt Name1: NGC-1277-STAR	Dec: +41 32 55.31 (41.54870d)	Proper Motion Dec: -0.316 mas/yr	Gaia Gmag 16.315447 mag	
			Equinox: J2000	Parallax: 0.2500"		
				Epoch of Position: 2016.0		
	Comments: This object was generated by the targetselector and retrieved from the 2MASS database.					
	Category=STAR					
	Description=[G III-I]					
	Extended=NO					
	(4)	NGC-1277-COS	Offset from GAIA-DR3-239421925421815424		V=19.40	Offset Position (NGC-1277-COS)
			RA Offset: 1.2187999999998311 Secs		GALEX NUV = 19.713 mag; G	
			Dec Offset: 89.62999999999965 Arcsec		ALEX FUV = 20.446 mag	
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					
	SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.					
	Category=GALAXY					
	Description=[ELLIPTICAL]					
	Extended=YES					

Proposal 18353 - COS-v02 (04) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	STAR-ACQ UISITION- OFFSET (COS.ta.236 3312)	(3) GAIA-DR3-2394 21925421815424	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				30 Secs (30 Secs) [==>]	[1]
	Comments: We got a star to anchor the positioning of NGC1277 given that it is a faint target. This is a star observed in GAIA with a spectral type F8V 6250 K. COS ETC requires 30s to acquire the target. These star i s being falgged and a Health/Safety but only because in the GSC2 it assumes the star is an O5V. As previously said, this is not true and observations are safe to be conducted using COS.									
	2	(COS.im.23 63331)	(4) NGC-1277-COS	COS/NUV, TIME-TAG, PSA	MIRRORA	BUFFER-TIME=15 0; FLASH=YES			300 Secs (305 Secs) [==>305.0 Secs]	[1]
	Comments: After the star acquisition and offset applied, we get NUV image for NGC1277 to help aid the interpretaion of the spectroscopic observations. We estiamte 300s to be enough to check if the galaxy is well cen tered in the apperture. We decide to use the FLASH=YES option to get a fixed point in the detector allowing us to sum all the exposures getting an even better image.									
	3	(COS.sp.236 3339)	(4) NGC-1277-COS	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=ALL; BUFFER-TIME=34 8; FLASH=YES; LIFETIME-POS=L P11; SEGMENT=A			700 Secs (2944 Secs) [==>780.0 Secs (Split 1)] [==>780.0 Secs (Split 2)] [==>692.0 Secs (Split 3)] [==>692.0 Secs (Split 4)]	[1] [2]
	Comments: This is the exposures to get the FUV spectrum once the object has been properly placed in the apperture. We estiamte we need 17ks for this. We organized for each of the three visits two exposures using all FP-POS, resulting in 24 sub exposures. This exposure streches accross two orbits. We decide to use the FLASH=YES to allow for time-resolved wavelegth calibration.									
	4	(COS.sp.236 3339)	(4) NGC-1277-COS	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=ALL; BUFFER-TIME=37 3; FLASH=YES; LIFETIME-POS=L P11; SEGMENT=A			750 Secs (2935 Secs) [==>742.0 Secs (Split 1)] [==>731.0 Secs (Split 2)] [==>731.0 Secs (Split 3)] [==>731.0 Secs (Split 4)]	[2] [3]
	Comments: This is the exposures to get the FUV spectrum once the object has been properly placed in the apperture. We estiamte we need 17ks for this. We organized for each of the three visits two exposures using all FP-POS, resulting in 24 sub exposures. This exposure streches accross two orbits. We decide to use the FLASH=YES to allow for time-resolved wavelegth calibration.									

