17465 - NGC 4214: Spatially-Resolved Calibration of Indirect Methods to detect LyC Leaking Photons at all Redshifts

Cycle: 31, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(2) NGC-4214-CLUSTER-1 (3) NGC-4214-CLUSTER-2 (4) NGC-4214-CLUSTER-3 (5) NGC-4214-CLUSTER-4 (6) NGC-4214-CLUSTER-5	COS/FUV COS/NUV	3	17-Jun-2024 14:01:10.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
02	(6) NGC-4214-CLUSTER-5 (7) NGC-4214-CLUSTER-6	COS/FUV COS/NUV	3	17-Jun-2024 14:01:11.0	yes
03	(1) NGC-4214-CLUSTER-A (2) NGC-4214-CLUSTER-1 (3) NGC-4214-CLUSTER-2 (4) NGC-4214-CLUSTER-3 (5) NGC-4214-CLUSTER-4 (6) NGC-4214-CLUSTER-5 (7) NGC-4214-CLUSTER-6 CCDFLAT	STIS/CCD	4	17-Jun-2024 14:01:13.0	yes

10 Total Orbits Used

ABSTRACT

The escape fraction f_esc of LyC photons from star-forming galaxies (SFGs) is a topic of great interest. Leaking dwarf SFGs have been indicated as candidates for the re-ionization of the Universe at z ~ 7-10. Only a fraction of candidate LyC leakers at z > 0.5 -5 have shown enough leakage for such re-ionization (> 10-20%). Direct detections are difficult due to absorption of the LyC emission at < 912 A from the Milky Way (z ~ 0) or the IGM (z > 0). To move this field forward, indirect methods need to be spatially resolved down to the scales of individual SF regions to establish if the low detection rate is due to spatial variations and geometry within galaxies or global versus local properties. The first of a kind spatially-resolved f_esc map from HST broadband photometry indicates variations between 0-40% within NGC 4214 (~ 3 Mpc). Here we propose to use 1 archival and 6 new COS G130M pointings in NGC 4214 to probe the paths for LyC escape through analysis of the residual intensity in the core of saturated UV absorption lines (e.g., C II). We will complement these data with guaranteed simultaneous STIS G430L and G750L long-slit spectra, gaining access to another indirect indicator, O32, and emission lines critical to constrain the local physical conditions of the clumpy ISM and the ionizing photon production. Archival optical IFU data will provide the gas kinematics in the very center of NGC 4214. This wealth of data will be key to characterize the local physical processes regulating the creation and leakage of LyC photons in galaxies, and deliver to the community spatially calibrated indirect methods to measure f_esc at all redshifts in the era of JWST and ELT.

OBSERVING DESCRIPTION

We propose to perform a spatially-resolved HST COS FUV and STIS long-slit optical study of seven star-forming knots labeled as #A (or #Archival), #1, #2, #3, #4, #5 and #6 and hosted in the nearby dwarf star-forming galaxy and LyC leaker NGC 4214. Our analysis will include archival COS data for complex #A (HST PID: 11579 and 15193). COS G130M/1291 covering the 1130-1430 angstroms spectral range with a resolution of ~ 15,000 (v~20 km/sec), will be used for this purpose.

The COS data will be complemented by guaranteed simultaneous and homogeneous STIS 52"x 2" G430L and G750L optical spectra (spectral resolution ~ 750) covering key emission-line diagnostics necessary to reddening correct the spectra via the Halpha/Hbeta Balmer decrement, determine electron density via the [SII] 6716, 6732 doublet, infer electron temperature via the [OIII] 5007/[O III]| 4363 emission-line ratio and consequently the direct-method metallicity indicator 12+log(O/H) and, most importantly, an accurate O32 ratio along the sightlines sampled with COS. Moreover, the combination of metallicity and O32 provides a determination of the ionization parameter, a direct measurement of the radiation field hardness which may be contributing to the escape of LyC along that sightline. With the plethora of UV and optical spectral and spatial information available, we will characterize the physical conditions of the environment (massive stars, stellar winds, multi-phase ISM, outflows) that regulate leakage of photons on the small spatial scales of individual H II regions (~40 pc).

The seven SF complexes targeted in NGC 4214 with this COS/STIS program were selected as the brightest UV knots in regions with the highest fesc (> 10%) according to the map published by Choi et al. (2020; C20), sampling both small and large spatial scales within the galaxy. We used the multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5" aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes for our targets. We run the COS spectroscopic ETC calculations assuming a Single Stellar Population with a ~5 Myr age, applying the appropriate local value of reddening and normalizing to the GALEX FUV magnitudes. COS exposure times were estimated to achieve S/N~8 at rest-frame 1335 angstroms. We do not expect violations of local/global bright object limits for COS as the ETC reported no warning. This is also supported by the previous COS observations of the star-forming complex #A, the brightest of our targets. As recommended, we will use different FP-POS settings to improve S/N and minimize the effects of flat-field artifacts. We use the same COS target acquisition strategy adopted in PID 11579 for pointing #A to acquire cluster #5 which is the most isolated and point-like source, then perform an offset without target acquisition to take spectra of each cluster.

The STIS calculations were performed by adding the weakest emission line that we want detected in G430L and G750L, [O II] 3727 and [N II] 6548 respectively, to the input spectra. Average fluxes for these lines were obtained from the optical spectra of Kobulnicky & Skillman (1996) and were used with a FWHM~100 km/sec (typical of HII regions). STIS exposure times were estimated to achieve S/N~10 at the rest-frame 3727 angstroms for G430L and 6548 angstroms for G750L. The STIS CCD observations will be executed with CR-split to get rid of cosmic rays.

We will make use of small slews < 2' to observe more than one cluster per instrument configuration/orbit/visit.

