12496 - A Quasar-Starburst Merger System at z=6.2 ?

Cycle: 19, 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) CFHQSJ1429+5447	WFC3/IR	3	15-Feb-2012 21:24:29.0	yes
02	(1) CFHQSJ1429+5447	WFC3/IR	2	15-Feb-2012 21:24:41.0	yes
03	(2) PSF-STAR-2MASS	WFC3/IR	1	15-Feb-2012 21:24:50.0	yes

6 Total Orbits Used

ABSTRACT

Observations of high-redshift quasars probe the growth of supermassive black holes and their connections to galaxy formation at the earliest epoch. We have been carrying out a systematic survey of the star formation and ISM properties in the host galaxies of z~6 quasars using millimeter dust continuum and molecular CO emission. In this survey, we recently discovered the first z~6 quasar-starburst merger system: radio-loud quasar

CFHQS J1429+5447 (z=6.2) is detected as a bright 3.4 mJy source in millimeter continuum; high resolution EVLA imaging of CO(2-1) transition reveals two distinct peaks separated by 1.2" (6.9 kpc), and ~50 km/s in velocity space, strongly suggesting that this is a merging system with two intense star forming components, only one of which is in the active quasar phase. We propose deep HST WFC3/F105W, F140W observations to confirm the merger nature, and measure the size, morphology, UV-based star formation rate, and constrain the UV continuum slope of both the quasar host galaxy and its merging companion galaxy. Comparison of our HST and mm/CO observations with detailed cosmological simulations of high-redshift quasar formation will place this unique system in the evolutionary sequence of SMBH/galaxy coevolution, and test models of quasar formation. The proposed observation of CFHQS J1429+5447 also provides an important test case for the future high-z quasar host galaxy imaging with HST/JWST and ALMA.

OBSERVING DESCRIPTION

The observations include 5-orbit observations of an CFHQS z=6.2 quasars with WFC3/IR F105W and F140W, and 1-orbit observation of a nearby star to measure the PSF with WFC3/IR F105W and F140W.

For the observations of the science target, we plan to do the 3-orbits observation with F140W first. Then if possible, please hold the observation for about 10~20 days to let us check the data and decide if we want to continue to do F105W or use the remaining 2 orbits in F140W to improve the S/N.

Visit

Proposal 12496, Visit 01, implementation Thu Feb 16 02:24:55 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 20D TO 70 D; ORIENT 110D TO 175 D; ORIENT 206D TO 255 D; ORIENT 296D TO 336 D

Comments: 3-orbit observations of CFHQSJ1429+5447 with F140W.
According to BOT, there are four bright 2MASS source J=13 to 16 in the field. We have defined a series of orient ranges. The goal is to avoid contaminations from spikes of the bright stars in the field.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	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

