17431 - A Remarkable Wide Separation Lensed Quasar

Cycle: 31, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*
Prof. Michael D. Gladders (PI) (Contact)	**University of Chicago**
Prof. Keren Sharon (CoI)	University of Michigan
Dr. Haakon Dahle (CoI) (ESA Member)	University of Oslo

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) COOLJ1153	ACS/WFC	2	03-Sep-2024 13:00:16.0	yes
02	(1) COOLJ1153	ACS/WFC	2	03-Sep-2024 13:00:17.0	yes
03	(1) COOLJ1153	ACS/WFC	2	03-Sep-2024 13:00:17.0	yes
04	(1) COOLJ1153	WFC3/IR	2	03-Sep-2024 13:00:19.0	yes

8 Total Orbits Used

ABSTRACT

We propose broadband HST imaging of a newly discovered wide-separation lensed quasar (WSLQ). There are only 7 WSLQs in the literature from 20 years of searching, and this new WSLQ is spectacular. The lensing cluster at z=0.42 is the most massive WSLQ lens found to date and is lensing a low luminosity quasar at z=1.524; initial ground-based imaging and spectroscopy shows four other obvious multiply-imaged sources, one of which is a second multiply-imaged AGN (obscured in this case, but readily apparent from emmission lines) at z=1.939. Both lensed AGN have multiply-imaged companion galaxies, and the foreground quasar shows numerous MgII absorbers - one of which matches one of the spectroscopically confirmed companions. Remarkably, the host galaxy of the quasar is also evident in ground-based NIR imaging, and so HST resolution will allow for

a probe of quasar feedback in the host from color gradients. The scientific possibilities with this new discovery are manifold; we propose here a modest 8-orbit imaging program to acquire the data necessary to immediately build a robust strong lens model, which will rapidly unlock the potential of this new
discovery.

OBSERVING DESCRIPTION

This is a 5-band imaging program of a newly discoverd wide-separation lensed quasar. The 8 allocated orbits are split into three 2-orbit visits for observations in 3 ACS filters, plus one 2-orbit visits for observations in 2 WFC3-IR filters.

The ACS observations have the strong-lensing center centered on Chip 1, which keeps the entire region of high magnification (in which objects of interest appear) within one chip regardless of roll angle. Across two orbits (for each filter) we use a total of 8 exposures, with a 2-point ACS-WFC-DITHER-LINE to span the chip gap between orbits, and a 4-point ACS-WFC-DITHER-BOX within each orbit to sample the PSF and reject outliers of various sorts. No post-flash is neede in any of these observations.

The WFC3-IR observations are centered on the single dececter, sufficient to map the whole region of high lensing magnification regardless of roll angle. Each filter gets 6 integrations; we've choseen to do a manual postarg for each orbit that replicates the WFC3-IR-DITHER-BLOB pattern in order to have maximum control over NSAMP/SAMPSEQ value and optimize orbit packing. This is coupled with the WFC3-IR-DITHER-LINE-3PT pattern within each filter in each orbit for PSF sampling.

Visit

Proposal 17431, Visit 01, implementation Tue Sep 03 17:00:19 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.034 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.29 Angle Between Sides= Center Pattern=false	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.2637 Line Spacing=0.1856	Coordinate Frame=POS-TARG Pattern Orientation=20.7 Angle Between Sides=69.02 Center Pattern=false	(1)