Visit	**Proposal 17465, Visit 01, completed** Mon Jun 17 18:01:14 GMT 2024 **Diagnostic Status: Warning** Scientific Instruments: COS/FUV, COS/NUV Special Requirements: (none)
Diagnostics	(Visit 01) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS (Visit 01) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS (Visit 01) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (Visit 01) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (ngc4214-cluster-3-cos-fp3 (01.002)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (ngc4214-cluster-3-cos-fp4 (01.003)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (ngc4214-cluster-2-cos-fp4 (01.004)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (ngc4214-cluster-2-cos-fp3 (01.005)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (ngc4214-cluster-1-cos-fp3 (01.006)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (ngc4214-cluster-1-cos-fp4 (01.007)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (ngc4214-cluster-4-cos-fp3 (01.008)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details. (ngc4214-cluster-4-cos-fp4 (01.009)) 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
(2)	NGC-4214-CLUSTER-1	Offset from NGC-4214-CLUSTER-5 RA Offset: 1.97 Secs Dec Offset: 46.88 Arcsec		V=17.7+/-0.1 GALEX FUV (AB) = 17.5 +/- 0.1 mag	Offset Position (NGC-4214-CLUSTER-1)
		Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging. *GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|*| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.* *Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.* *Category=STELLAR CLUSTER* *Description=[STAR FORMING REGION]* *Extended=YES*			
(3)	NGC-4214-CLUSTER-2	Offset from NGC-4214-CLUSTER-5 RA Offset: 2.11 Secs Dec Offset: 28.12 Arcsec		V=17.1+/-0.1 GALEX FUV (AB) = 16.8 +/- 0.1 mag	Offset Position (NGC-4214-CLUSTER-2)
		Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging. *GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|*| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.* *Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.* *Category=STELLAR CLUSTER* *Description=[STAR FORMING REGION]* *Extended=YES*			
(4)	NGC-4214-CLUSTER-3	Offset from NGC-4214-CLUSTER-5 RA Offset: 0.64 Secs Dec Offset: 1.095 Arcmin		V=17.7+/-0.1 GALEX FUV (AB) = 17.5 +/- 0.1 mag	Offset Position (NGC-4214-CLUSTER-3)
		Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging. *GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|*| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.* *Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.* *Category=STELLAR CLUSTER* *Description=[STAR FORMING REGION]* *Extended=YES*			
(5)	NGC-4214-CLUSTER-4	Offset from NGC-4214-CLUSTER-5 RA Offset: -3.82 Secs Dec Offset: 1.543 Arcmin		V=18.0+/-0.1 GALEX FUV (AB) = 17.7 +/- 0.1 mag	Offset Position (NGC-4214-CLUSTER-4)
		Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging. *GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|*| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.* *Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.* *Category=STELLAR CLUSTER* *Description=[STAR FORMING REGION]* *Extended=YES*			

(6) NGC-4214-CLUSTER-5 RA: 12 15 38.5013 (183.9104221d) V=17.7+/-0.1 Reference Frame: ICRS

Dec: +36 18 45.75 (36.31271d) GALEX FUV (AB) = 18.4 +/- 0. 1 mag

Equinox: J2000

Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging.

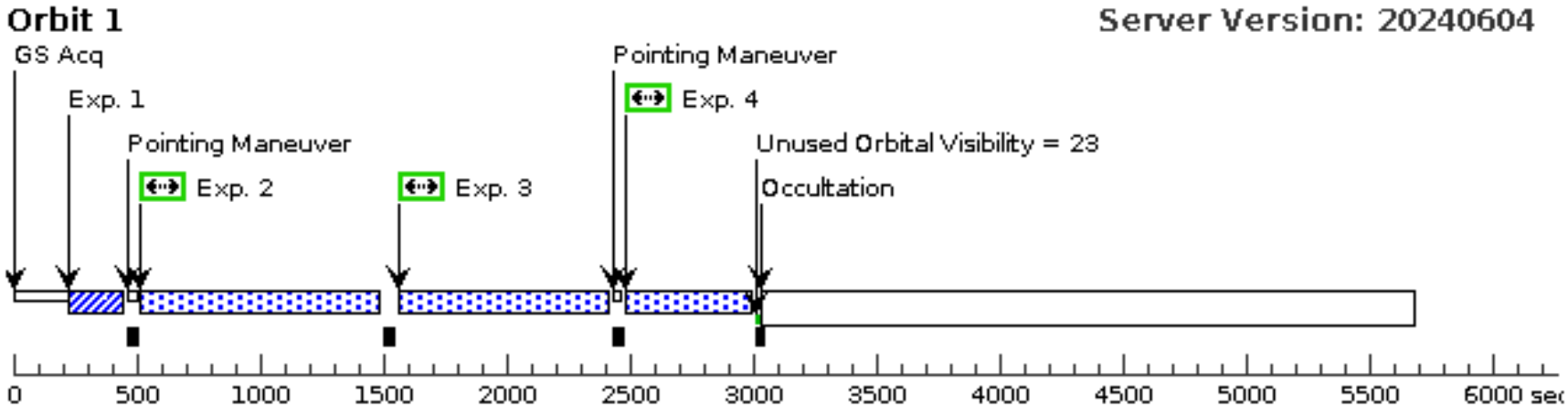
GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.*

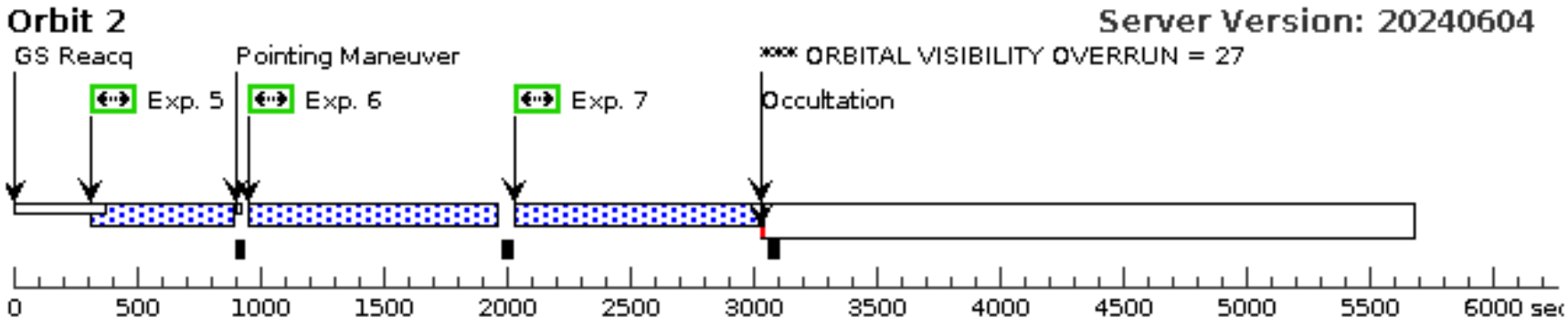
Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.
Category=STELLAR CLUSTER
Description=[STAR FORMING REGION]
Extended=YES