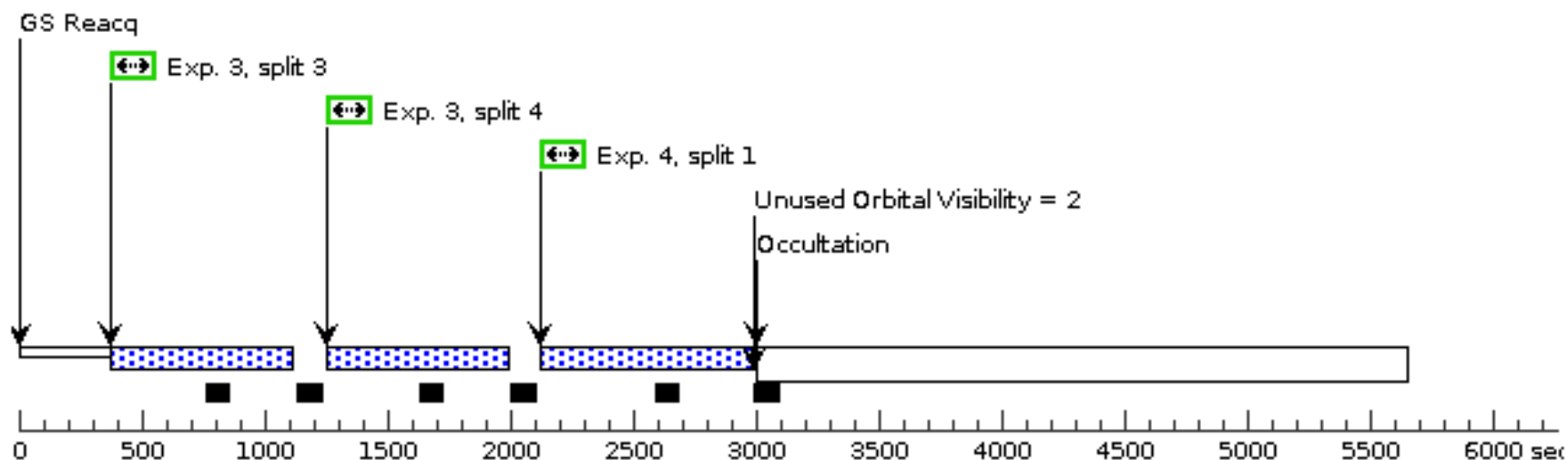
Orbit 1

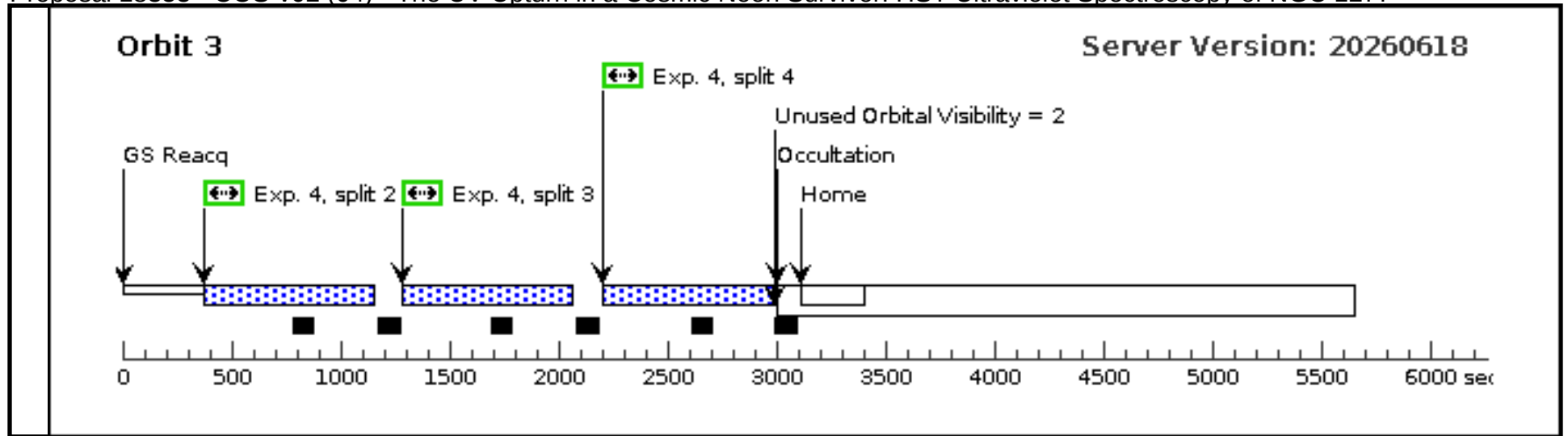
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Proposal 18353 - COS-v03 (05) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

