15253 - The nature of ultra-massive lens galaxies

Cycle: 25, Proposal Category: GO

(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) CSWA15	WFC3/UVIS	1	20-Jul-2017 00:00:13.0	yes
02	(1) CSWA15	WFC3/IR	1	20-Jul-2017 00:00:14.0	yes
03	(2) CSWA31	WFC3/UVIS	1	20-Jul-2017 00:00:15.0	yes
04	(2) CSWA31	WFC3/IR	1	20-Jul-2017 00:00:16.0	yes
05	(3) CSWA63	WFC3/UVIS	1	20-Jul-2017 00:00:16.0	yes
06	(3) CSWA63	WFC3/IR	1	20-Jul-2017 00:00:17.0	yes
07	(4) CSWA64	WFC3/UVIS	1	20-Jul-2017 00:00:18.0	yes
08	(4) CSWA64	WFC3/IR	1	20-Jul-2017 00:00:18.0	yes

8 Total Orbits Used

ABSTRACT

During the past decade, strong gravitational lensing analyses have contributed tremendously to the characterization of the inner properties of massive early-type galaxies, beyond the local Universe. Here we intend to extend studies of this kind to the most massive lens galaxies known to date, well outside the mass limits investigated by previous lensing surveys. This will allow us to probe the physics of the likely descendants of the most violent episodes of star formation and of the compact massive galaxies at high redshift.

We propose WFC3 imaging (F438W and F160W) of four extremely massive early-type lens galaxies at z ~ 0.5, in order to put them into context with the evolutionary trends of ellipticals as a function of mass and redshift. These systems were discovered in the SDSS and show one single main lens galaxy with a stellar mass above 1.5x10^12 Msun and large Einstein radii. Our high-resolution spectroscopic follow-up with VLT/X-shooter provides secure lens and source redshifts, between 0.3 and 0.7 and between 1.5 and 2.5, respectively, and confirm extreme stellar velocity dispersions >~400 km/s for the lenses. The excellent angular resolution of the proposed WFC3 imaging - not achievable from the ground - is the remaining indispensable piece of information to :

(1) Resolve the lens structural parameters and obtain robust measurements of their stellar mass distributions,

(2) Model the amount and distribution of the lens total masses and measure their M/L ratios and stellar IMF with joint strong lensing and stellar dynamics analyses,

(3) Enhance our on-going lens models through the most accurate positions and morphologies of the blue multiply-imaged sources.

OBSERVING DESCRIPTION

This program aims to image the 4 ultra-massive lens galaxies in the target list. Each target is imaged in 2 filters (WFC3/UVIS F438W and WFC3/IR F160W), with 1 orbit per filter. All the orbits can be run independently of each other.

One of the targets, CSWA31, falls about 50 arcsec away from a bright star with H~11. Since the primary targets (the lens and background lensed galaxies) are much fainter, we want to avoid the diffraction spikes of the bright star. Table 7.4 in P2PI specifies that to place the target along rows in UVIS, the orientation is target_angle +221 deg. For the IR aperture the angle is target_angle +224 deg. CSWA31 has a position angle of ~170 deg, which leads to the following orientation angles (with a +/-10 deg flexibility):

IR ORIENT: 170 +224 = 394 (= 34). Allow a +/-90 and-180 ORIENT and a +/-10 deg range.

Allowed ORIENT ranges: 24 - 44 , 114 - 134, 204 - 224, 294 - 314

UVIS ORIENT: 170 +221 = 391 (=31). Allow a +90 and -180 ORIENT and a +/-10 deg range.

Allowed ORIENT ranges: 21 - 41, 111 -131, 201 - 221, 291-311

Visit

Proposal 15253, CSWA15-UVIS-F438W (01) Thu Jul 20 04:00:19 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1)

