14655 - Probing Warm-Hot Gas in the Outskirts of Galaxy Clusters Using Quasar Absorption Lines

Cycle: 24, 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	(1) UVQSJ004038.09-505756.5	COS/FUV	5	29-Jul-2016 14:20:12.0	yes
02	(2) UVQSJ201710.20-451650.0	COS/FUV	5	29-Jul-2016 14:20:15.0	yes
03	(3) UVQSJ210956.11-504209.3	COS/FUV	5	29-Jul-2016 14:20:19.0	yes

15 Total Orbits Used

ABSTRACT

By cross-correlating the recently published sample of clusters by Bleem+15 from the 2500 deg^2 South Pole Telescope Sunyaev-Zel'dovich effect survey and the sample of all-sky UV-bright QSOs by Monroe+16, we have constructed a sample of 9 QSO-cluster pairs in the redshift range

0.1<z<0.7. In all cases the QSOs are in the background and at impact parameters of r ~(1-5)r_500 (r_500 being the radius within which the mean matter density is 500 times the critical density of the universe). This sample gives us a unique opportunity to probe unexplored cluster outskirts. Here we propose to obtain 3 QSO spectra as a pilot program that will probe the warm-hot gas, with log (T/K) = 5-6, via the OVI and NeVIII absorption lines, in the outskirts of 3 clusters at z~0.46.

Recent cosmological hydrodynamical simulations suggest that the outskirts of galaxy clusters beyond r >r_500 are ``cosmic melting pots", where galaxies and groups of galaxies are stripped of their metal-rich gas by tidal forces and ram pressure provided by the cluster atmosphere. This enriches the ICM with heavy elements and dissipates heat, thus establishing the overall thermodynamical and chemical structures of galaxy clusters. These simulations predict that the warm-hot gas atmosphere extends out to the accretion shock located at r ~(4-5)r_500, and that it is too cool to be probed via X-ray emission. Detecting this warm-hot gas in the outskirts of galaxy clusters will not only help account for some of the ``missing baryons", but it will also advance our understanding of the physics of galaxy clusters and their use as cosmological and astrophysical laboratories.

OBSERVING DESCRIPTION

We propose to observe 3 UV-bright QSOs (GALEX FUV ~ 17.4-17.9) using COS/FUV gratings. For each target we will use both G130M and G160M gratings for a continuous FUV spectral coverage. Each target will be observed for 5 orbits, totalling 15 orbits, in order to achieve a spectral S/N of ~10 per resolution element at the relevant wavelengths. For each target we will allocate 3 orbits for the G130M grating and the remaining 2 orbits for the G160M grating. The G130M observations will use two different central wavelength (cen-wave) settings (i.e. cen-wave 1222 and cen-wave 1309). The cen-wave 1222 setting is particularly needed for covering both members of the NeVIII 770, 780 doublet from the targeted clusters (z = 0.45-0.47). For the G160M observations, cen-wave 1600 and cen-wave 1623 settings will be used. For each cen-wave setting, 4 fixed-pattern positions (i.e. FP-POS=1,2,3,4) will be used in order to minimise the detector's gain sag effect.

For source acquisition, we will do an ACQ/SEARCH with SCAN-SIZE=3, with exposure time calculated with the COS ETC (i.e., obtaining S/N=40 using G130M 1309 grating), using the target flux as found from GALEX. The ETC-run IDs are mentioned for each of the exposures. The ACQ/SEARCH step will be followed by the ACQ/PEAKXD and ACQ/PEAKD steps, respectively, for proper centring of the source. Once the source is rightly centered, TIME-TAG mode will be used for the rest of the observations. Since a maximum of 5 orbits can be used in a given visit, we will observe each target in one visit. Thus, a total of 3 visits are required for completing the program.

Visit

Proposal 14655, J0040-5057 (01) Fri Jul 29 18:20:20 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV

Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	UVQSJ004038.09-505756.5	RA: 00 40 38.0550 (10.1585625d) Dec: -50 57 56.55 (-50.96571d) Equinox: J2000	Redshift: 0.608	V=17.43+/-0.04	Reference Frame: ICRS