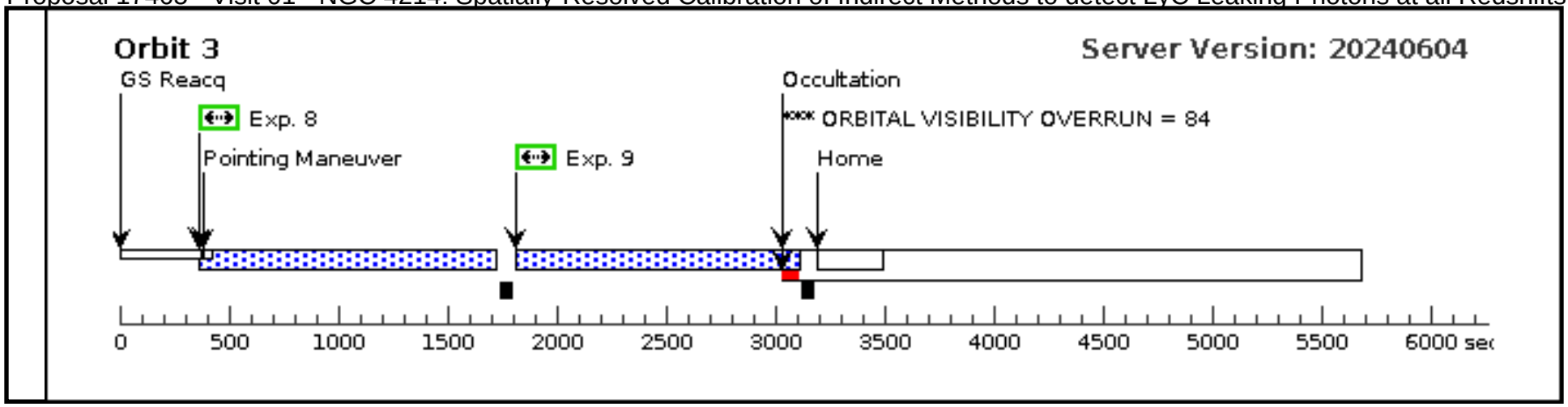
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ngc4214-cluster-5-cos-ta (1890781)	(6) NGC-4214-CLUSTER-5	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				5 Secs (5 Secs)	
								[==>]	***[1]***
2	ngc4214-cluster-3-cos-fp3 (1893999)	(4) NGC-4214-CLUSTER-3	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=3100			802 Secs (802 Secs)	
								[==>]	***[1]***
3	ngc4214-cluster-3-cos-fp4 (1893999)	(4) NGC-4214-CLUSTER-3	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=3100			802 Secs (802 Secs)	
								[==>]	***[1]***
4	ngc4214-cluster-2-cos-fp4 (1894002)	(3) NGC-4214-CLUSTER-2	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=2400			464 Secs (464 Secs)	
								[==>]	***[1]***
5	ngc4214-cluster-2-cos-fp3 (1894002)	(3) NGC-4214-CLUSTER-2	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=2400			464 Secs (464 Secs)	
								[==>]	***[2]***
6	ngc4214-cluster-1-cos-fp3 (1894006)	(2) NGC-4214-CLUSTER-1	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=3060			961 Secs (961 Secs)	
								[==>]	***[2]***
7	ngc4214-cluster-1-cos-fp4 (1894006)	(2) NGC-4214-CLUSTER-1	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=3060			961 Secs (961 Secs)	
								[==>]	***[2]***
8	ngc4214-cluster-4-cos-fp3 (1894018)	(5) NGC-4214-CLUSTER-4	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=3180			1244 Secs (1244 Secs)	
								[==>]	***[3]***
9	ngc4214-cluster-4-cos-fp4 (1894018)	(5) NGC-4214-CLUSTER-4	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=3180			1244 Secs (1244 Secs)	
								[==>]	***[3]***

Orbit Structure



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Visit

Proposal 17465, Visit 02, implementation Mon Jun 17 18:01:15 GMT 2024

Diagnostic Status: Warning

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Diagnostics

(Visit 02) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(ngc4214-cluster-5-cos-fp3 (02.002)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details.

(ngc4214-cluster-5-cos-fp4-1 (02.003)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details.

(ngc4214-cluster-5-cos-fp4-2 (02.004)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details.

(ngc4214-cluster-6-cos-fp3-1 (02.005)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details.

(ngc4214-cluster-6-cos-fp3-2 (02.006)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See "Errors and Warnings" for more details.

(ngc4214-cluster-6-cos-fp4 (02.007)) 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
(6)	NGC-4214-CLUSTER-5	RA: 12 15 38.5013 (183.9104221d) Dec: +36 18 45.75 (36.31271d) Equinox: J2000		V=17.7+/-0.1 GALEX FUV (AB) = 18.4 +/- 0.1 mag	Reference Frame: ICRS

Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging.

GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.*

Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.
Category=STELLAR CLUSTER
Description=[STAR FORMING REGION]
Extended=YES

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(7)	NGC-4214-CLUSTER-6	Offset from NGC-4214-CLUSTER-5 RA Offset: -3.42 Secs Dec Offset: 1.164 Arcmin		V=17.3+/-0.1 GALEX FUV (AB) = 18.3 +/- 0.1 mag	Offset Position (NGC-4214-CLUSTER-6)

Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging.