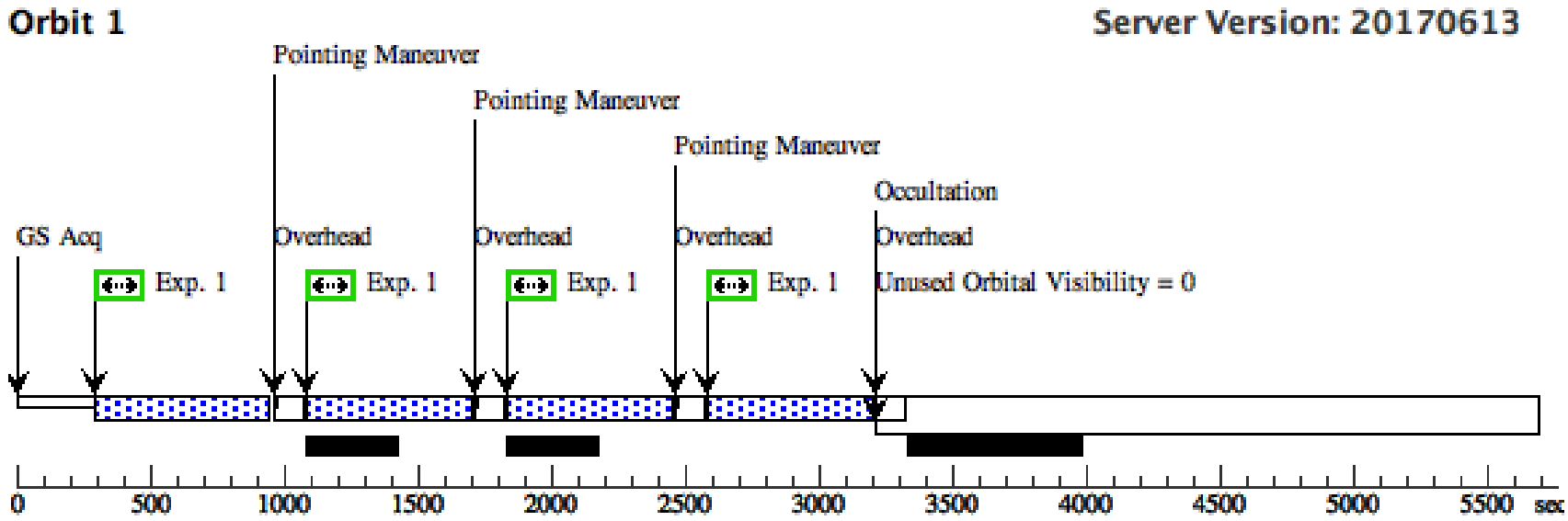
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	CSWA15	RA: 01 00 49.1900 (15.2049583d) Dec: +18 18 27.70 (18.30769d) Equinox: J2000	Redshift: 0.581	V=(?) g-band AB-mag from the SDSS: 21.48 +/- 0.12	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CSWA15-UVIS-F438W	(1) CSWA15	WFC3/UVIS, ACCUM, UVIS	F438W	FLASH=6		Pattern 1, Exps 1-1 in CSWA15-UVIS-F438W (01) (1)	200 Secs (2476 Secs) *[==>619.0 Secs (Pattern 1)]* *[==>619.0 Secs (Pattern 2)]* *[==>619.0 Secs (Pattern 3)]* *[==>619.0 Secs (Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15253, CSWA15-IR-F160W (02) Thu Jul 20 04:00:19 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1)