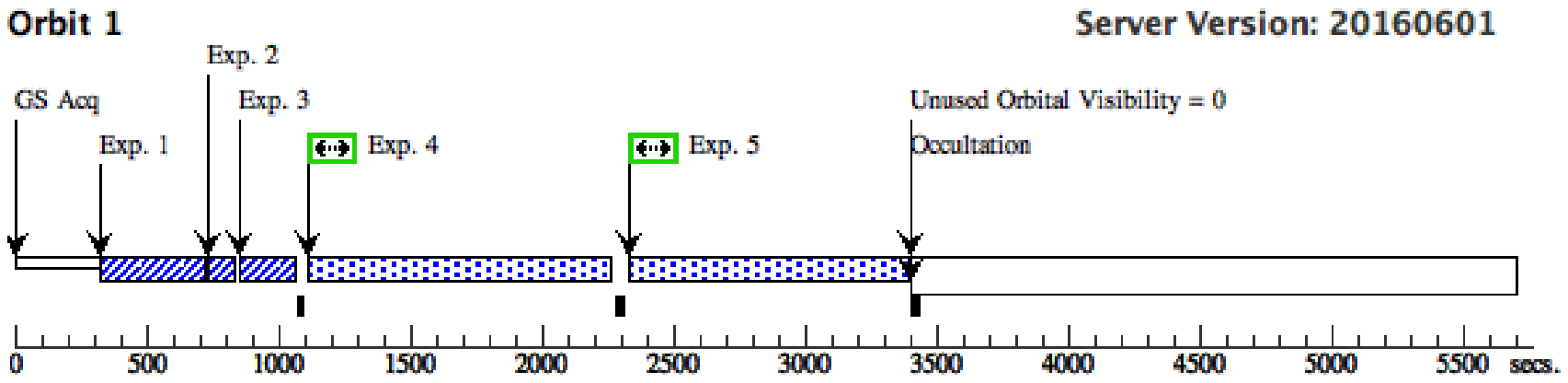
Comments: Extended=NO

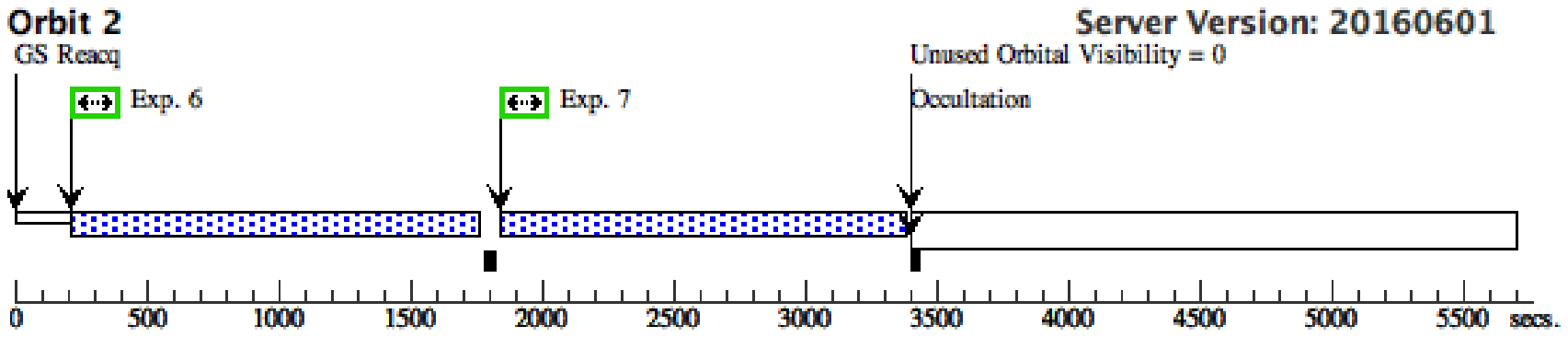
Exposures

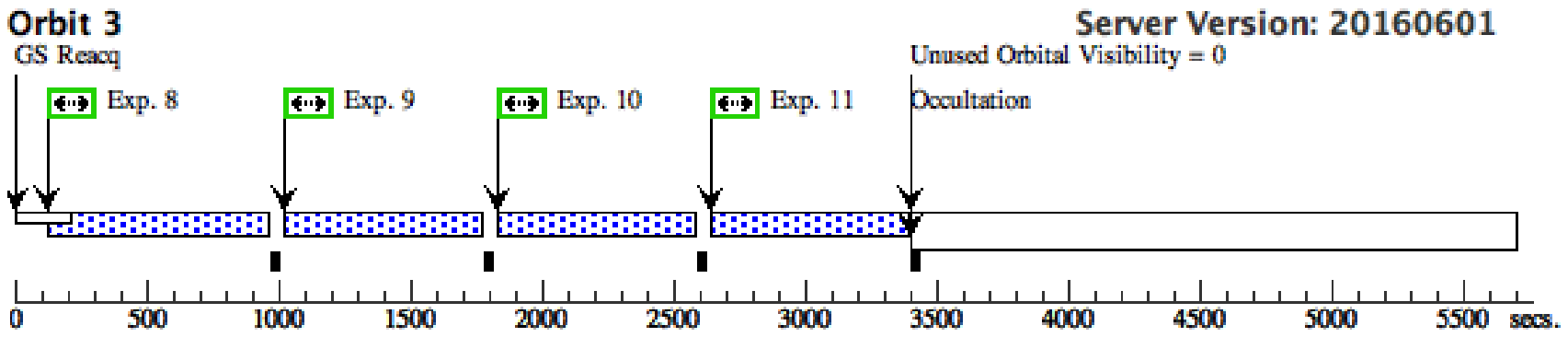
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ-SEARCH (COS.sa.824026)	(1) UVQSJ004038.09-505756.5	COS/FUV, ACQ/SEARCH, PSA	G130M 1309 A	SCAN-SIZE=3; STEP-SIZE=1.767; CENTER=FLUX-WT-FLR			12 Secs (12 Secs) *[==>]*	*[1]*
2	ACQ-PEAKXD (COS.sa.824026)	(1) UVQSJ004038.09-505756.5	COS/FUV, ACQ/PEAKXD, PSA	G130M 1309 A				12 Secs (12 Secs) *[==>]*	*[1]*
3	ACQ-PEAKD (COS.sa.824026)	(1) UVQSJ004038.09-505756.5	COS/FUV, ACQ/PEAKD, PSA	G130M 1309 A	NUM-POS=5; STEP-SIZE=0.9; CENTER=FLUX-WT-FLR			12 Secs (12 Secs) *[==>]*	*[1]*
4	TIME-TAG-G130-1222-FP-1 (COS.sp.824321)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=1; BUFFER-TIME=6742; FLASH=YES			1004 Secs (1004 Secs) *[==>]*	*[1]*
5	TIME-TAG-G130-1222-FP2 (COS.sp.824321)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=2; BUFFER-TIME=6742; FLASH=YES			1005 Secs (1005 Secs) *[==>]*	*[1]*
6	TIME-TAG-G130-1222-FP3 (COS.sp.824321)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=6742; FP-POS=3; FLASH=YES			1501 Secs (1501 Secs) *[==>]*	*[2]*
7	TIME-TAG-G130-1222-FP4 (COS.sp.824321)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=6742; FP-POS=4; FLASH=YES			1492 Secs (1492 Secs) *[==>]*	*[2]*
8	TIME-TAG-G130-1309-FP1 (COS.sp.824317)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3430; FP-POS=1; FLASH=YES			693 Secs (693 Secs) *[==>]*	*[3]*
9	TIME-TAG-G130-1309-FP2 (COS.sp.824317)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3430; FP-POS=2; FLASH=YES			693 Secs (693 Secs) *[==>]*	*[3]*
10	TIME-TAG-G130-1309-FP3 (COS.sp.824317)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3430; FP-POS=3; FLASH=YES			693 Secs (693 Secs) *[==>]*	*[3]*
11	TIME-TAG-G130-1309-FP4 (COS.sp.824317)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3430; FP-POS=4; FLASH=YES			693 Secs (693 Secs) *[==>]*	*[3]*
12	TIME-TAG-G160-1600-FP1 (COS.sp.824323)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=8435; FP-POS=1; FLASH=YES			700 Secs (700 Secs) *[==>]*	*[4]*