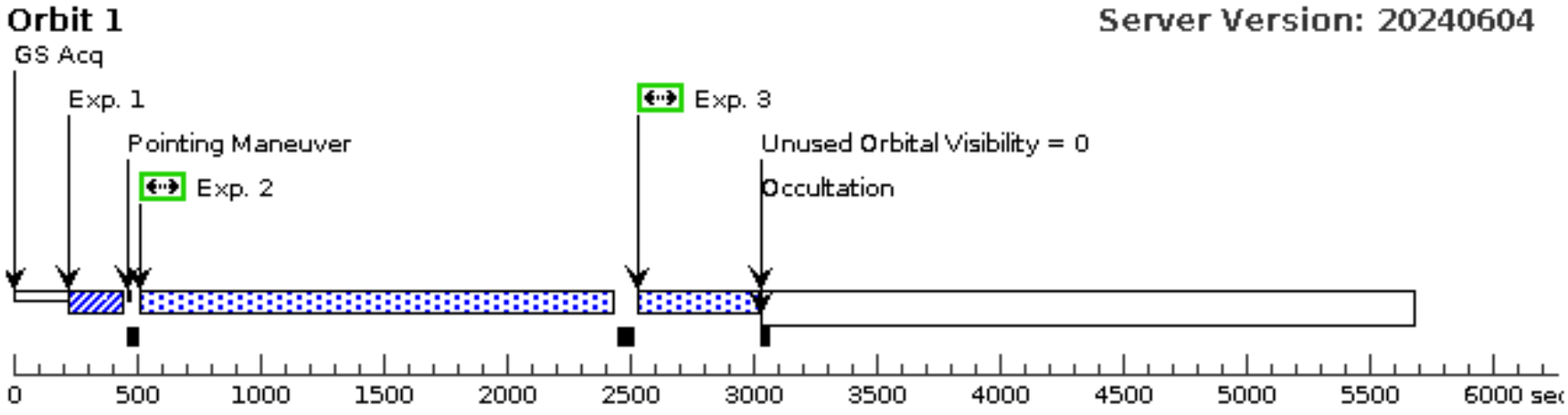
GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.*

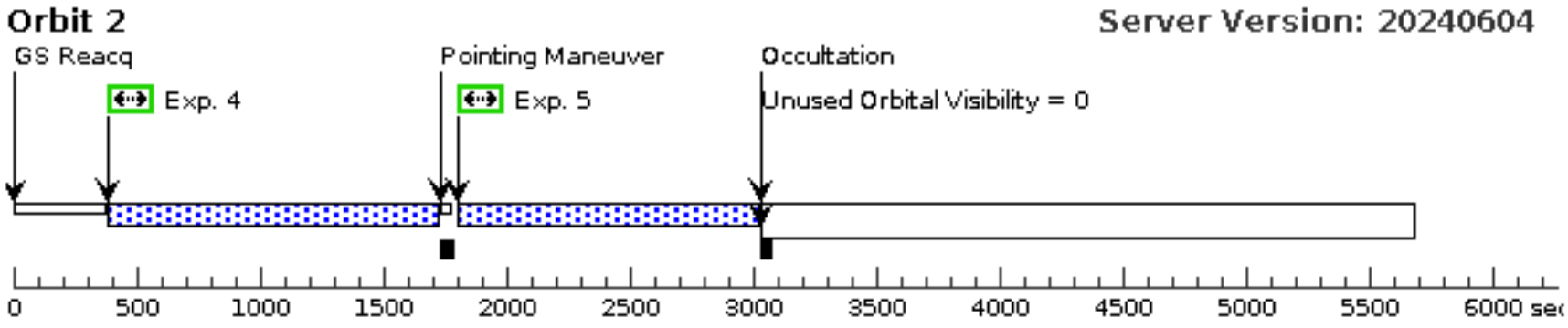
Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.
Category=STELLAR CLUSTER
Description=[STAR FORMING REGION]
Extended=YES

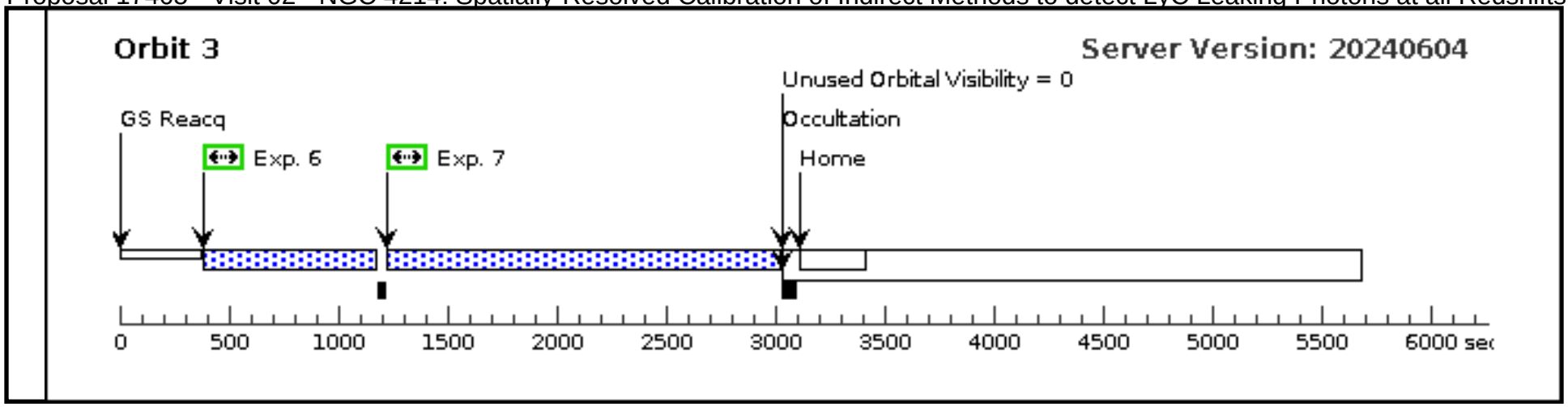
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ngc4214-cluster-5-cos-ta (1890781)	(6) NGC-4214-CLUSTER-5	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				5 Secs (5 Secs) *[==>]*	*[1]*
2	ngc4214-cluster-5-cos-fp3 (1894092)	(6) NGC-4214-CLUSTER-5	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=3670			1752 Secs (1752 Secs) *[==>]*	*[1]*
3	ngc4214-cluster-5-cos-fp4-1 (1894092)	(6) NGC-4214-CLUSTER-5	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=3670			441 Secs (441 Secs) *[==>]*	*[1]*
4	ngc4214-cluster-5-cos-fp4-2 (1894092)	(6) NGC-4214-CLUSTER-5	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=3670			1294 Secs (1294 Secs) *[==>]*	*[2]*
5	ngc4214-cluster-6-cos-fp3-1 (1894100)	(7) NGC-4214-CLUSTER-6	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=3685			1100 Secs (1100 Secs) *[==>]*	*[2]*
6	ngc4214-cluster-6-cos-fp3-2 (1894100)	(7) NGC-4214-CLUSTER-6	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=3685			736 Secs (736 Secs) *[==>]*	*[3]*
7	ngc4214-cluster-6-cos-fp4 (1894100)	(7) NGC-4214-CLUSTER-6	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=3685			1744 Secs (1744 Secs) *[==>]*	*[3]*