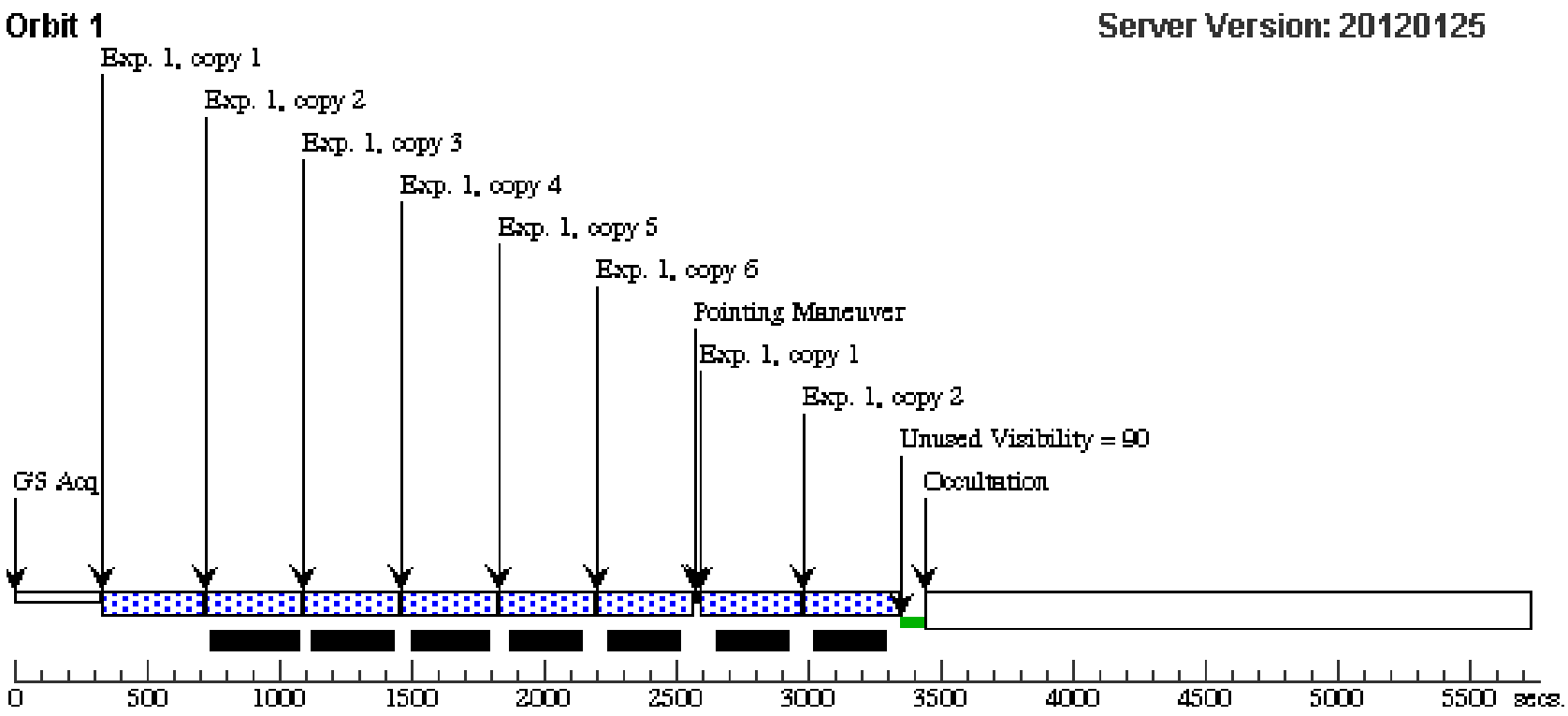
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	CFHQSJ1429+5447	RA: 14 29 52.1700 (217.4673750d) Dec: +54 47 17.70 (54.78825d) Equinox: J2000	Redshift: 6.183	V=(?) z'=21.45, J=20.64	Reference Frame: ICRS