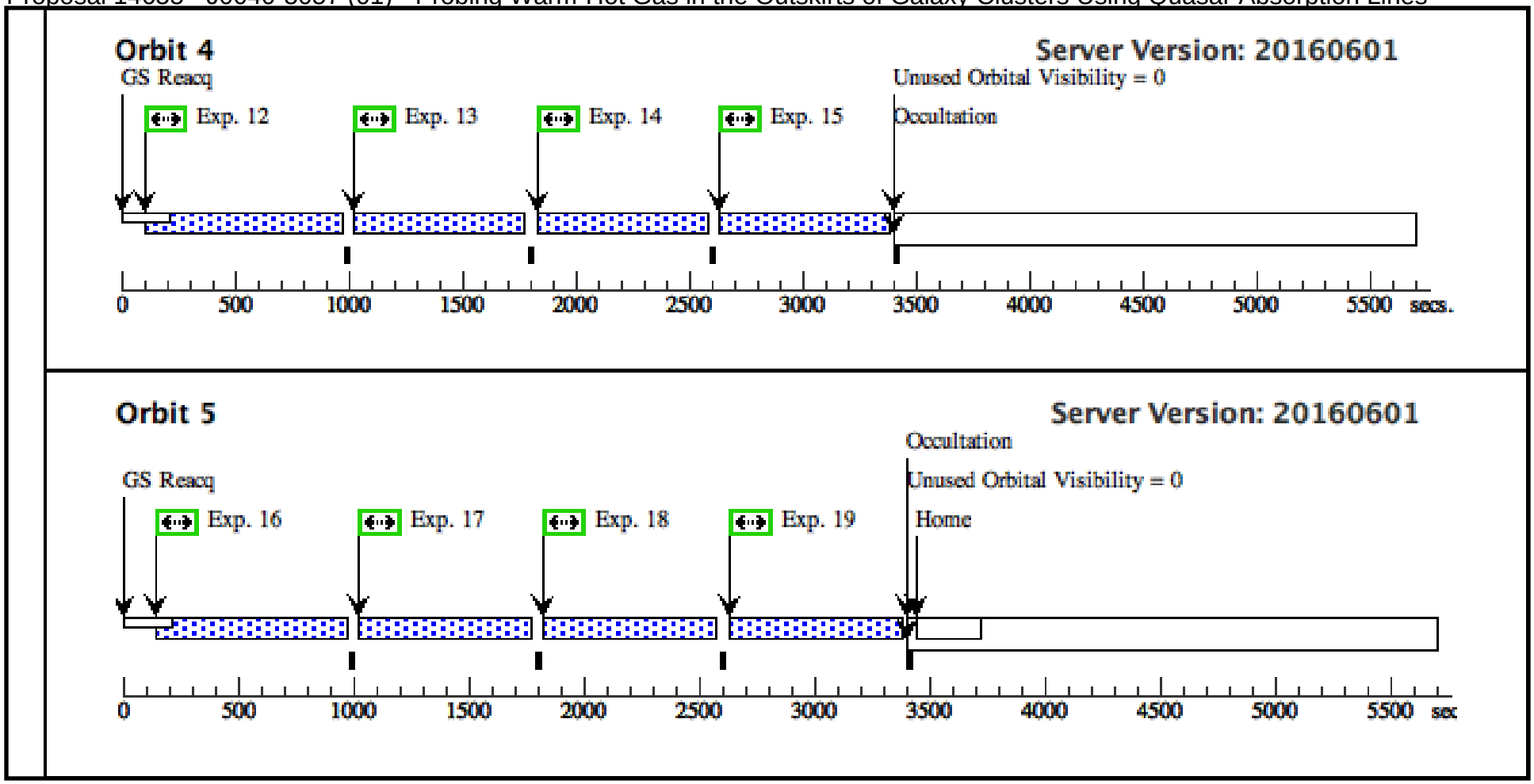
	13	TIME-TAG-G160-1600-FP2 (COS.sp.824323)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=8435; FP-POS=2; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[4]***
	14	TIME-TAG-G160-1600-FP3 (COS.sp.824323)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=8435; FP-POS=3; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[4]***
	15	TIME-TAG-G160-1600-FP4 (COS.sp.824323)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=8435; FP-POS=4; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[4]***
	16	TIME-TAG-G160-1623-FP1 (COS.sp.824325)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=8738; FP-POS=1; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[5]***
	17	TIME-TAG-G160-1623-FP2 (COS.sp.824325)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=8738; FP-POS=2; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[5]***
	18	TIME-TAG-G160-1623-FP3 (COS.sp.824325)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=8738; FP-POS=3; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[5]***
	19	TIME-TAG-G160-1623-FP4 (COS.sp.824325)	(1) UVQSJ004038.09-505756.5	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=8738; FP-POS=4; FLASH=YES	702 Secs (702 Secs) *[==>]*	***[5]***