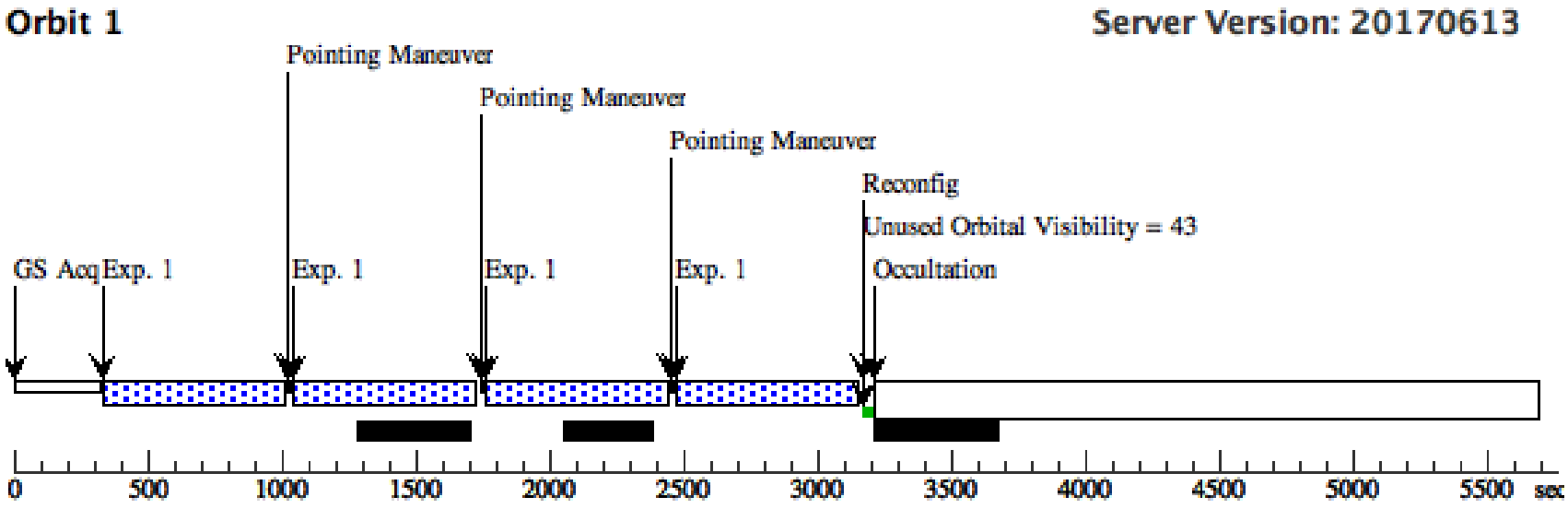
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	CSWA15	RA: 01 00 49.1900 (15.2049583d) Dec: +18 18 27.70 (18.30769d) Equinox: J2000	Redshift: 0.581	V=(?) g-band AB-mag from the SDSS: 21.48 +/- 0.12	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CSWA15-IR-F160W	(1) CSWA15	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 2, Exps 1-1 in CSWA15-IR-F160W (02) (2)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15253, CSWA31-UVIS-F438W (03) Thu Jul 20 04:00:19 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 21D TO 41 D; ORIENT 111D TO 131 D; ORIENT 201D TO 221 D; ORIENT 291D TO 311 D