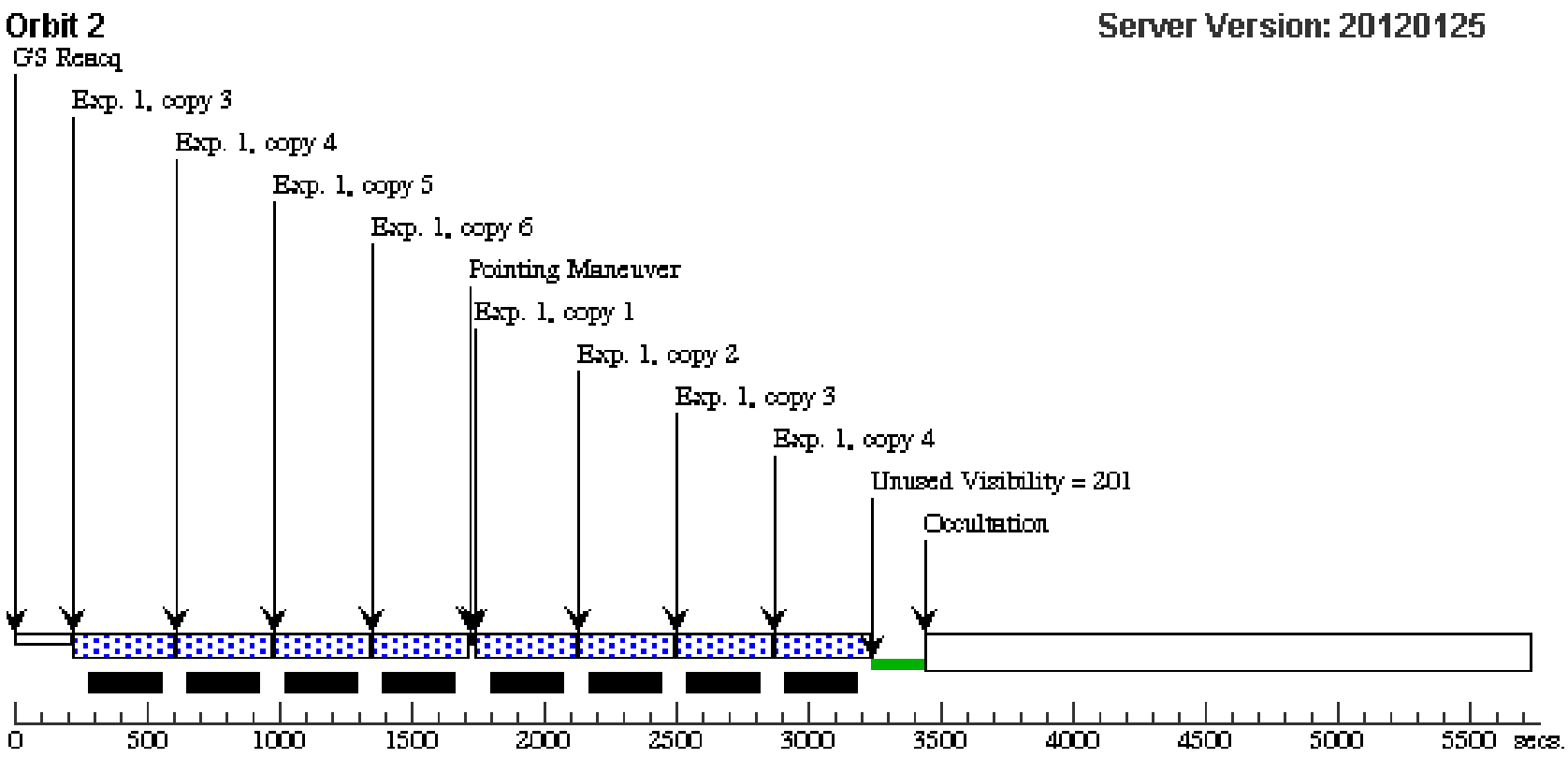
Comments: Science target

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	QSO-exp1-f140w	(1) CFHQSJ1429+5447	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=STEP50; NSAMP=12		Pattern 1, Exps 1-1 in Visit 01 (1)	*[==>(Pattern 1, Copy 1)]* *[==>(Pattern 1, Copy 2)]* *[==>(Pattern 1, Copy 3)]* *[==>(Pattern 1, Copy 4)]* *[==>(Pattern 1, Copy 5)]* *[==>(Pattern 1, Copy 6)]* *[==>(Pattern 2, Copy 1)]* *[==>(Pattern 2, Copy 2)]*	***[1]***
								[==>(Pattern 2, Copy 3)] *[==>(Pattern 2, Copy 4)]* *[==>(Pattern 2, Copy 5)]* *[==>(Pattern 2, Copy 6)]* *[==>(Pattern 3, Copy 1)]* *[==>(Pattern 3, Copy 2)]* *[==>(Pattern 3, Copy 3)]* *[==>(Pattern 3, Copy 4)]*	***[2]***
								[==>(Pattern 3, Copy 5)] *[==>(Pattern 3, Copy 6)]* *[==>(Pattern 4, Copy 1)]* *[==>(Pattern 4, Copy 2)]* *[==>(Pattern 4, Copy 3)]* *[==>(Pattern 4, Copy 4)]* *[==>(Pattern 4, Copy 5)]* *[==>(Pattern 4, Copy 6)]*	***[3]***