Orbit Structure



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5500
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Proposal 17465 - Visit 03 - NGC 4214: Spatially-Resolved Calibration of Indirect Methods to detect LyC Leaking Photons at all Redshifts

Visit	**Proposal 17465, Visit 03, completed** Mon Jun 17 18:01:15 GMT 2024 **Diagnostic Status: Warning** Scientific Instruments: STIS/CCD Special Requirements: (none)
Diagnostics	(Visit 03) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (Visit 03) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (Visit 03) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-4214-CLUSTER-A	Offset from NGC-4214-CLUSTER-5 RA Offset: 0.92 Secs Dec Offset: 49.73 Arcsec		V=15.2+/-0.1 GALEX FUV (AB) = 15.8 +/- 0.1 mag	Offset Position (NGC-4214-CLUSTER-A)
		Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging. *GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|*| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.* *Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.* *Category=STELLAR CLUSTER* *Description=[STAR FORMING REGION]* *Extended=YES*			
(2)	NGC-4214-CLUSTER-1	Offset from NGC-4214-CLUSTER-5 RA Offset: 1.97 Secs Dec Offset: 46.88 Arcsec		V=17.7+/-0.1 GALEX FUV (AB) = 17.5 +/- 0.1 mag	Offset Position (NGC-4214-CLUSTER-1)
		Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging. *GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|*| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.* *Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.* *Category=STELLAR CLUSTER* *Description=[STAR FORMING REGION]* *Extended=YES*			
(3)	NGC-4214-CLUSTER-2	Offset from NGC-4214-CLUSTER-5 RA Offset: 2.11 Secs Dec Offset: 28.12 Arcsec		V=17.1+/-0.1 GALEX FUV (AB) = 16.8 +/- 0.1 mag	Offset Position (NGC-4214-CLUSTER-2)
		Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging. *GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|*| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.* *Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.* *Category=STELLAR CLUSTER* *Description=[STAR FORMING REGION]* *Extended=YES*			
(4)	NGC-4214-CLUSTER-3	Offset from NGC-4214-CLUSTER-5 RA Offset: 0.64 Secs Dec Offset: 1.095 Arcmin		V=17.7+/-0.1 GALEX FUV (AB) = 17.5 +/- 0.1 mag	Offset Position (NGC-4214-CLUSTER-3)
		Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging. *GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|*| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.* *Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.* *Category=STELLAR CLUSTER* *Description=[STAR FORMING REGION]* *Extended=YES*			

(5)	NGC-4214-CLUSTER-4	Offset from NGC-4214-CLUSTER-5 RA Offset: -3.82 Secs Dec Offset: 1.543 Arcmin	V=18.0+/-0.1 GALEX FUV (AB) = 17.7 +/- 0.1 mag	Offset Position (NGC-4214-CLUSTER-4)

Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging.

GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.*

Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.
Category=STELLAR CLUSTER
Description=[STAR FORMING REGION]
Extended=YES

(6)	NGC-4214-CLUSTER-5	RA: 12 15 38.5013 (183.9104221d) Dec: +36 18 45.75 (36.31271d) Equinox: J2000	V=17.7+/-0.1 GALEX FUV (AB) = 18.4 +/- 0.1 mag	Reference Frame: ICRS

Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging.

GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.*

Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.
Category=STELLAR CLUSTER
Description=[STAR FORMING REGION]
Extended=YES

(7)	NGC-4214-CLUSTER-6	Offset from NGC-4214-CLUSTER-5 RA Offset: -3.42 Secs Dec Offset: 1.164 Arcmin	V=17.3+/-0.1 GALEX FUV (AB) = 18.3 +/- 0.1 mag	Offset Position (NGC-4214-CLUSTER-6)

Comments: This object was generated by the targetselector, retrieved from the NED database, and updated based on HST imaging.

GALEX FUV magnitudes in AB system were obtained by using multi-band photometric data and modeling from C20 to integrate the light from all the stars within the COS 2.5|| aperture and estimate reddening and integrated GALEX FUV (AB) magnitudes.*

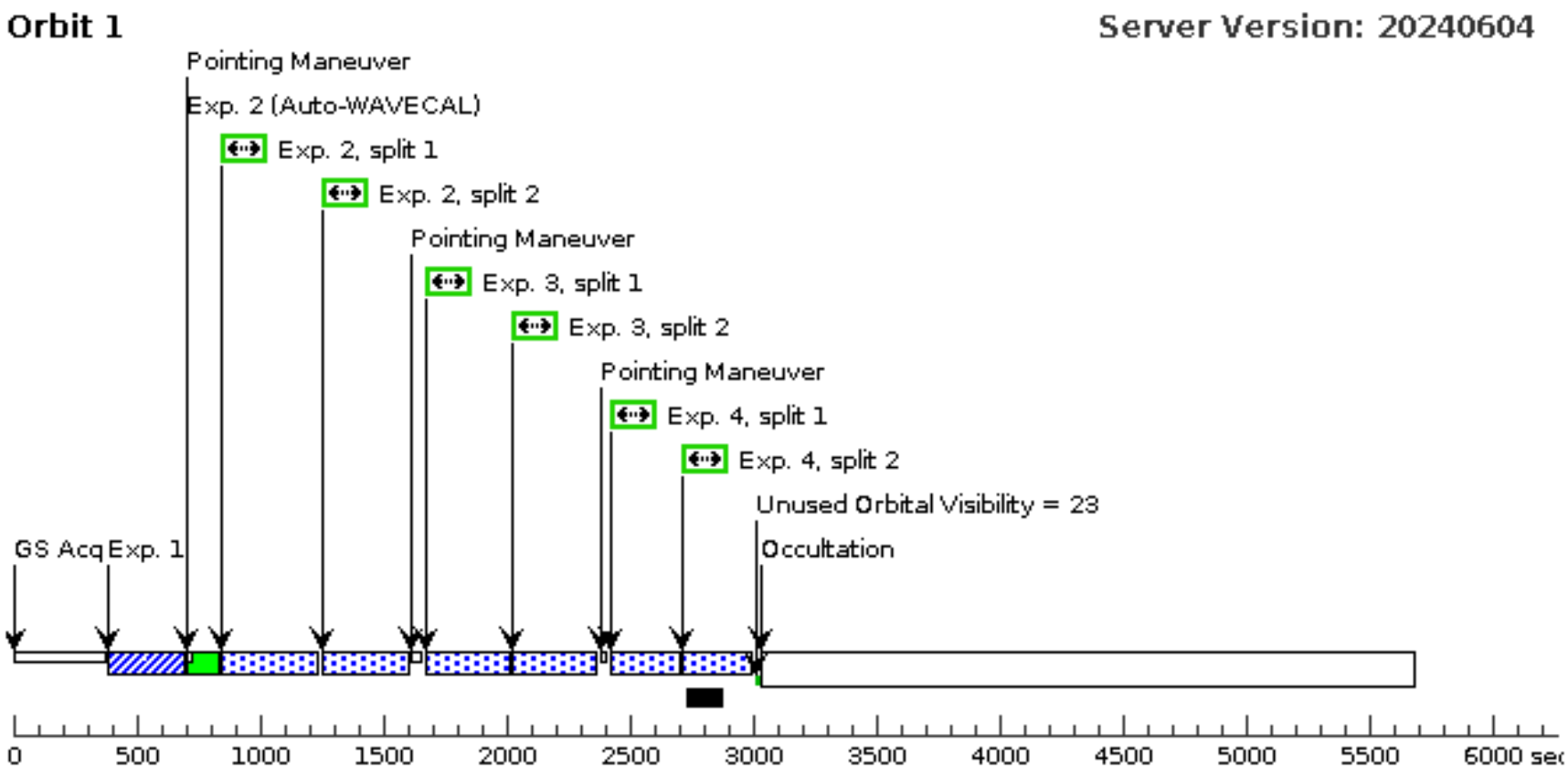
Johnson V magnitudes were obtained from the GALEX FUV magnitudes using PySynphot and same modelling information inserted into the ETC runs.
Category=STELLAR CLUSTER
Description=[STAR FORMING REGION]
Extended=YES