Fixed Targets

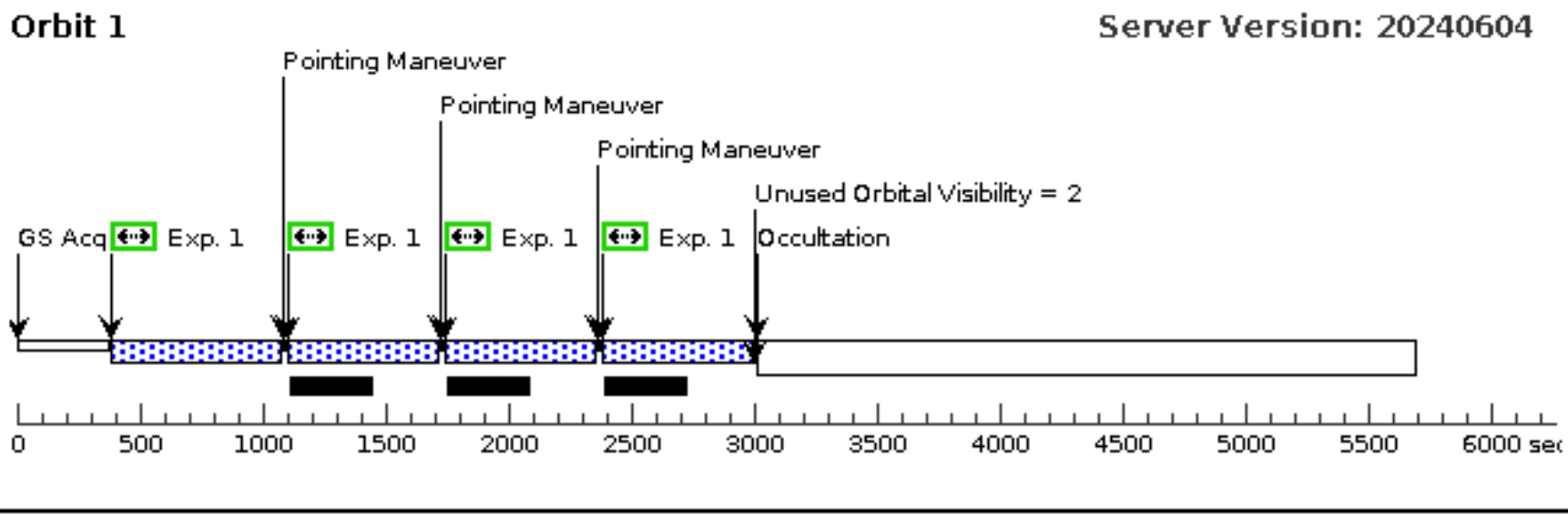
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	COOLJ1153	RA: 11 53 19.2500 (178.3302083d) Dec: +07 55 57.20 (7.93256d) Equinox: J2000		V=21	Reference Frame: ICRS

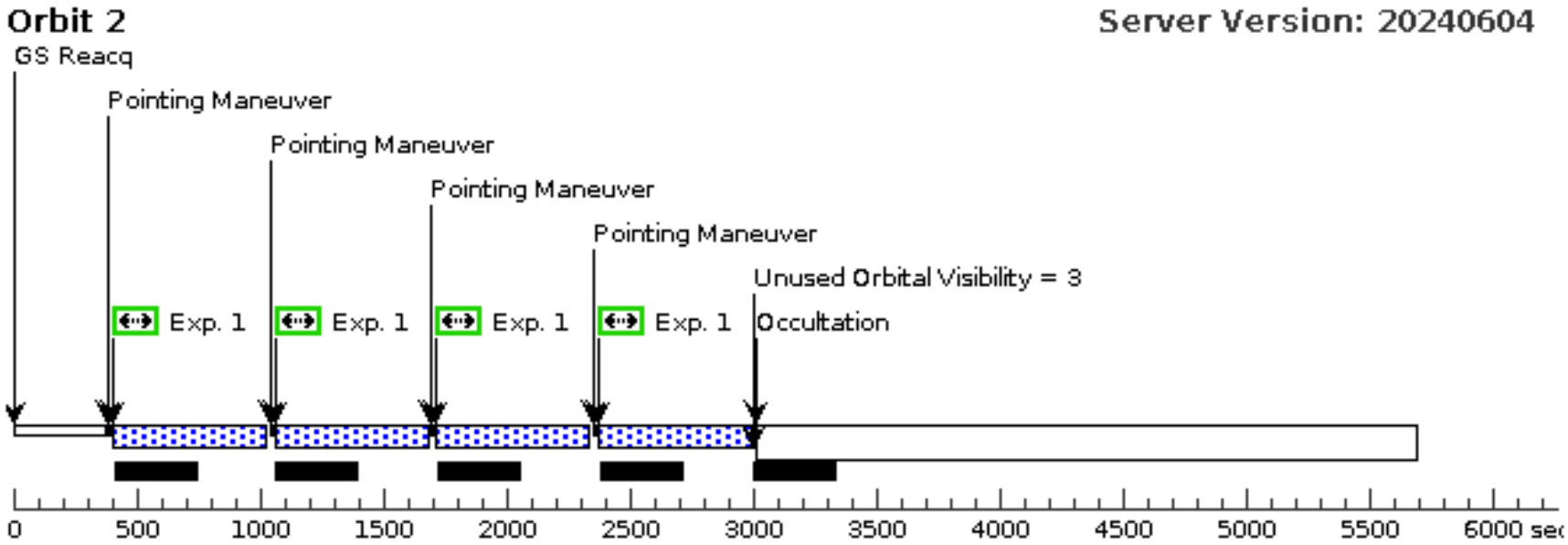
Comments:
Category=CLUSTER OF GALAXIES
Description=[GRAVITATIONAL LENS, RICH CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) COOLJ1153	ACS/WFC, ACCUM, WFC1	F475W			Pattern 1, Exps 1-1 in Visit 01 (1)	500 Secs (3925 Secs)	
								[==>483.0 Secs (Pattern 1,1)] *[==>484.0 Secs (Pattern 1,2)]* *[==>484.0 Secs (Pattern 1,3)]* *[==>483.0 Secs (Pattern 1,4)]*	***[1]***
								[==>498.0 Secs (Pattern 2,1)] *[==>498.0 Secs (Pattern 2,2)]* *[==>498.0 Secs (Pattern 2,3)]* *[==>497.0 Secs (Pattern 2,4)]*	***[2]***