Patterns

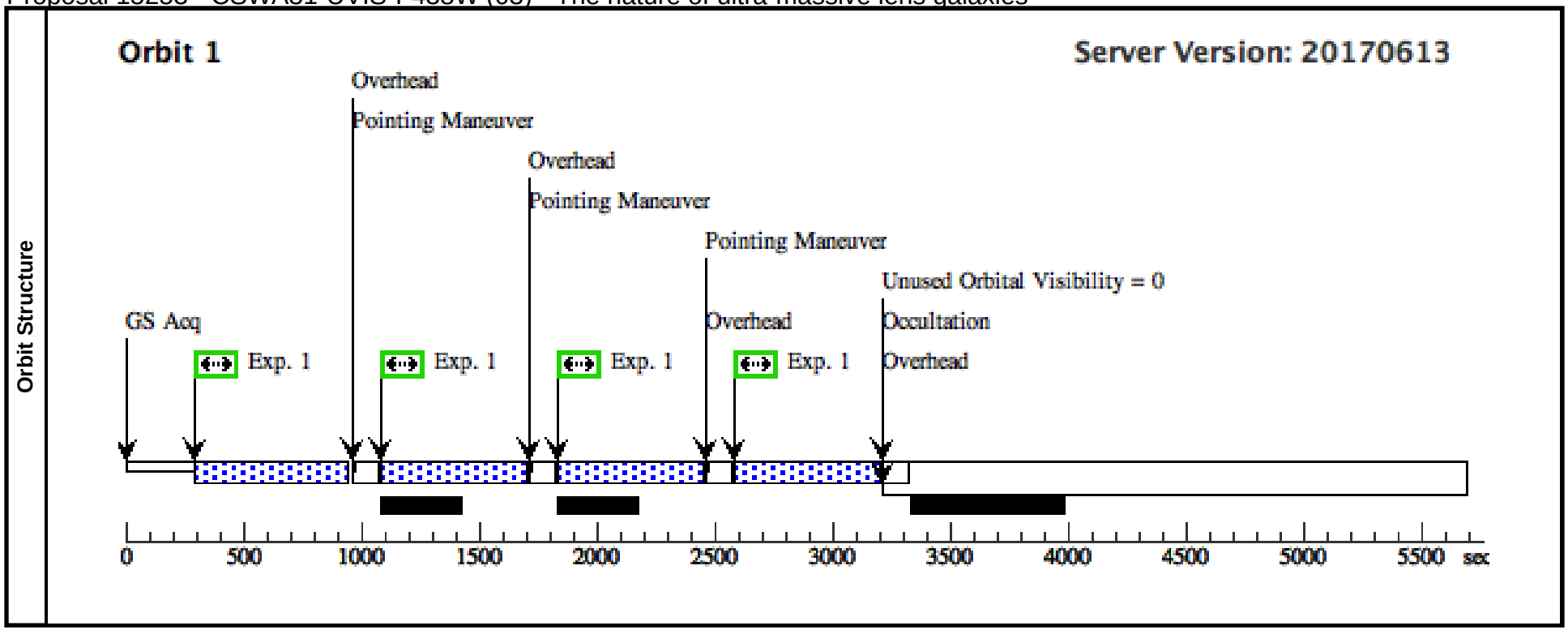
#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	CSWA31	RA: 09 21 25.7400 (140.3572500d) Dec: +18 10 17.30 (18.17147d) Equinox: J2000	Redshift: 0.683	V=(?) g-band AB-mag from the SDSS: 22.52 +/- 0.44	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CSWA31-UVIS-F438W	(2) CSWA31	WFC3/UVIS, ACCUM, UVIS	F438W	FLASH=6		Pattern 1, Exps 1-1 in CSWA31-UVIS-F438W (03) (1)	200 Secs (2476 Secs) *[==>619.0 Secs (Pattern 1)]* *[==>619.0 Secs (Pattern 2)]* *[==>619.0 Secs (Pattern 3)]* *[==>619.0 Secs (Pattern 4)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20170613
Overhead
Pointing Maneuver
Overhead
Pointing Maneuver
Pointing Maneuver
Unused Orbital Visibility = 0
GS Acq
Exp. 1
Exp. 1
Exp. 1
Overhead
Exp. 1
Occultation
Overhead
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 15253, CSWA31-IR-F160W (04) Thu Jul 20 04:00:19 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 24D TO 44 D; ORIENT 114D TO 134 D; ORIENT 204D TO 224 D; ORIENT 294D TO 314 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1)

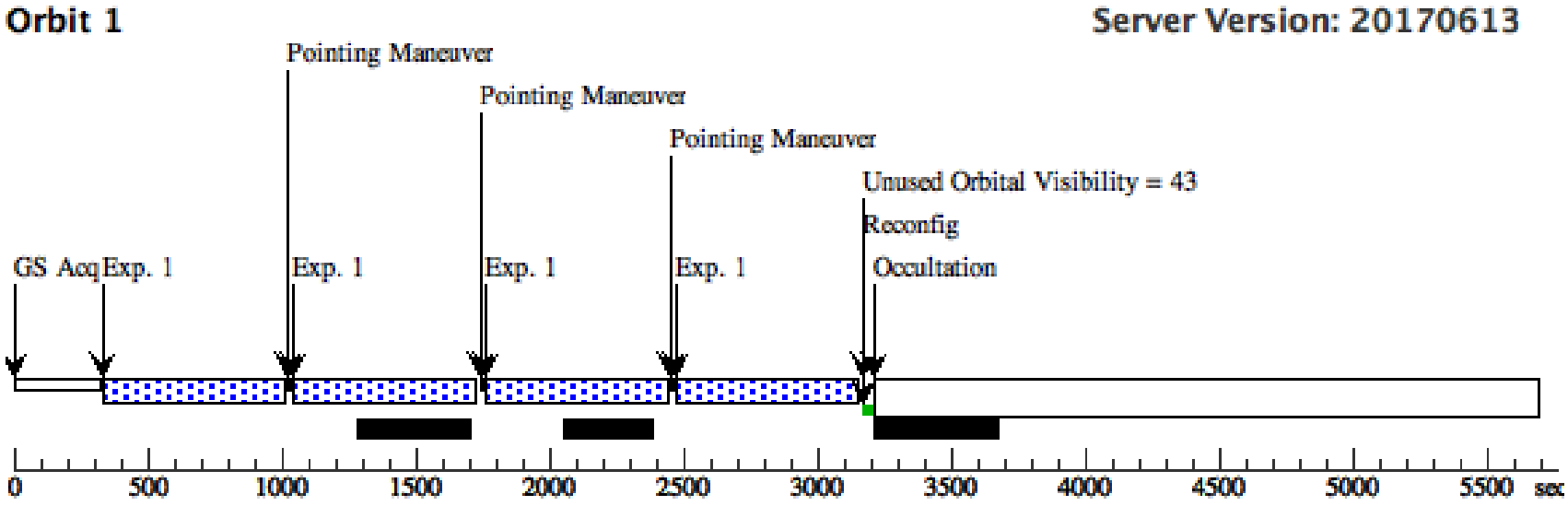
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	CSWA31	RA: 09 21 25.7400 (140.3572500d) Dec: +18 10 17.30 (18.17147d) Equinox: J2000	Redshift: 0.683	V=(?) g-band AB-mag from the SDSS: 22.52 +/- 0.44	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CSWA31-IR-F160W	(2) CSWA31	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 2, Exps 1-1 in CSWA31-IR-F160W (04) (2)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15253, CSWA63-UVIS-F438W (05) Thu Jul 20 04:00:20 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