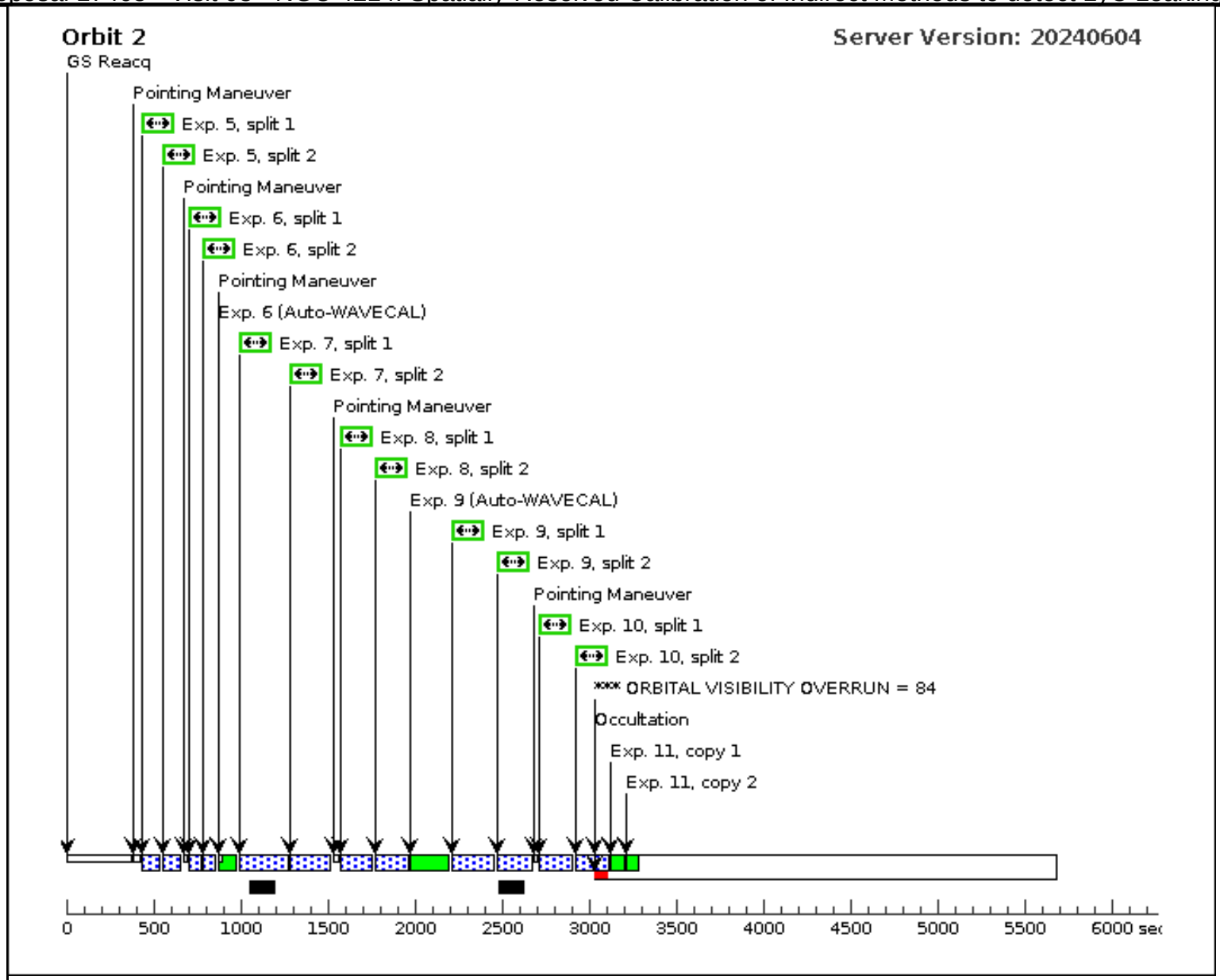
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ngc4214-cluster-5-stis-ta (1894108)	(6) NGC-4214-CLUSTER-5	STIS/CCD, ACQ, F28X50LP	MIRROR				20 Secs (20 Secs) *[==>]*	***[1]***
2	ngc4214-cluster-5-stis-g430l (1728628)	(6) NGC-4214-CLUSTER-5	STIS/CCD, ACCUM, 52X2E1	G430L 4300 A	CR-SPLIT=2			630 Secs (630 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
3	ngc4214-cluster-6-stis-g430l (1728623)	(7) NGC-4214-CLUSTER-6	STIS/CCD, ACCUM, 52X2E1	G430L 4300 A	CR-SPLIT=2			615 Secs (615 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
4	ngc4214-cluster-4-stis-g430l (1728609)	(5) NGC-4214-CLUSTER-4	STIS/CCD, ACCUM, 52X2E1	G430L 4300 A	CR-SPLIT=2			500 Secs (500 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
5	ngc4214-cluster-1-stis-g430l (1728541)	(2) NGC-4214-CLUSTER-1	STIS/CCD, ACCUM, 52X2E1	G430L 4300 A	CR-SPLIT=2			140 Secs (140 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[2]***
6	ngc4214-cluster-A-stis-g430l (1728692)	(1) NGC-4214-CLUSTER-A	STIS/CCD, ACCUM, 52X2E1	G430L 4300 A	CR-SPLIT=2			76 Secs (76 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[2]***
7	ngc4214-cluster-3-stis-g430l (1728600)	(4) NGC-4214-CLUSTER-3	STIS/CCD, ACCUM, 52X2E1	G430L 4300 A	CR-SPLIT=2			400 Secs (400 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[2]***
8	ngc4214-cluster-2-stis-g430l (1728589)	(3) NGC-4214-CLUSTER-2	STIS/CCD, ACCUM, 52X2E1	G430L 4300 A	CR-SPLIT=2			300 Secs (300 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[2]***
9	ngc4214-cluster-2-stis-g750l (1739719)	(3) NGC-4214-CLUSTER-2	STIS/CCD, ACCUM, 52X2E1	G750L 7751 A	CR-SPLIT=2			330 Secs (330 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[2]***
10	ngc4214-cluster-1-stis-g750l (1739718)	(2) NGC-4214-CLUSTER-1	STIS/CCD, ACCUM, 52X2E1	G750L 7751 A	CR-SPLIT=2			310 Secs (310 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[2]***
11		CCDFLAT	STIS/CCD, ACCUM, 52X2	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***
12	ngc4214-cluster-5-stis-g750l (1739722)	(6) NGC-4214-CLUSTER-5	STIS/CCD, ACCUM, 52X2E1	G750L 7751 A	CR-SPLIT=2			1580 Secs (1580 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[3]***
13	ngc4214-cluster-3-stis-g750l (1739720)	(4) NGC-4214-CLUSTER-3	STIS/CCD, ACCUM, 52X2E1	G750L 7751 A	CR-SPLIT=2			600 Secs (600 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[3]***
14	ngc4214-cluster-A-stis-g750l (1739729)	(1) NGC-4214-CLUSTER-A	STIS/CCD, ACCUM, 52X2E1	G750L 7751 A	CR-SPLIT=2			132 Secs (132 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[3]*** ***[4]***