Orbit Structure





Visit

Proposal 17431, Visit 02, implementation Tue Sep 03 17:00:19 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.034 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.29 Angle Between Sides= Center Pattern=false	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.2637 Line Spacing=0.1856	Coordinate Frame=POS-TARG Pattern Orientation=20.7 Angle Between Sides=69.02 Center Pattern=false	(1)

Fixed Targets

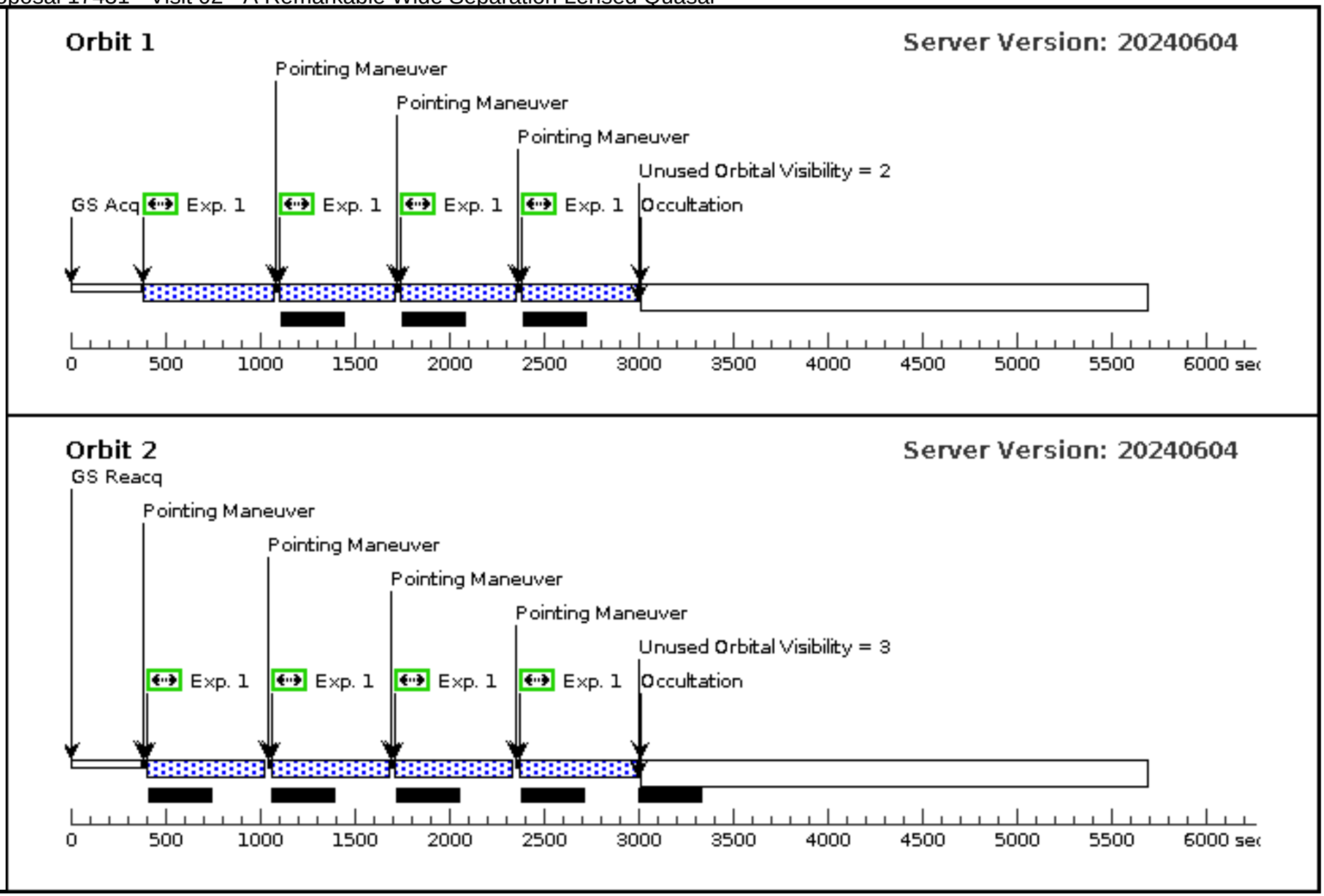
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	COOLJ1153	RA: 11 53 19.2500 (178.3302083d) Dec: +07 55 57.20 (7.93256d) Equinox: J2000		V=21	Reference Frame: ICRS