Orbit Structure





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5500
secs.
Orbit 5
Server Version: 20160601
Occultation
GS Reacq
Unused Orbital Visibility = 0
Exp. 16
Exp. 17
Exp. 18
Exp. 19
Home
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2000
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5000
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sec

Visit

Proposal 14655, J2017-4516 (02) Fri Jul 29 18:20:20 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV

Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	UVQSJ201710.20-451650.0	RA: 20 17 10.1580 (304.2923250d) Dec: -45 16 50.20 (-45.28061d) Equinox: J2000	Redshift: 0.692	V=17.81+/-0.05	Reference Frame: ICRS

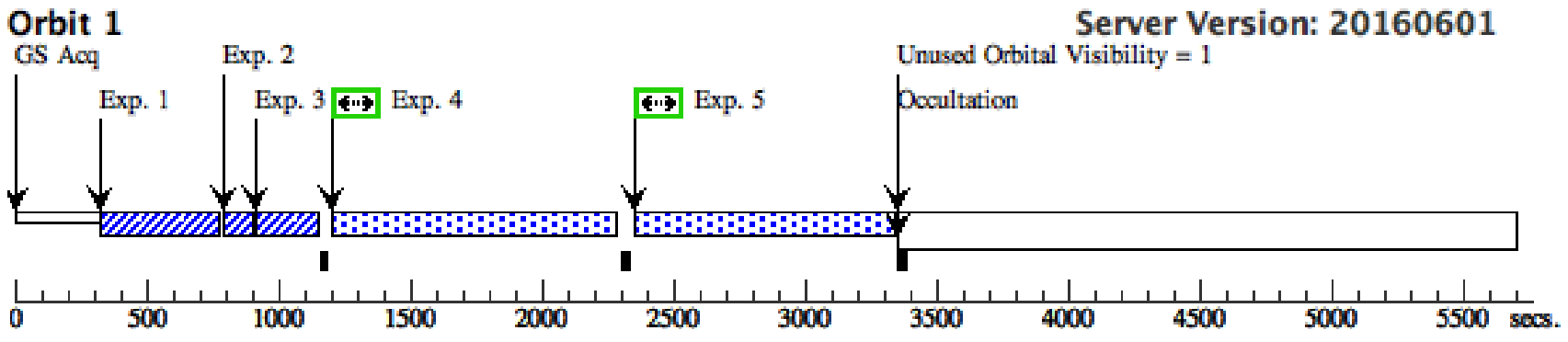
Comments: Extended=NO

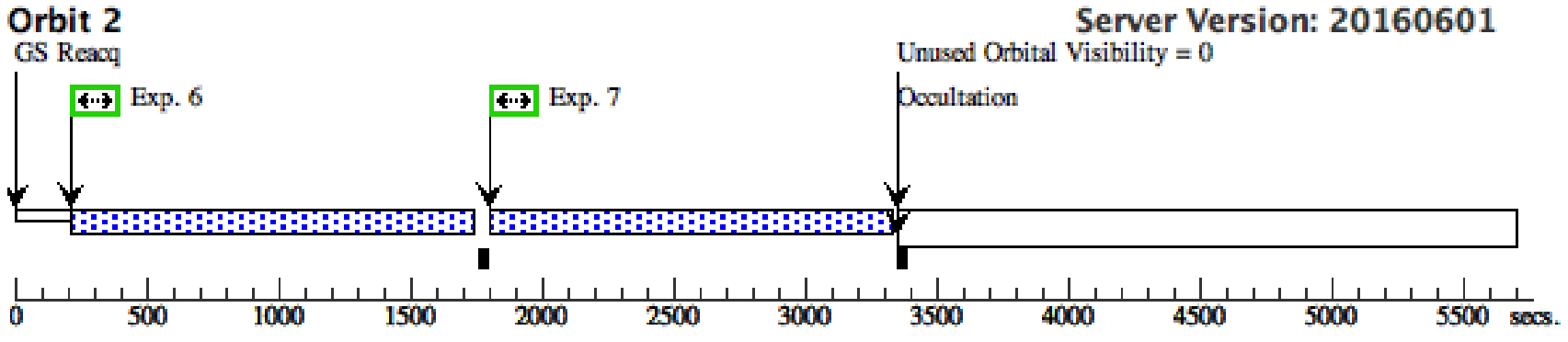
Exposures

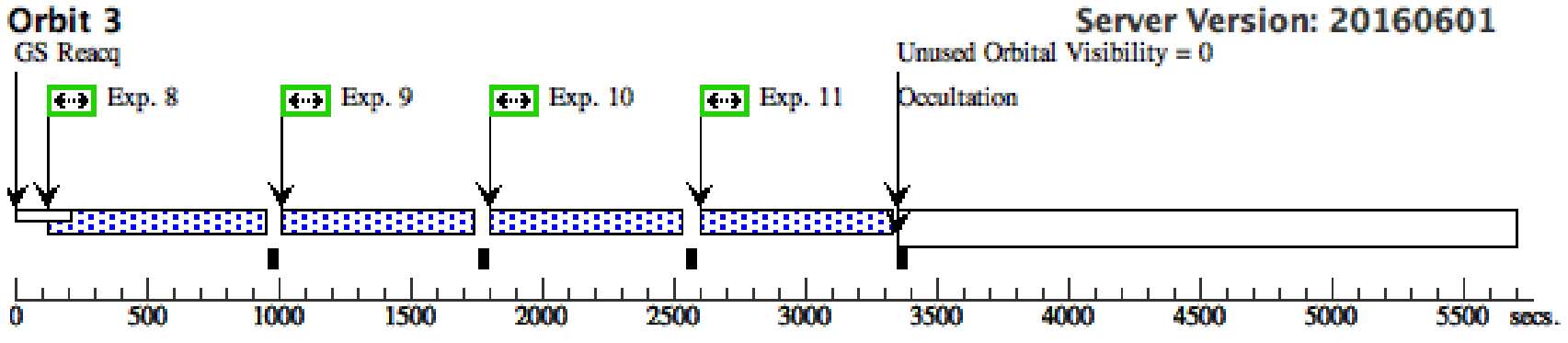
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ-SEARCH (COS.sa.824328)	(2) UVQSJ201710.20-451650.0	COS/FUV, ACQ/SEARCH, PSA	G130M 1309 A	SCAN-SIZE=3; STEP-SIZE=1.767; CENTER=FLUX-WT-FLR			18 Secs (18 Secs) *[==>]*	***[1]***
2	ACQ-PEAKXD (COS.sa.824328)	(2) UVQSJ201710.20-451650.0	COS/FUV, ACQ/PEAKXD, PSA	G130M 1309 A				18 Secs (18 Secs) *[==>]*	***[1]***
3	ACQ-PEAKD (COS.sa.824328)	(2) UVQSJ201710.20-451650.0	COS/FUV, ACQ/PEAKD, PSA	G130M 1309 A	NUM-POS=5; STEP-SIZE=0.9; CENTER=FLUX-WT-FLR			18 Secs (18 Secs) *[==>]*	***[1]***