Orbit Structure

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Pointing Maneuver
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Exp. 1, copy 3
Exp. 1, copy 4
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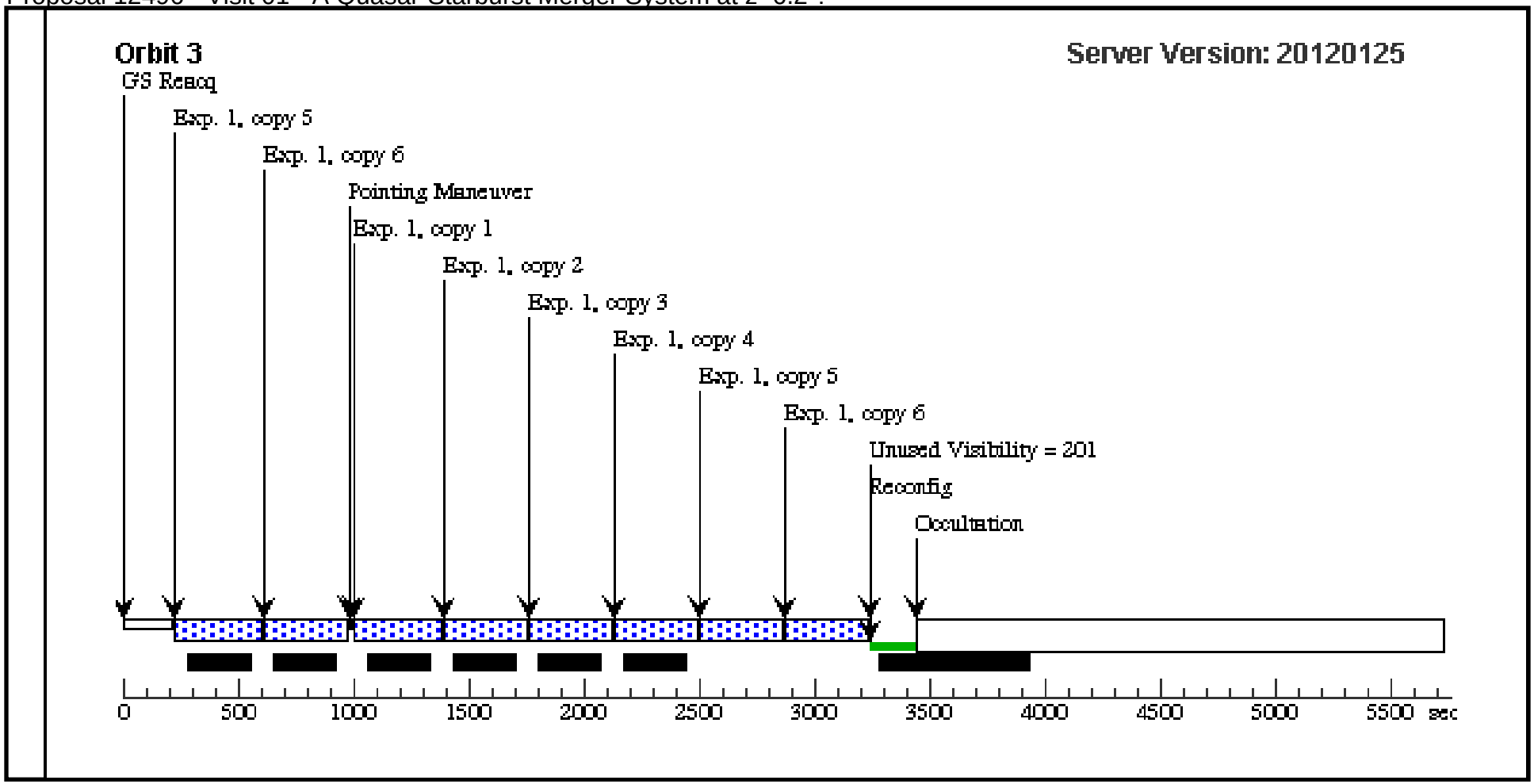
Orbit 3
Server Version: 20120125
GS Reacq
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Exp. 1, copy 6
Pointing Maneuver
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Exp. 1, copy 2
Exp. 1, copy 3
Exp. 1, copy 4
Exp. 1, copy 5
Exp. 1, copy 6
Unused Visibility = 201
Reconfig
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 12496, Visit 02, implementation Thu Feb 16 02:24:56 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 20D TO 70 D; ORIENT 110D TO 175 D; ORIENT 206D TO 255 D; ORIENT 296D TO 336 D; AFTER 01 BY 30 D TO 40 D