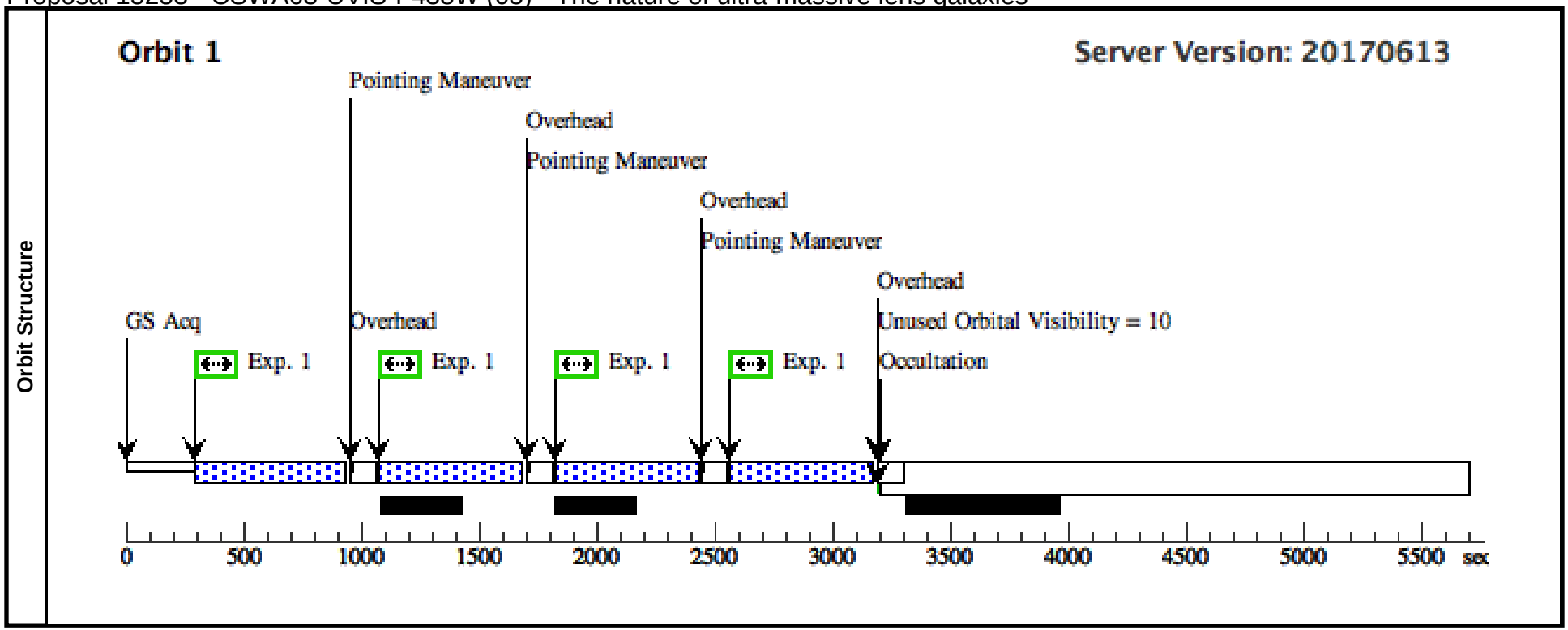
#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	CSWA63	RA: 21 58 43.6700 (329.6819583d) Dec: +02 57 30.20 (2.95839d) Equinox: J2000	Redshift: 0.287	V=(?) g-band AB-mag from the SDSS: 19.38 +/- 0.02	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CSWA63-UVIS-F438W	(3) CSWA63	WFC3/UVIS, ACCUM, UVIS	F438W	FLASH=7		Pattern 1, Exps 1-1 in CSWA63-UVIS-F438W (05) (1)	200 Secs (2452 Secs) *[==>613.0 Secs (Pattern 1)]* *[==>613.0 Secs (Pattern 2)]* *[==>613.0 Secs (Pattern 3)]* *[==>613.0 Secs (Pattern 4)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20170613
Pointing Maneuver
Overhead
Pointing Maneuver
Overhead
Pointing Maneuver
Overhead
GS Acq
Overhead
Unused Orbital Visibility = 10
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 15253, CSWA63-IR-F160W (06) Thu Jul 20 04:00:20 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1)