Comments:
Category=CLUSTER OF GALAXIES
Description=[GRAVITATIONAL LENS, RICH CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) COOLJ1153	ACS/WFC, ACCUM, WFC1	F606W			Pattern 1, Exps 1-1 in Visit 02 (1)	500 Secs (3925 Secs)	
								[==>483.0 Secs (Pattern 1,1)] *[==>484.0 Secs (Pattern 1,2)]* *[==>484.0 Secs (Pattern 1,3)]* *[==>483.0 Secs (Pattern 1,4)]*	***[1]***
								[==>498.0 Secs (Pattern 2,1)] *[==>498.0 Secs (Pattern 2,2)]* *[==>498.0 Secs (Pattern 2,3)]* *[==>497.0 Secs (Pattern 2,4)]*	***[2]***

Orbit Structure



Visit

Proposal 17431, Visit 03, implementation Tue Sep 03 17:00:19 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.034 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.29 Angle Between Sides= Center Pattern=false	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.2637 Line Spacing=0.1856	Coordinate Frame=POS-TARG Pattern Orientation=20.7 Angle Between Sides=69.02 Center Pattern=false	(1)

Fixed Targets

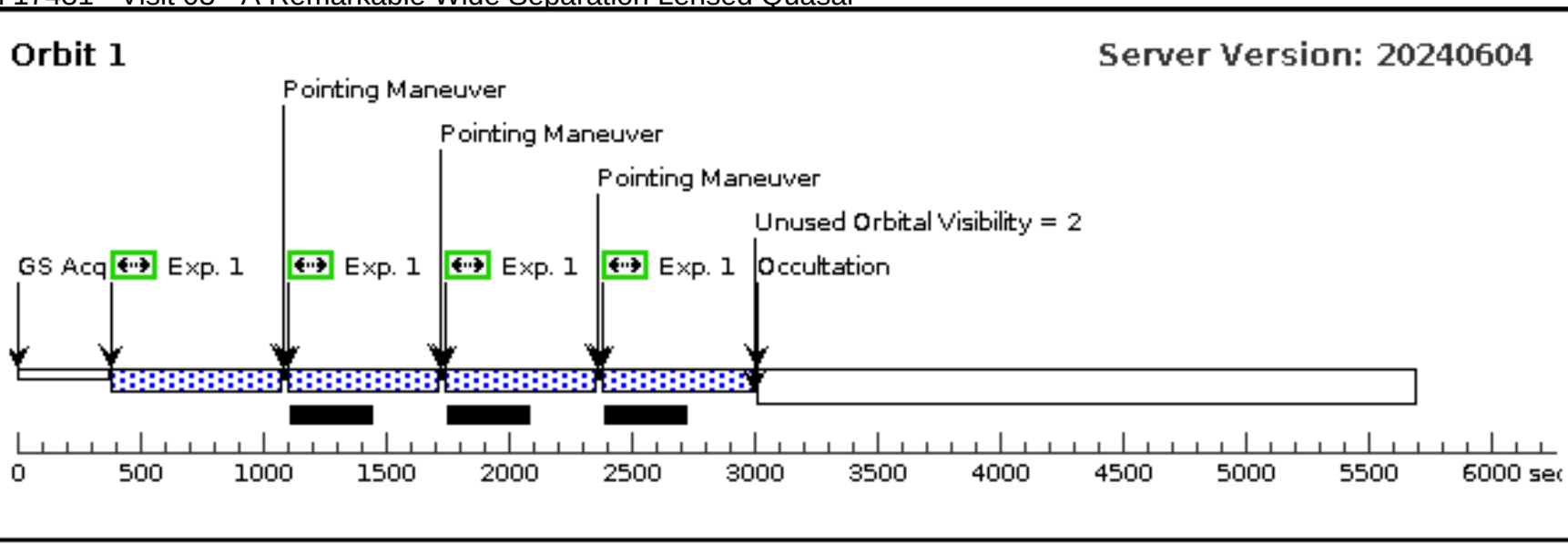
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	COOLJ1153	RA: 11 53 19.2500 (178.3302083d) Dec: +07 55 57.20 (7.93256d) Equinox: J2000		V=21	Reference Frame: ICRS