4	TIME-TAG-G130-1222-FP1 (COS.sp.824342)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=8041; FP-POS=1; FLASH=YES			927 Secs (933 Secs) *[==>933.0 Secs]*	***[1]***
5	TIME-TAG-G130-1222-FP2 (COS.sp.824342)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=8041; FP-POS=2; FLASH=YES			928 Secs (934 Secs) *[==>934.0 Secs]*	***[1]***
6	TIME-TAG-G130-1222-FP3 (COS.sp.824342)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=8041; FP-POS=3; FLASH=YES			1475 Secs (1475 Secs) *[==>]*	***[2]***
7	TIME-TAG-G130-1222-FP4 (COS.sp.824342)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=8041; FP-POS=4; FLASH=YES			1476 Secs (1476 Secs) *[==>]*	***[2]***
8	TIME-TAG-G130-1309-FP1 (COS.sp.824344)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3821; FP-POS=1; FLASH=YES			680 Secs (680 Secs) *[==>]*	***[3]***
9	TIME-TAG-G130-1309-FP2 (COS.sp.824344)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3821; FP-POS=2; FLASH=YES			680 Secs (680 Secs) *[==>]*	***[3]***
10	TIME-TAG-G130-1309-FP3 (COS.sp.824344)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3821; FP-POS=3; FLASH=YES			680 Secs (680 Secs) *[==>]*	***[3]***
11	TIME-TAG-G130-1309-FP4 (COS.sp.824344)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3821; FP-POS=4; FLASH=YES			681 Secs (681 Secs) *[==>]*	***[3]***
12	TIME-TAG-G160-1600-FP1 (COS.sp.824345)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=9960; FP-POS=1; FLASH=YES			688 Secs (688 Secs) *[==>]*	***[4]***