Comments: 2-orbit observations of CFHQSJ1429+5447 with WFC3/IR F105W.
According to BOT, there are four bright 2MASS source J=13 to 16 in the field. We have defined a series of orient ranges. The goal is to avoid contaminations from spikes of the bright stars in the field.

we plan to do the 3-orbits observation with F140W first. Then if possible, please hold the observation for about 10~20 days to let us check the data and decide if we want to continue to do F105W or use the remaining 2 orbits in F140W to improve the S/N.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	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

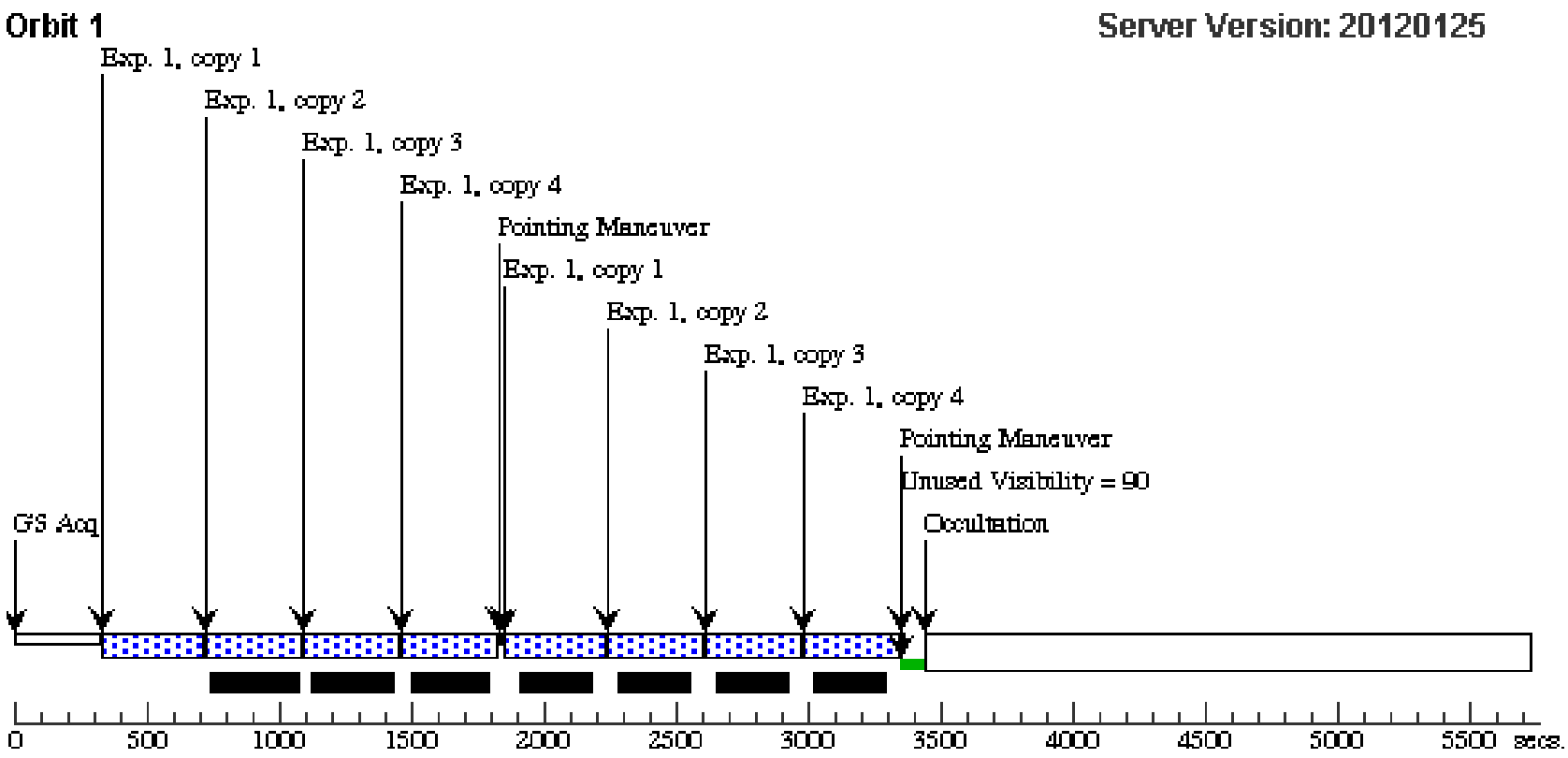
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	CFHQSJ1429+5447	RA: 14 29 52.1700 (217.4673750d) Dec: +54 47 17.70 (54.78825d) Equinox: J2000	Redshift: 6.183	V=(?) z'=21.45, J=20.64	Reference Frame: ICRS