	15	ngc4214-cluster-6-stis-g750l (1739724)	(7) NGC-4214-CLUSTER-6	STIS/CCD, ACCUM, 52X2E1	G750L 7751 A	CR-SPLIT=2	1308 Secs (1308 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[4]***
	16	ngc4214-cluster-4-stis-g750l (1739721)	(5) NGC-4214-CLUSTER-4	STIS/CCD, ACCUM, 52X2E1	G750L 7751 A	CR-SPLIT=2	860 Secs (860 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[4]***
	17		CCDFLAT	STIS/CCD, ACCUM, 52X2	G750L 7751 A		*[==>(Copy 1)]* *[==>(Copy 2)]*	***[4]***

Orbit Structure

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GS Reacq
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Pointing Maneuver
Exp. 6, split 1
Exp. 6, split 2
Pointing Maneuver
Exp. 6 (Auto-WAVECAL)
Exp. 7, split 1
Exp. 7, split 2
Pointing Maneuver
Exp. 8, split 1
Exp. 8, split 2
Exp. 9 (Auto-WAVECAL)
Exp. 9, split 1
Exp. 9, split 2
Pointing Maneuver
Exp. 10, split 1
Exp. 10, split 2
*** ORBITAL VISIBILITY OVERRUN = 84
Occultation
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Exp. 11, copy 2
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3000
3500
4000
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5000
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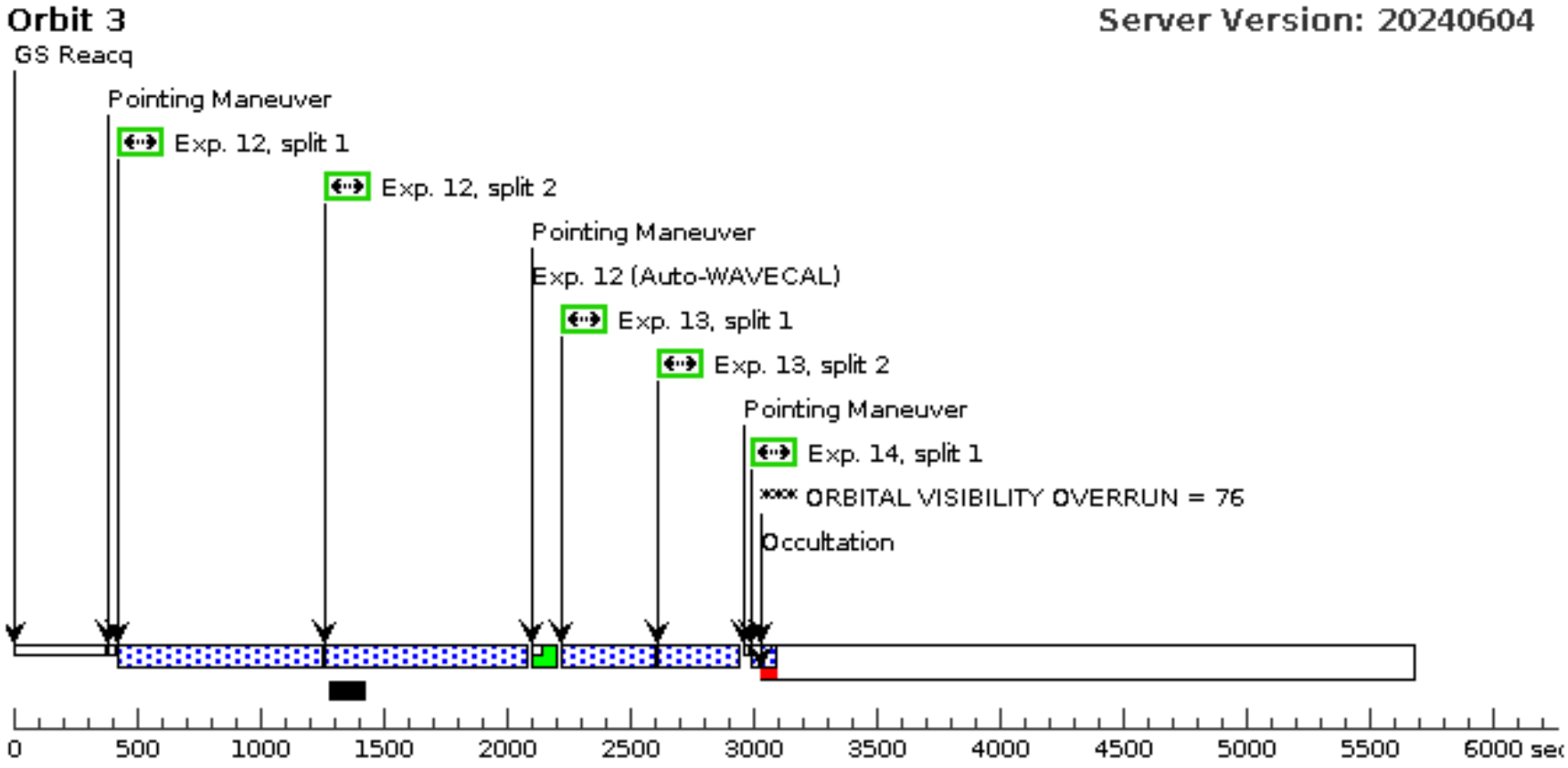
6000 sec