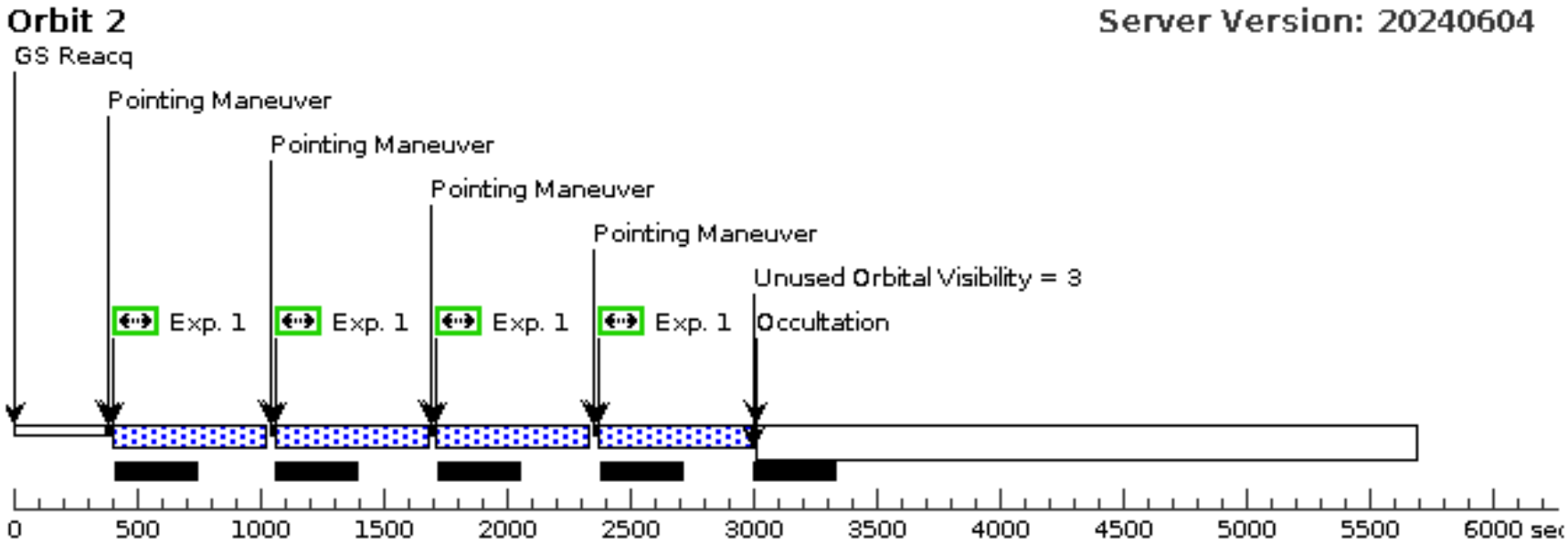
Comments:
Category=CLUSTER OF GALAXIES
Description=[GRAVITATIONAL LENS, RICH CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) COOLJ1153	ACS/WFC, ACCUM, WFC1	F814W			Pattern 1, Exps 1-1 in Visit 03 (1)	500 Secs (3925 Secs)	
								[==>483.0 Secs (Pattern 1,1)] *[==>484.0 Secs (Pattern 1,2)]* *[==>484.0 Secs (Pattern 1,3)]* *[==>483.0 Secs (Pattern 1,4)]*	***[1]***
								[==>498.0 Secs (Pattern 2,1)] *[==>498.0 Secs (Pattern 2,2)]* *[==>498.0 Secs (Pattern 2,3)]* *[==>497.0 Secs (Pattern 2,4)]*	***[2]***