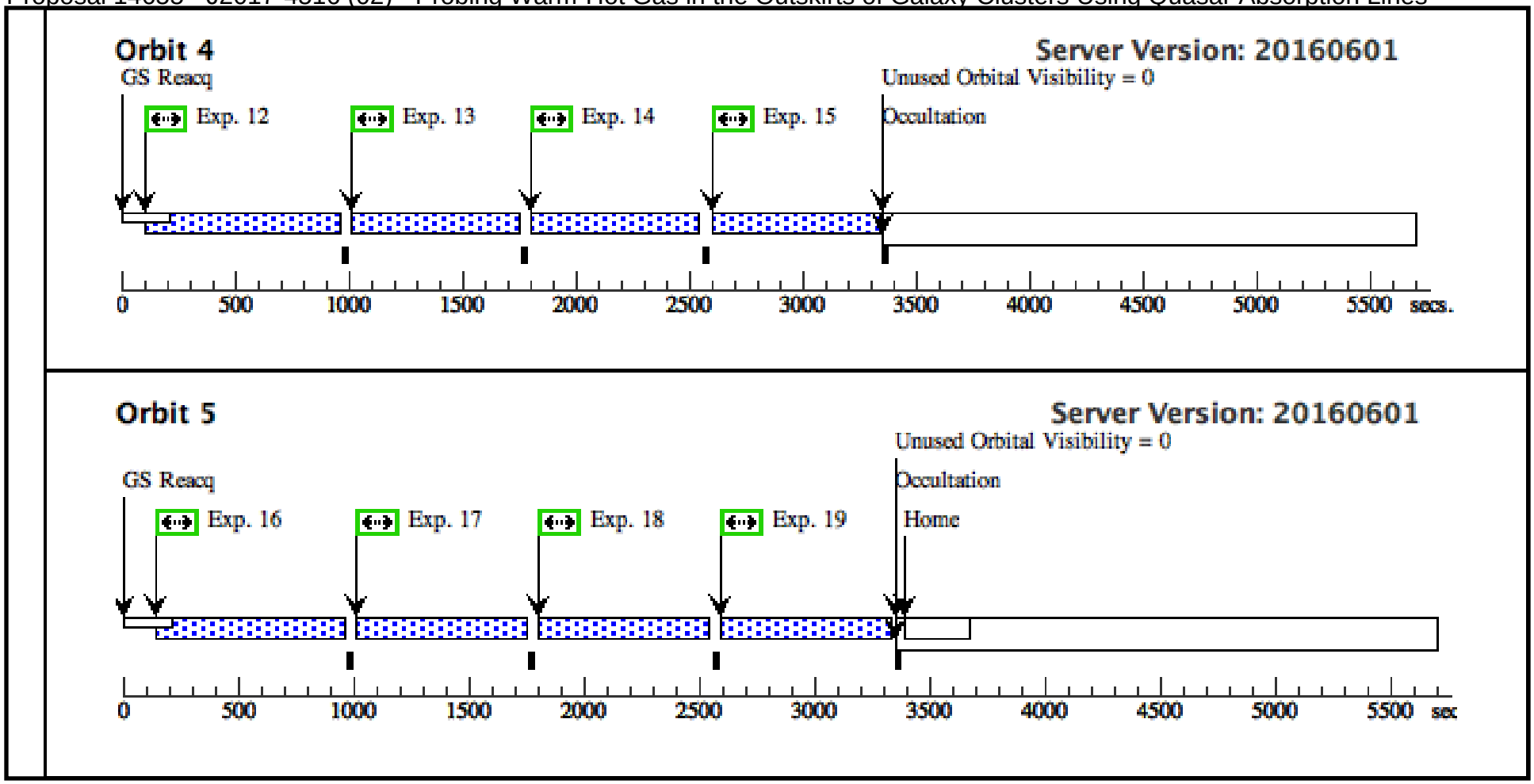
	13	TIME-TAG-G160-1600-FP2 (COS.sp.824345)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=9960; FP-POS=2; FLASH=YES	688 Secs (688 Secs) *[==>]*	***[4]***
	14	TIME-TAG-G160-1600-FP3 (COS.sp.824345)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=9960; FP-POS=3; FLASH=YES	688 Secs (688 Secs) *[==>]*	***[4]***
	15	TIME-TAG-G160-1600-FP4 (COS.sp.824345)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=9960; FP-POS=4; FLASH=YES	685 Secs (685 Secs) *[==>]*	***[4]***
	16	TIME-TAG-G160-1623-FP1 (COS.sp.824346)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=10256; FP-POS=1; FLASH=YES	688 Secs (688 Secs) *[==>]*	***[5]***
	17	TIME-TAG-G160-1623-FP2 (COS.sp.824346)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=10256; FP-POS=2; FLASH=YES	688 Secs (688 Secs) *[==>]*	***[5]***
	18	TIME-TAG-G160-1623-FP3 (COS.sp.824346)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=10256; FP-POS=3; FLASH=YES	688 Secs (688 Secs) *[==>]*	***[5]***
	19	TIME-TAG-G160-1623-FP4 (COS.sp.824346)	(2) UVQSJ201710.20-451650.0	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=10256; FP-POS=4; FLASH=YES	687 Secs (687 Secs) *[==>]*	***[5]***

Orbit Structure





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secs.
Orbit 5
Server Version: 20160601
Unused Orbital Visibility = 0
GS Reacq
Occultation
Exp. 16
Exp. 17
Exp. 18
Exp. 19
Home
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4000
4500
5000
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sec

Visit

Proposal 14655, J2109-5042 (03) Fri Jul 29 18:20:21 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV

Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	UVQSJ210956.11-504209.3	RA: 21 09 56.0720 (317.4836333d) Dec: -50 42 9.87 (-50.70274d) Equinox: J2000	Redshift: 1.262	V=17.93+/-0.04	Reference Frame: ICRS