Orbit 3
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GS Reacq
Pointing Maneuver
Exp. 12, split 1
Exp. 12, split 2
Pointing Maneuver
Exp. 12 (Auto-WAVECAL)
Exp. 13, split 1
Exp. 13, split 2
Pointing Maneuver
Exp. 14, split 1
*** ORBITAL VISIBILITY OVERRUN = 76
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4000
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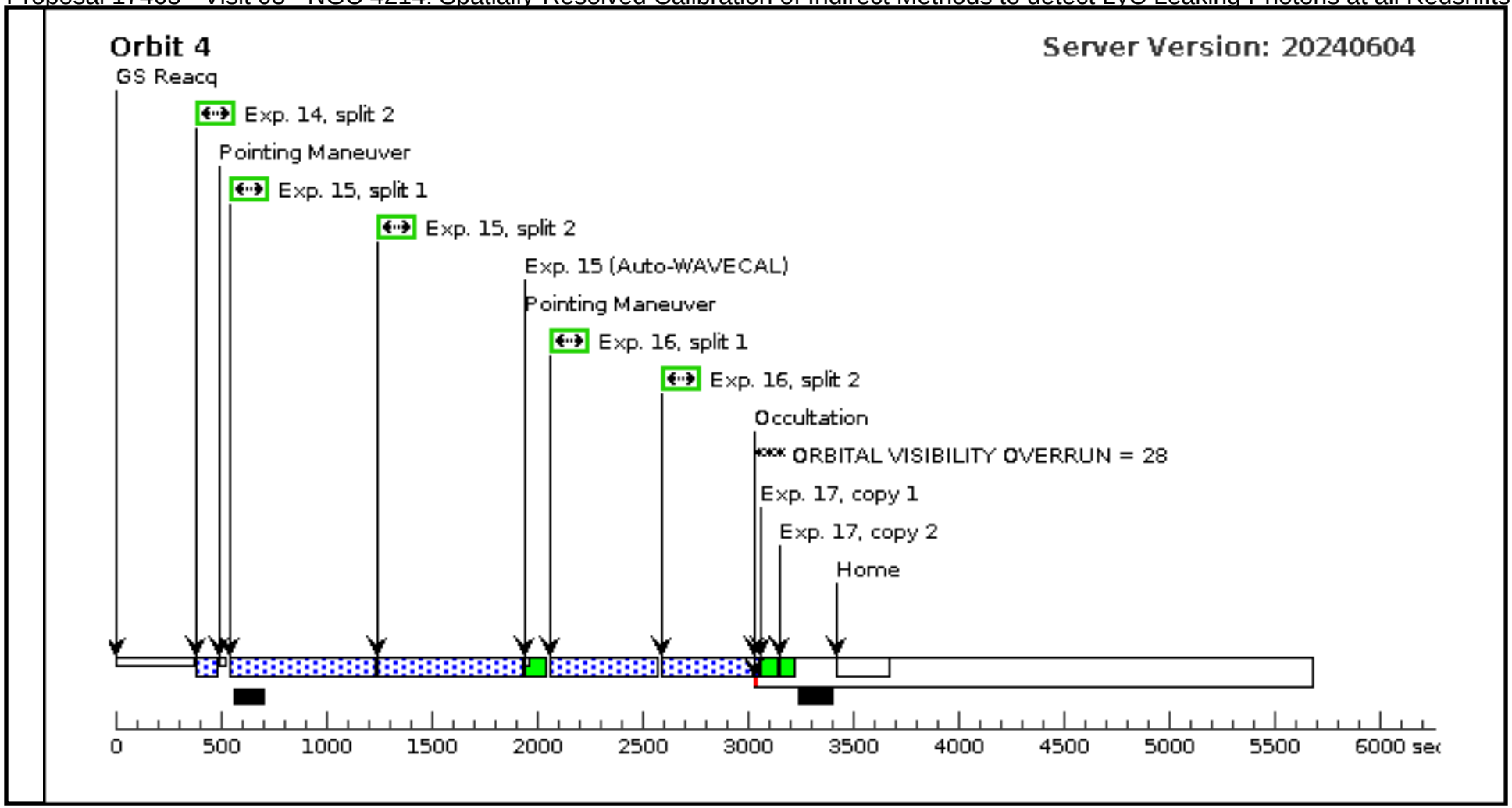
5000
5500
6000 sec


Orbit 4
Server Version: 20240604
GS Reacq
Exp. 14, split 2
Pointing Maneuver
Exp. 15, split 1
Exp. 15, split 2
Exp. 15 (Auto-WAVECAL)
Pointing Maneuver
Exp. 16, split 1
Exp. 16, split 2
Occultation
*** ORBITAL VISIBILITY OVERRUN = 28
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Exp. 17, copy 2
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