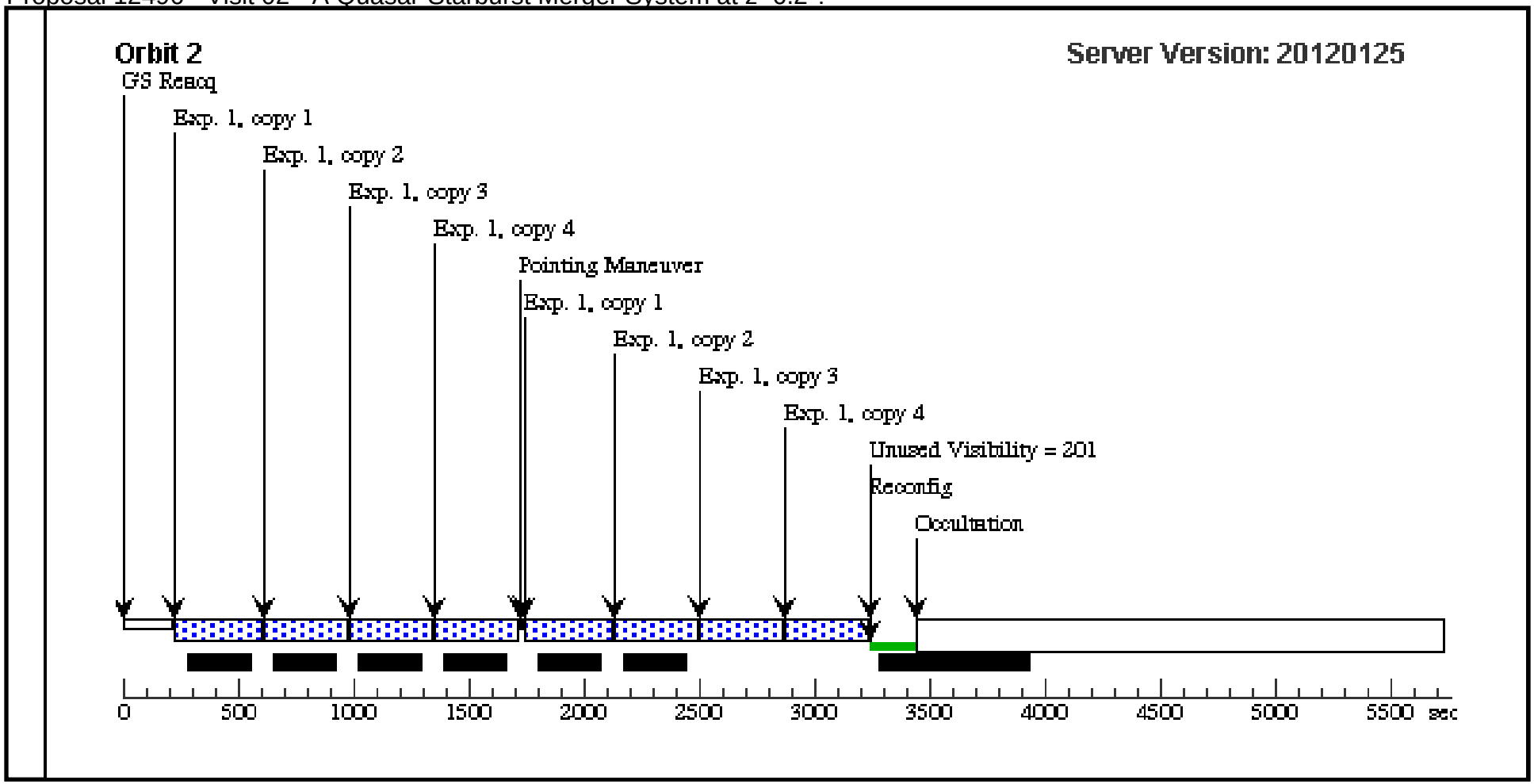
Comments: Science target

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	QSO-exp1-f105w	(1) CFHQSJ1429+5447	WFC3/IR, MULTIACCUM, IR	F105W	SAMP-SEQ=STEP50; NSAMP=12		Pattern 1, Exps 1-1 in Visit 02 (1)	*[==>(Pattern 1, Copy 1)]* *[==>(Pattern 1, Copy 2)]* *[==>(Pattern 1, Copy 3)]* *[==>(Pattern 1, Copy 4)]* *[==>(Pattern 2, Copy 1)]* *[==>(Pattern 2, Copy 2)]* *[==>(Pattern 2, Copy 3)]* *[==>(Pattern 2, Copy 4)]*	***[1]***
								[==>(Pattern 3, Copy 1)] *[==>(Pattern 3, Copy 2)]* *[==>(Pattern 3, Copy 3)]* *[==>(Pattern 3, Copy 4)]* *[==>(Pattern 4, Copy 1)]* *[==>(Pattern 4, Copy 2)]* *[==>(Pattern 4, Copy 3)]* *[==>(Pattern 4, Copy 4)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20120125
GS Reacq
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Exp. 1, copy 2
Exp. 1, copy 3
Exp. 1, copy 4
Pointing Maneuver
Exp. 1, copy 1
Exp. 1, copy 2
Exp. 1, copy 3
Exp. 1, copy 4
Unused Visibility = 201
Reconfig
Occultation
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500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 12496, Visit 03, implementation Thu Feb 16 02:24:57 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 15D TO 35 D; ORIENT 60D TO 85 D; ORIENT 95D TO 130 D; ORIENT 150D TO 160 D; ORIENT 190D TO 220 D; ORIENT 240D TO 265 D; ORIENT 275D TO 295 D; ORIENT 325D TO 360 D

Comments: Observations of the PSF star WFC3/IR F105W F140W.
According to BOT, there are two bright 2MASS source J=13 to 15 close to the edge of the field. We have defined a series of orient ranges. The goal is to avoid contaminations from spikes of the bright stars in the field.