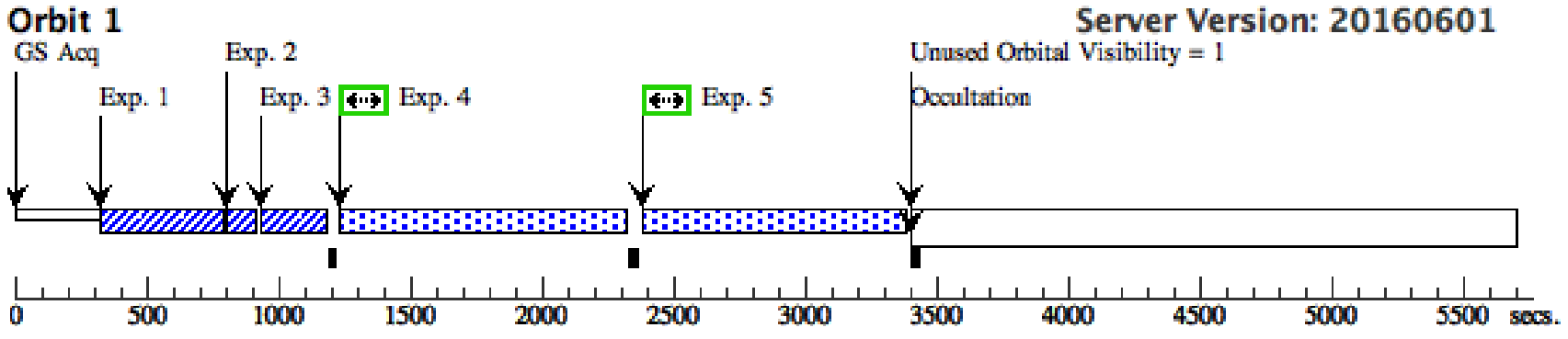
Comments: Extended=NO

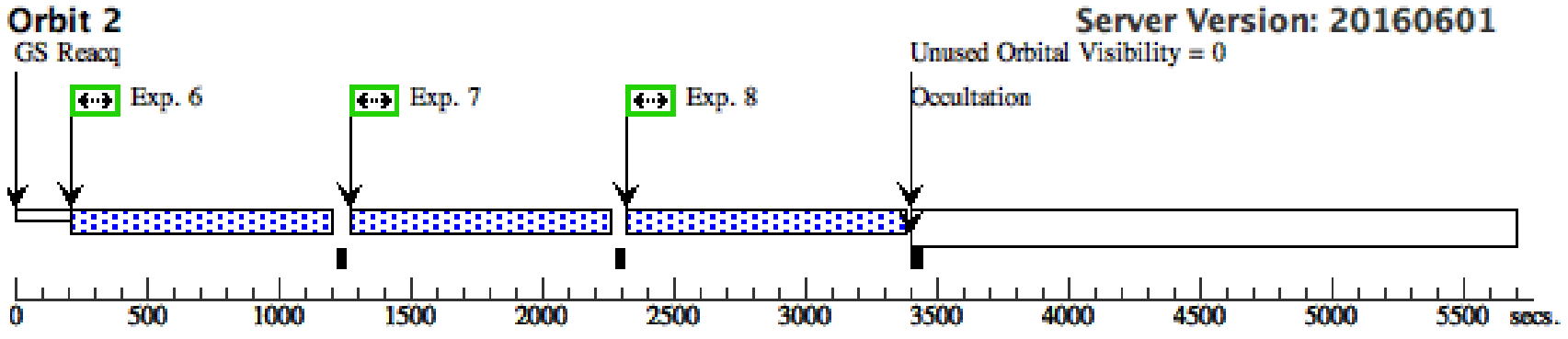
Exposures

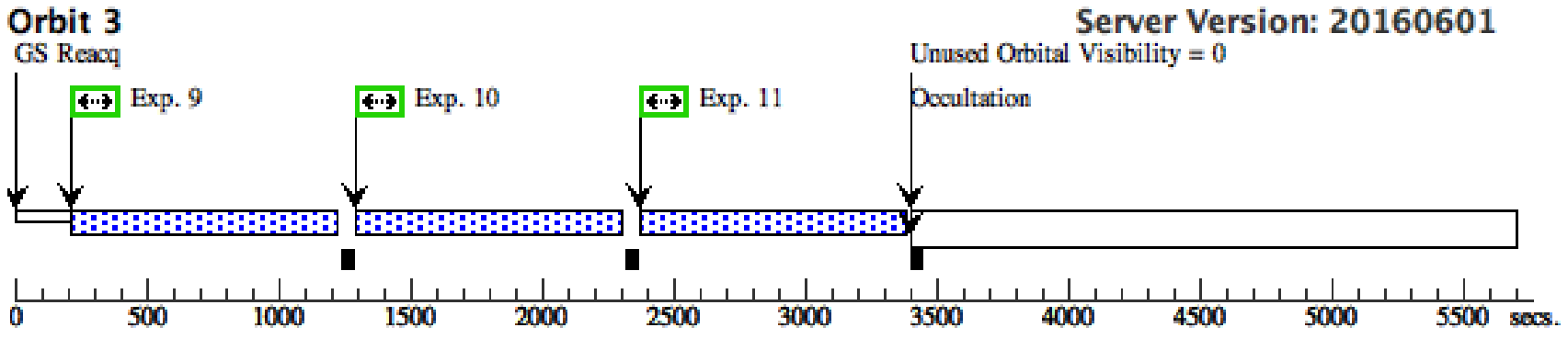
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ-SEARCH (COS.sa.824400)	(3) UVQSJ210956.11-504209.3	COS/FUV, ACQ/SEARCH, PSA	G130M 1309 A	SCAN-SIZE=3; STEP-SIZE=1.767; CENTER=FLUX-WT-FLR			20 Secs (20 Secs) *[==>]*	*[1]*
2	ACQ-PEAKXD (COS.sa.824400)	(3) UVQSJ210956.11-504209.3	COS/FUV, ACQ/PEAKXD, PSA	G130M 1309 A				20 Secs (20 Secs) *[==>]*	*[1]*
3	ACQ-PEAKD (COS.sa.824400)	(3) UVQSJ210956.11-504209.3	COS/FUV, ACQ/PEAKD, PSA	G130M 1309 A	NUM-POS=5; STEP-SIZE=0.9; CENTER=FLUX-WT-FLR			20 Secs (20 Secs) *[==>]*	*[1]*
4	TIME-TAG-G130-1222-FP1 (COS.sp.824409)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=8448; FP-POS=1; FLASH=YES			938 Secs (939 Secs) *[==>939.0 Secs]*	*[1]*
5	TIME-TAG-G130-1222-FP2 (COS.sp.824409)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=8448; FP-POS=2; FLASH=YES			948 Secs (949 Secs) *[==>949.0 Secs]*	*[1]*
6	TIME-TAG-G130-1222-FP3 (COS.sp.824409)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=8448; FP-POS=3; FLASH=YES			940 Secs (940 Secs) *[==>]*	*[2]*
7	TIME-TAG-G130-1222-FP4 (COS.sp.824409)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G130M 1222 A	BUFFER-TIME=8448; FP-POS=4; FLASH=YES			940 Secs (940 Secs) *[==>]*	*[2]*
8	TIME-TAG-G130-1309-FP1 (COS.sp.824410)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3932; FP-POS=1; FLASH=YES			910 Secs (910 Secs) *[==>]*	*[2]*
9	TIME-TAG-G130-1309-FP2 (COS.sp.824410)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3932; FP-POS=2; FLASH=YES			956 Secs (956 Secs) *[==>]*	*[3]*
10	TIME-TAG-G130-1309-FP3 (COS.sp.824410)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3932; FP-POS=3; FLASH=YES			956 Secs (956 Secs) *[==>]*	*[3]*
11	TIME-TAG-G130-1309-FP4 (COS.sp.824410)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=3932; FP-POS=4; FLASH=YES			957 Secs (957 Secs) *[==>]*	*[3]*
12	TIME-TAG-G160-1600-FP1 (COS.sp.824406)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=10432; FP-POS=1; FLASH=YES			700 Secs (700 Secs) *[==>]*	*[4]*