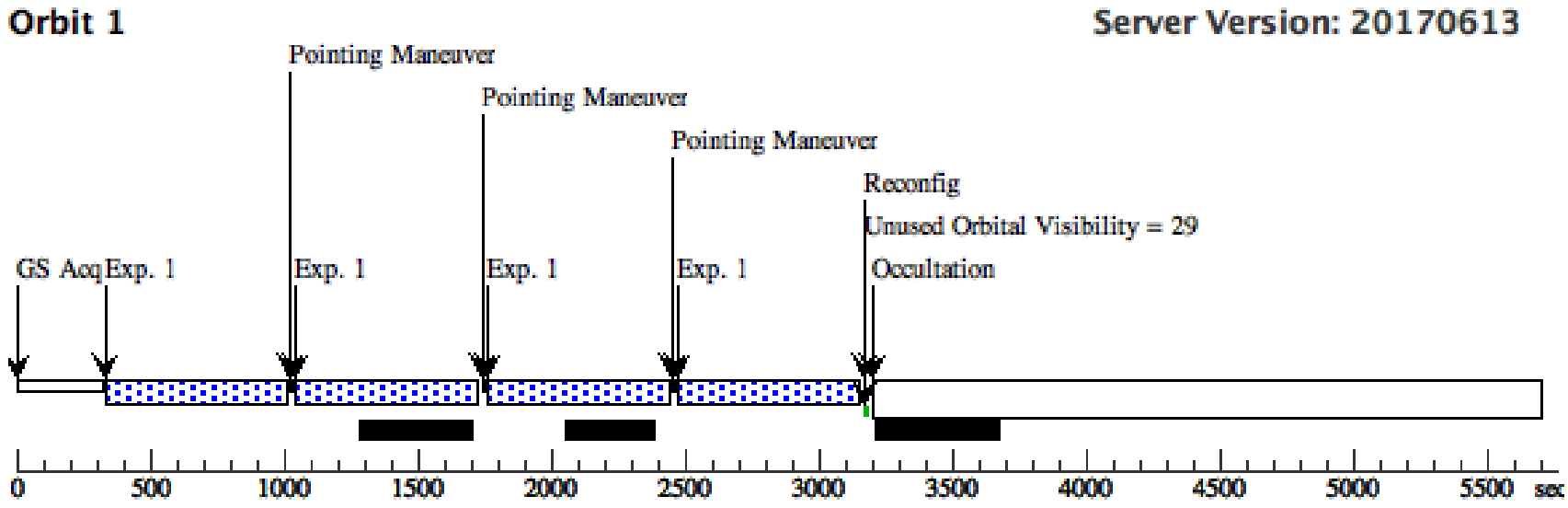
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	CSWA63	RA: 21 58 43.6700 (329.6819583d) Dec: +02 57 30.20 (2.95839d) Equinox: J2000	Redshift: 0.287	V=(?) g-band AB-mag from the SDSS: 19.38 +/- 0.02	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CSWA63-IR-F160W	(3) CSWA63	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 2, Exps 1-1 in CSWA63-IR-F160W (06) (2)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15253, CSWA64-UVIS-F438W (07) Thu Jul 20 04:00:20 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1)