Patterns

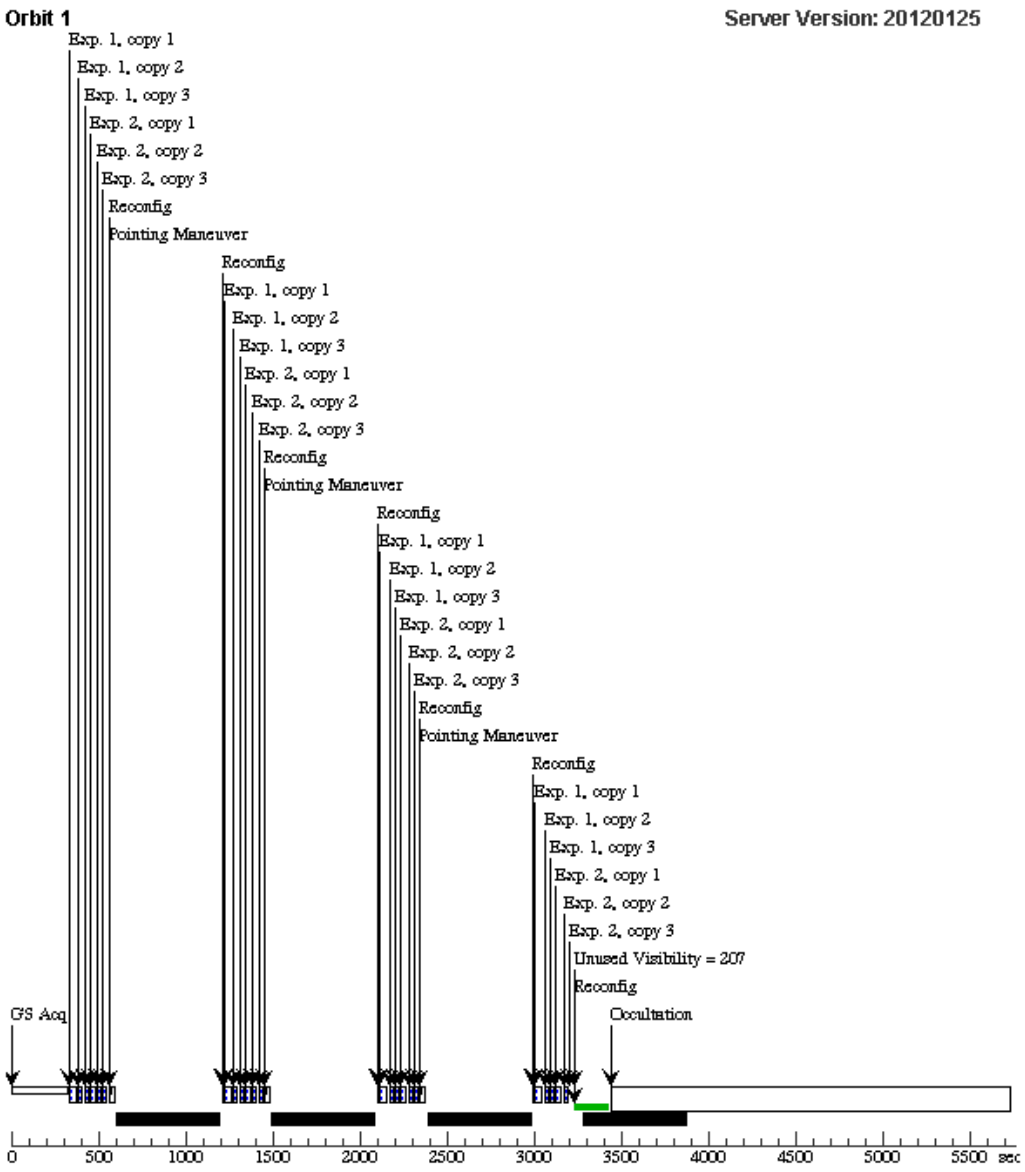
#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	PSF-STAR-2MASS Alt Name1: 2MASS-J14282482+5443207	RA: 14 28 24.8237 (217.1034321d) Dec: +54 43 20.75 (54.72243d) Equinox: J2000		V=(?) J=16.37, H=15.92, Ks=15.25	Reference Frame: ICRS

Comments: a star for PSF

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	PSF-f140w-expa	(2) PSF-STAR-2MASS	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=STEP50; NSAMP=4		Pattern 1, Exps 1-2 in Visit 03 (1)	*[==>(Pattern 1, Copy 1)]* *[==>(Pattern 1, Copy 2)]* *[==>(Pattern 1, Copy 3)]* *[==>(Pattern 2, Copy 1)]* *[==>(Pattern 2, Copy 2)]* *[==>(Pattern 2, Copy 3)]* *[==>(Pattern 3, Copy 1)]* *[==>(Pattern 3, Copy 2)]* *[==>(Pattern 3, Copy 3)]* *[==>(Pattern 4, Copy 1)]* *[==>(Pattern 4, Copy 2)]* *[==>(Pattern 4, Copy 3)]*	***[1]***
2	PSF-f105w-expa	(2) PSF-STAR-2MASS	WFC3/IR, MULTIACCUM, IR	F105W	SAMP-SEQ=STEP50; NSAMP=4		Pattern 1, Exps 1-2 in Visit 03 (1)	*[==>(Pattern 1, Copy 1)]* *[==>(Pattern 1, Copy 2)]* *[==>(Pattern 1, Copy 3)]* *[==>(Pattern 2, Copy 1)]* *[==>(Pattern 2, Copy 2)]* *[==>(Pattern 2, Copy 3)]* *[==>(Pattern 3, Copy 1)]* *[==>(Pattern 3, Copy 2)]* *[==>(Pattern 3, Copy 3)]* *[==>(Pattern 4, Copy 1)]* *[==>(Pattern 4, Copy 2)]* *[==>(Pattern 4, Copy 3)]*	***[1]***

Orbit Structure