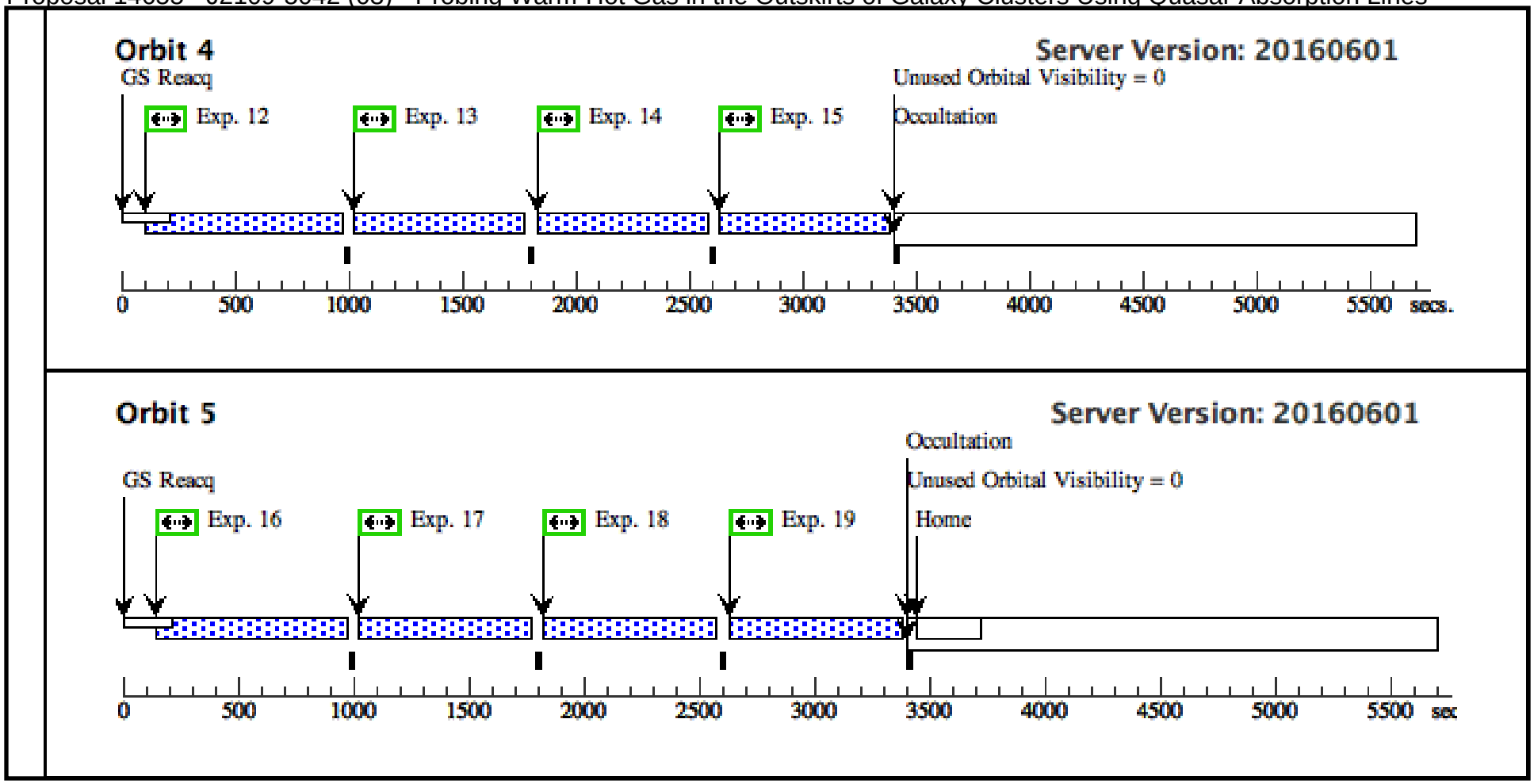
	13	TIME-TAG-G160-1600-FP2 (COS.sp.824406)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=10432; FP-POS=2; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[4]***
	14	TIME-TAG-G160-1600-FP3 (COS.sp.824406)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=10432; FP-POS=3; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[4]***
	15	TIME-TAG-G160-1600-FP4 (COS.sp.824406)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=10432; FP-POS=4; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[4]***
	16	TIME-TAG-G160-1623-FP1 (COS.sp.824407)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=10721; FP-POS=1; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[5]***
	17	TIME-TAG-G160-1623-FP2 (COS.sp.824407)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=10721; FP-POS=2; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[5]***
	18	TIME-TAG-G160-1623-FP3 (COS.sp.824407)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=10721; FP-POS=3; FLASH=YES	700 Secs (700 Secs) *[==>]*	***[5]***
	19	TIME-TAG-G160-1623-FP4 (COS.sp.824407)	(3) UVQSJ210956.11-504209.3	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=10721; FP-POS=4; FLASH=YES	702 Secs (702 Secs) *[==>]*	***[5]***

Orbit Structure





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2000
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3000
3500
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4500
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secs.
Orbit 5
Server Version: 20160601
Occultation
GS Reacq
Unused Orbital Visibility = 0
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Exp. 17
Exp. 18
Exp. 19
Home
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sec