Orbit Structure





Visit

Proposal 17431, Visit 04, implementation Tue Sep 03 17:00:19 GMT 2024

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Diagnostics

(Visit 04) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(3)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2), (3), (4)

Fixed Targets

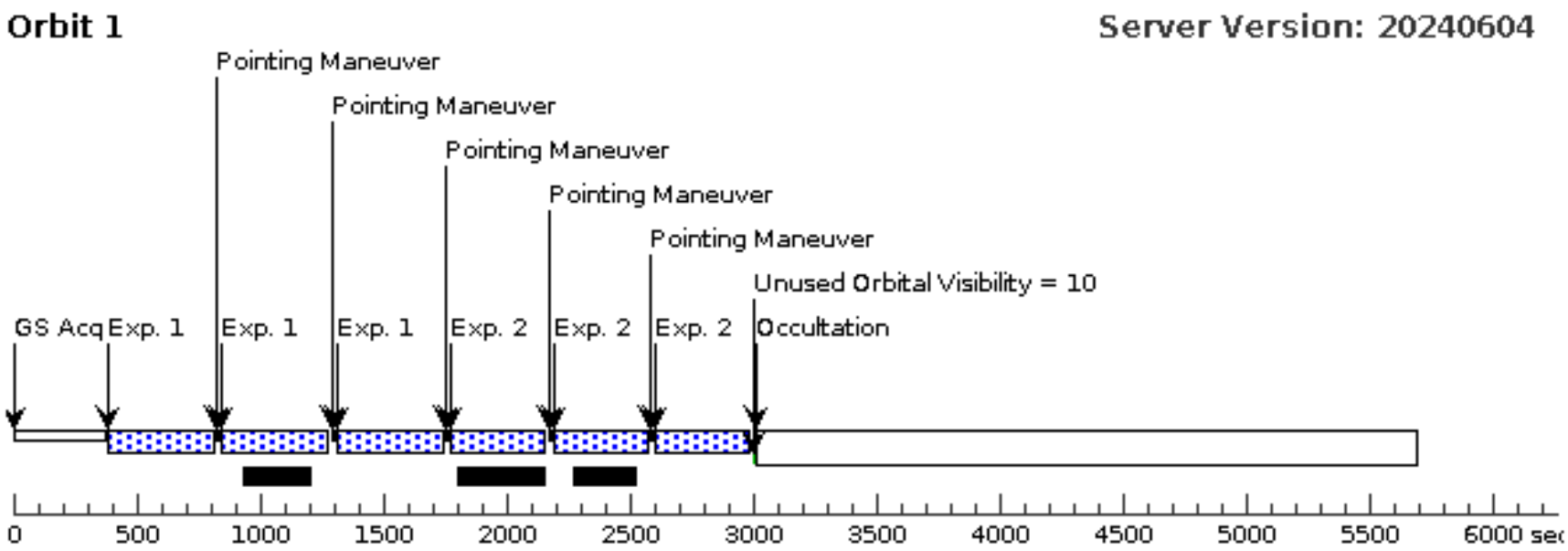
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	COOLJ1153	RA: 11 53 19.2500 (178.3302083d) Dec: +07 55 57.20 (7.93256d) Equinox: J2000		V=21	Reference Frame: ICRS

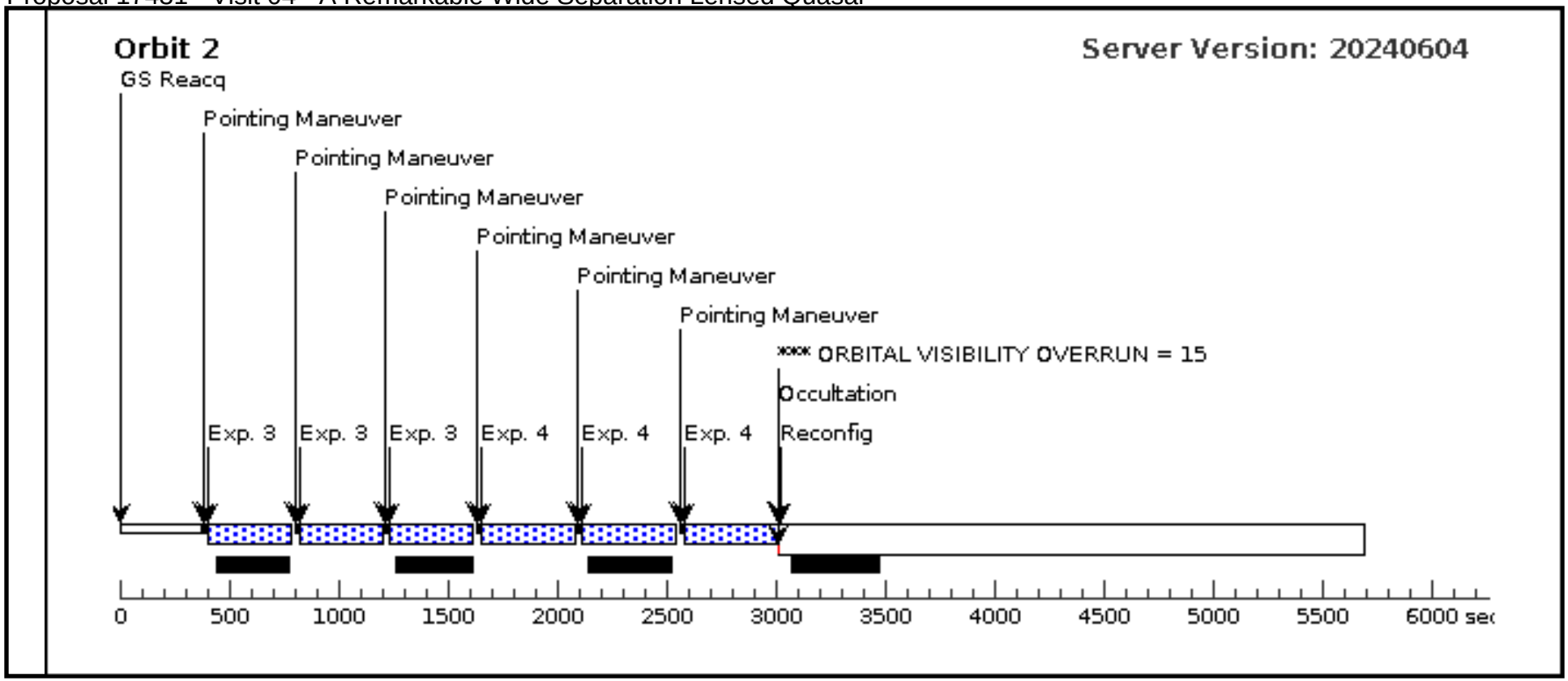
Comments:
Category=CLUSTER OF GALAXIES
Description=[GRAVITATIONAL LENS, RICH CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) COOLJ1153	WFC3/IR, MULTIACCUM, IR	F105W	NSAMP=9; SAMP-SEQ=SPARS50	POS TARG -1.82793,-1.82793	Pattern 3, Exps 1-1 in Visit 04 (3)	402.935899 Secs (1208.808 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2		(1) COOLJ1153	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -1.82793,-1.82793	Pattern 3, Exps 2-2 in Visit 04 (3)	352.935448 Secs (1058.806 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
3		(1) COOLJ1153	WFC3/IR, MULTIACCUM, IR	F105W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 1.82793, 1.82793	Pattern 3, Exps 3-3 in Visit 04 (3)	352.935448 Secs (1058.806 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[2]***
4		(1) COOLJ1153	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=9; SAMP-SEQ=SPARS50	POS TARG 1.82793, 1.82793	Pattern 3, Exps 4-4 in Visit 04 (3)	402.935899 Secs (1208.808 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[2]***

Orbit Structure

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Occultation
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Exp. 3
Exp. 4
Exp. 4
Exp. 4
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