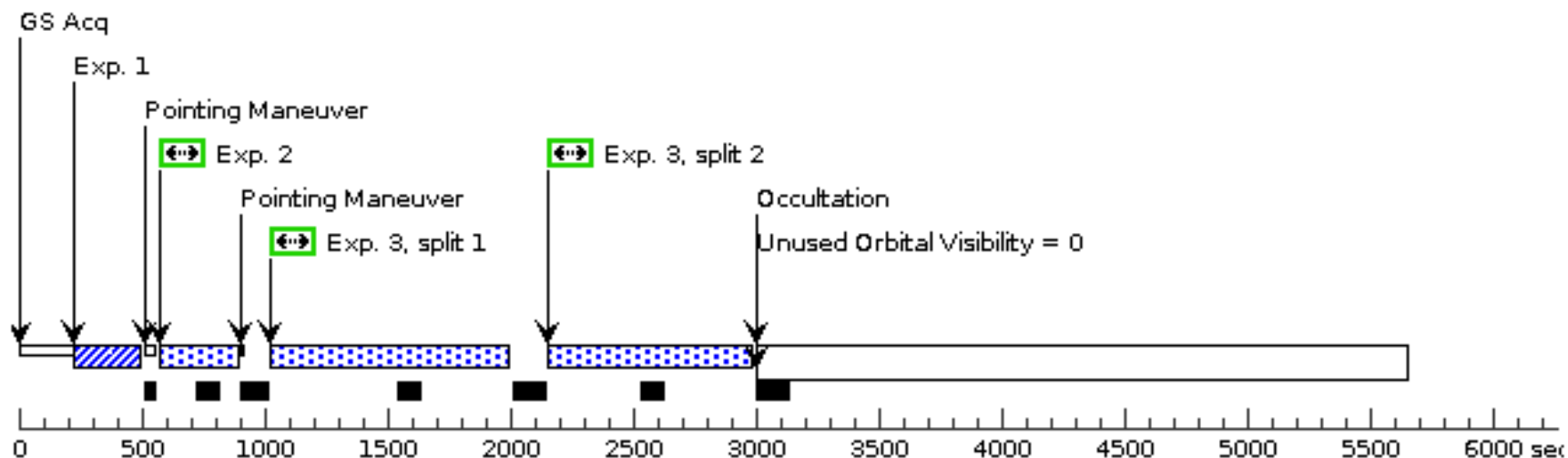
Visit	Proposal 18353, COS-v03 (05)					Tue Aug 18 18:00:20 GMT 2026
	Diagnostic Status: Warning Scientific Instruments: COS/FUV, COS/NUV Special Requirements: SAME ORIENT AS 03 <i>Comments: This visit primarily focusses on getting FUV spectra for the galaxy NGC 1277. The acquisition strategy is a bit more intricate than for STIS due to the faintness of the source. We first acquire a star, then move the telescope to be centered in our galaxy, performing a NUV image to chech if it was properly centered. We then move on to get the spectra. These have been organized into two exposures using FP-POS=ALL, resulting in eight sub exposures two of them grouped in the first orbit and the next ones the two subsequent orbits.</i>					
Diagnostics	(COS-v03 (05)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS (Exposure 3 (COS-v03 (05))) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (Exposure 4 (COS-v03 (05))) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details.					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(3)	GAIA-DR3-239421925421815424 Alt Name1: NGC-1277-STAR	RA: 03 19 50.2714 (49.9594642d) Dec: +41 32 55.31 (41.54870d) Equinox: J2000	Proper Motion RA: -0.595 mas/yr Proper Motion Dec: -0.316 mas/yr Parallax: 0.2500" Epoch of Position: 2016.0	V=16.28 Gaia Gmag 16.315447 mag	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the 2MASS database.</i> Category=STAR Description=[G III-I] Extended=NO					
	(4)	NGC-1277-COS	Offset from GAIA-DR3-239421925421815424 RA Offset: 1.218799999998311 Secs Dec Offset: 89.62999999999965 Arcsec		V=19.40 GALEX NUV = 19.713 mag; G ALEX FUV = 20.446 mag	Offset Position (NGC-1277-COS)
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM. Category=GALAXY Description=[ELLIPTICAL] Extended=YES					

Proposal 18353 - COS-v03 (05) - The UV Upturn in a Cosmic Noon Survivor: HST Ultraviolet Spectroscopy of NGC 1277

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	STAR-ACQ UISITION- OFFSET (COS.ta.236 3312)	(3) GAIA-DR3-2394 21925421815424	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				30 Secs (30 Secs) [==>]	[1]
	Comments: We got a star to anchor the positioning of NGC1277 given that it is a faint target. This is a star observed in GAIA with a spectral type F8V 6250 K. COS ETC requires 30s to acquire the target. These star i s being falgged and a Health/Safety but only because in the GSC2 it assumes the star is an O5V. As previously said, this is not true and observations are safe to be conducted using COS.									
	2	(COS.im.23 63331)	(4) NGC-1277-COS	COS/NUV, TIME-TAG, PSA	MIRRORA	BUFFER-TIME=15 0; FLASH=YES			300 Secs (305 Secs) [==>305.0 Secs]	[1]
	Comments: After the star acquisition and offset applied, we get NUV image for NGC1277 to help aid the interpretaion of the spectroscopic observations. We estiamte 300s to be enough to check if the galaxy is well cen tered in the apperture. We decide to use the FLASH=YES option to get a fixed point in the detector allowing us to sum all the exposures getting an even better image.									
	3	(COS.sp.236 3339)	(4) NGC-1277-COS	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=ALL; BUFFER-TIME=34 8; FLASH=YES; LIFETIME-POS=L P11; SEGMENT=A			700 Secs (2944 Secs) [==>780.0 Secs (Split 1)] [==>780.0 Secs (Split 2)] [==>692.0 Secs (Split 3)] [==>692.0 Secs (Split 4)]	[1] [2]
	Comments: This is the exposures to get the FUV spectrum once the object has been properly placed in the apperture. We estiamte we need 17ks for this. We organized for each of the three visits two exposures using all FP-POS, resulting in 24 sub exposures. This exposure streches accross two orbits. We decide to use the FLASH=YES to allow for time-resolved wavelegth calibration.									
	4	(COS.sp.236 3339)	(4) NGC-1277-COS	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=ALL; BUFFER-TIME=37 3; FLASH=YES; LIFETIME-POS=L P11; SEGMENT=A			750 Secs (2935 Secs) [==>742.0 Secs (Split 1)] [==>731.0 Secs (Split 2)] [==>731.0 Secs (Split 3)] [==>731.0 Secs (Split 4)]	[2] [3]
	Comments: This is the exposures to get the FUV spectrum once the object has been properly placed in the apperture. We estiamte we need 17ks for this. We organized for each of the three visits two exposures using all FP-POS, resulting in 24 sub exposures. This exposure streches accross two orbits. We decide to use the FLASH=YES to allow for time-resolved wavelegth calibration.									

Orbit 1

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Orbit 2

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