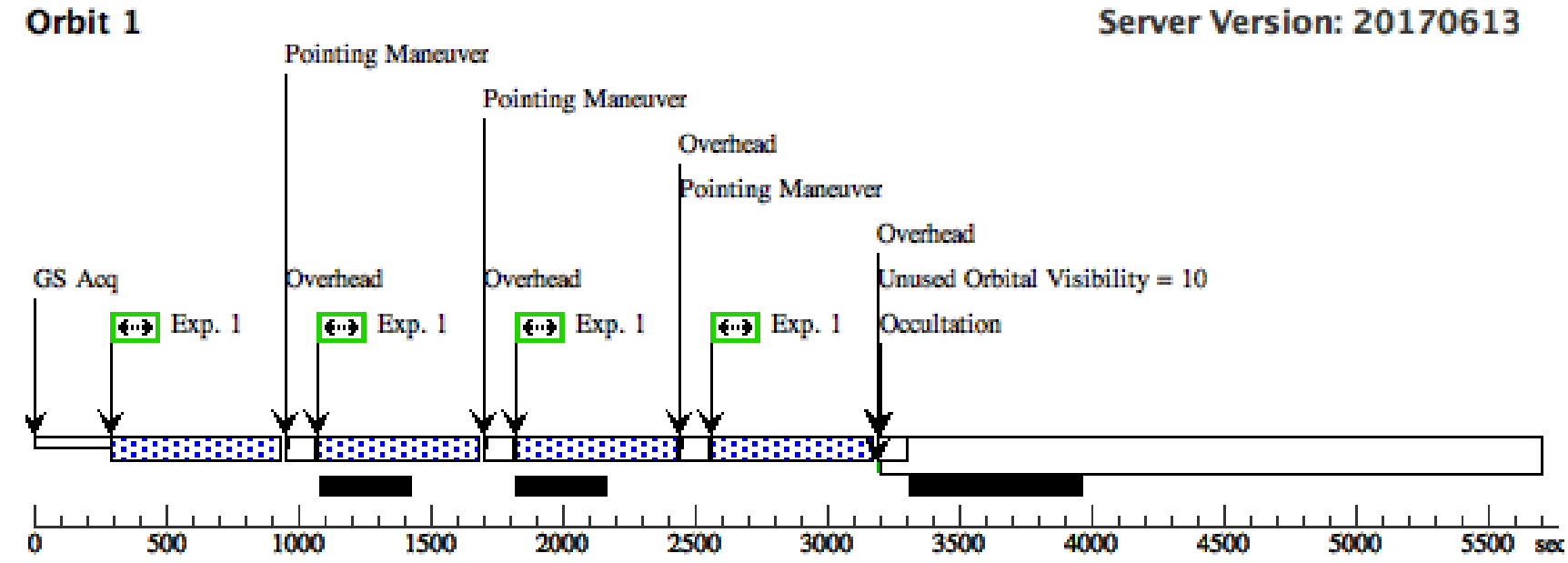
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	CSWA64	RA: 02 32 49.8600 (38.2077500d) Dec: -03 23 26.02 (-3.39056d) Equinox: J2000	Redshift: 0.453	V=(?) g-band AB-mag from the SDSS: 19.70 +/- 0.04	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CSWA64-UVIS-F438W	(4) CSWA64	WFC3/UVIS, ACCUM, UVIS	F438W	FLASH=7		Pattern 1, Exps 1-1 in CSWA64-UVIS-F438W (07) (1)	200 Secs (2452 Secs) *[==>613.0 Secs (Pattern 1)]* *[==>613.0 Secs (Pattern 2)]* *[==>613.0 Secs (Pattern 3)]* *[==>613.0 Secs (Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15253, CSWA64-IR-F160W (08) Thu Jul 20 04:00:20 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	CSWA64	RA: 02 32 49.8600 (38.2077500d) Dec: -03 23 26.02 (-3.39056d) Equinox: J2000	Redshift: 0.453	V=(?) g-band AB-mag from the SDSS: 19.70 +/- 0.04	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CSWA64-IR-F160W	(4) CSWA64	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 2, Exps 1-1 in CSWA64-IR-F160W (08) (2)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure