14046 - Testing for a Recoiling Supermassive Black Hole in the Giant Core of BCG 2261

Cycle: 22, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Sarah Burke-Spolaor (PI) (Contact)	**Jet Propulsion Laboratory**	**sarahbspolaor@gmail.com**
Dr. Marc Postman (CoI)	Space Telescope Science Institute	postman@stsci.edu
Dr. Tod R. Lauer (CoI)	National Optical Astronomy Observatory, AURA	lauer@noao.edu
Dr. Leonidas Moustakas (CoI)	Jet Propulsion Laboratory	leonidas@jpl.nasa.gov
Dr. Kayhan Gultekin (CoI)	University of Michigan	kayhan@umich.edu
Dr. Joseph Lazio (CoI) (AdminUSPI)	Jet Propulsion Laboratory	joseph.lazio@jpl.nasa.gov
Dr. Holland Ford (CoI)	The Johns Hopkins University	ford@pha.jhu.edu
Dr. Abraham Loeb (CoI)	Harvard University	aloeb@cfa.harvard.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) BCGKNOTS123 CCDFLAT	STIS/CCD	4	03-Mar-2015 21:08:38.0	yes
02	(1) BCGKNOTS123 CCDFLAT	STIS/CCD	4	03-Mar-2015 21:08:42.0	yes

8 Total Orbits Used

ABSTRACT

We request 8 orbits for STIS spectroscopic observations of three compact knots near the center of the brightest cluster galaxy in Abell 2261 (BCG2261) to directly test for the presence of a recoiling supermassive black hole (SMBH). BCG2261's exceptionally large, flat core is thought to have been formed by scouring from a binary SMBH inspiral, with additional broadening effects caused by a recoiling SMBH after the binary's coalescence. A radio jet in the system indicates recent or current active nucleus activity, and appears to point to an origin in one of the off-center stellar concentrations (knots). All of the knots are candidates for a "cloaked" SMBH. Theory predicts that an ejected SMBH should carry a cloak of tightly bound stars with it. The stellar cloak would resemble a globular cluster or dwarf galaxy, but would have a high velocity dispersion. The presence of the off-center knots, the galactic core morphology, and the radio jet tentatively imply that one knot is likely to be cloaking a recoiling SMBH. Our proposed HST/STIS observations will test of the presence of a SMBH in the knots by seeking high-dispersion absorption lines and evidence for active nucleus emission. If any such signature is found, BCG2261 will represent the first direct observational support for three preeminent theoretical speculations: that scouring forms cores, that SMBHs may recoil after coalescence, and that recoil can strongly influence core formation and morphology.

OBSERVING DESCRIPTION

Observe compact galaxies

Visit

Proposal 14046, STIS Knots 123 V1 (01) Wed Mar 04 02:08:44 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

Special Requirements: ORIENT 130.5D TO 136 D; ORIENT 310.5D TO 316 D

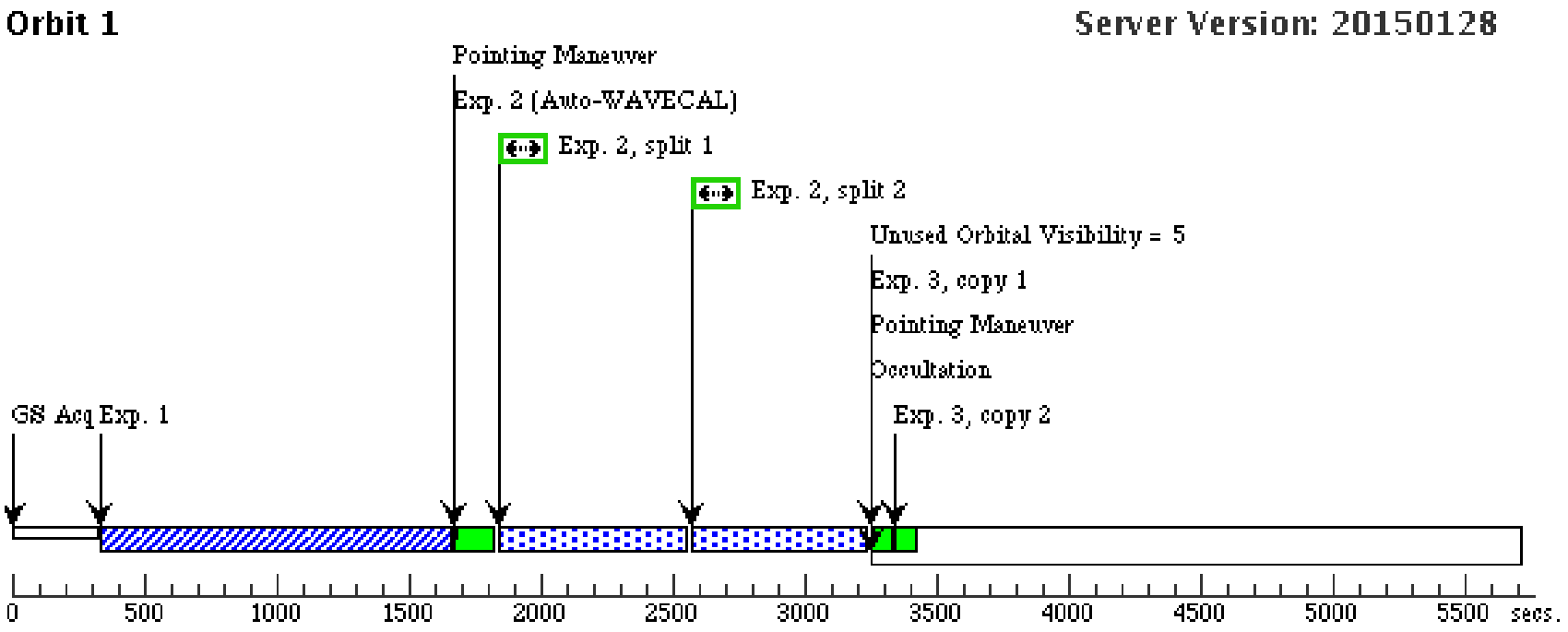
Fixed Targets

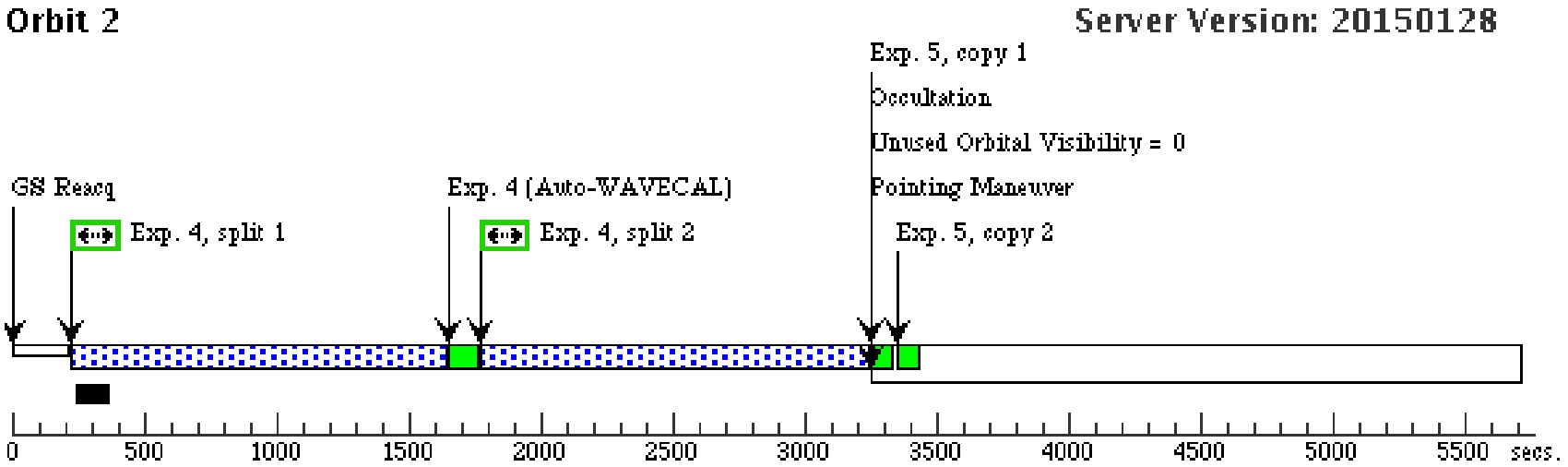
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BCGKNOTS123	RA: 17 22 27.1400 (260.6130833d) Dec: +32 07 57.59 (32.13266d) Equinox: J2000		V=20.8+/-0.06 Knot 1: 22.15, Knot 2:	Reference Frame: ICRS

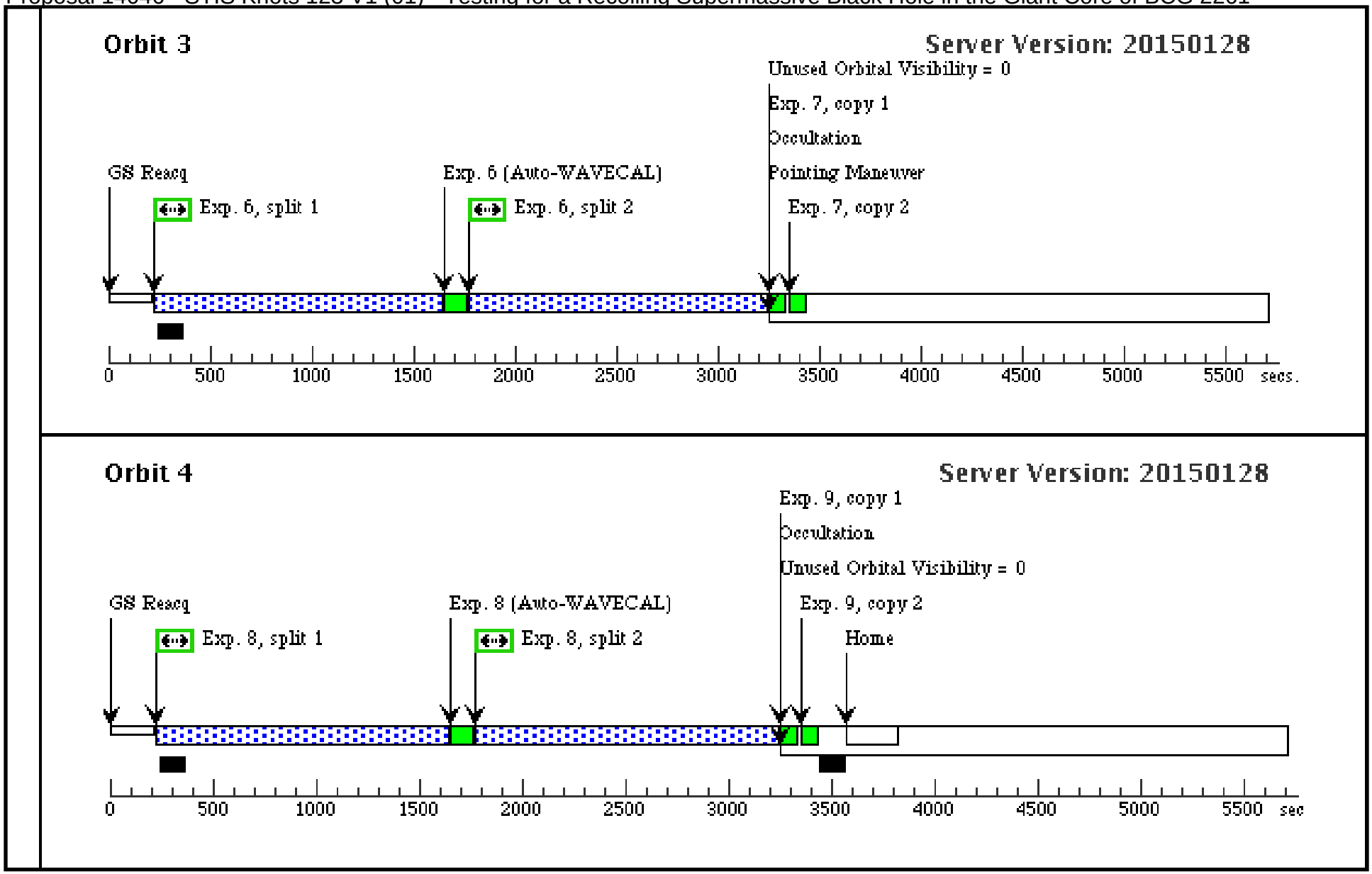
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	STIS Acquisition (STIS.ta.662812)	(1) BCGKNOTS123	STIS/CCD, ACQ, 50CCD	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=5.0; DIFFUSE-CENTER=FLUX-CENTROID			270 Secs (270 Secs) *[==>]*	***[1]***
2	Knots123	(1) BCGKNOTS123	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A	CR-SPLIT=2			1000 Secs (1264 Secs) *[==>632.0 Secs (Split 1)]* *[==>632.0 Secs (Split 2)]*	***[1]***
3	Fringe Frame 1	CCDFLAT	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[1]***
4	Knots123	(1) BCGKNOTS123	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A	CR-SPLIT=2	POS TARG null,0.2		2400 Secs (2762 Secs) *[==>1381.0 Secs (Split 1)]* *[==>1381.0 Secs (Split 2)]*	***[2]***
5	Fringe Frame 2	CCDFLAT	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***
6	Knots123	(1) BCGKNOTS123	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A	CR-SPLIT=2	POS TARG null,-0.2		2400 Secs (2762 Secs) *[==>1381.0 Secs (Split 1)]* *[==>1381.0 Secs (Split 2)]*	***[3]***
7	Fringe Frame 3	CCDFLAT	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[3]***
8	Knots123	(1) BCGKNOTS123	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A	CR-SPLIT=2	POS TARG null,-0.4		1000 Secs (2762 Secs) *[==>1381.0 Secs (Split 1)]* *[==>1381.0 Secs (Split 2)]*	***[4]***
9	Fringe Frame 4	CCDFLAT	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[4]***

Orbit Structure



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Unused Orbital Visibility = 0
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Occultation
GS Reacq
Exp. 6 (Auto-WAVECAL)
Pointing Maneuver
Exp. 6, split 1
Exp. 6, split 2
Exp. 7, copy 2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.
Orbit 4
Server Version: 20150128
Exp. 9, copy 1
Occultation
Unused Orbital Visibility = 0
GS Reacq
Exp. 8 (Auto-WAVECAL)
Exp. 9, copy 2
Exp. 8, split 1
Exp. 8, split 2
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14046, STIS Knots 123 V2 (02) Wed Mar 04 02:08:44 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD

Special Requirements: ORIENT 130.5D TO 136 D; ORIENT 310.5D TO 316 D

Fixed Targets

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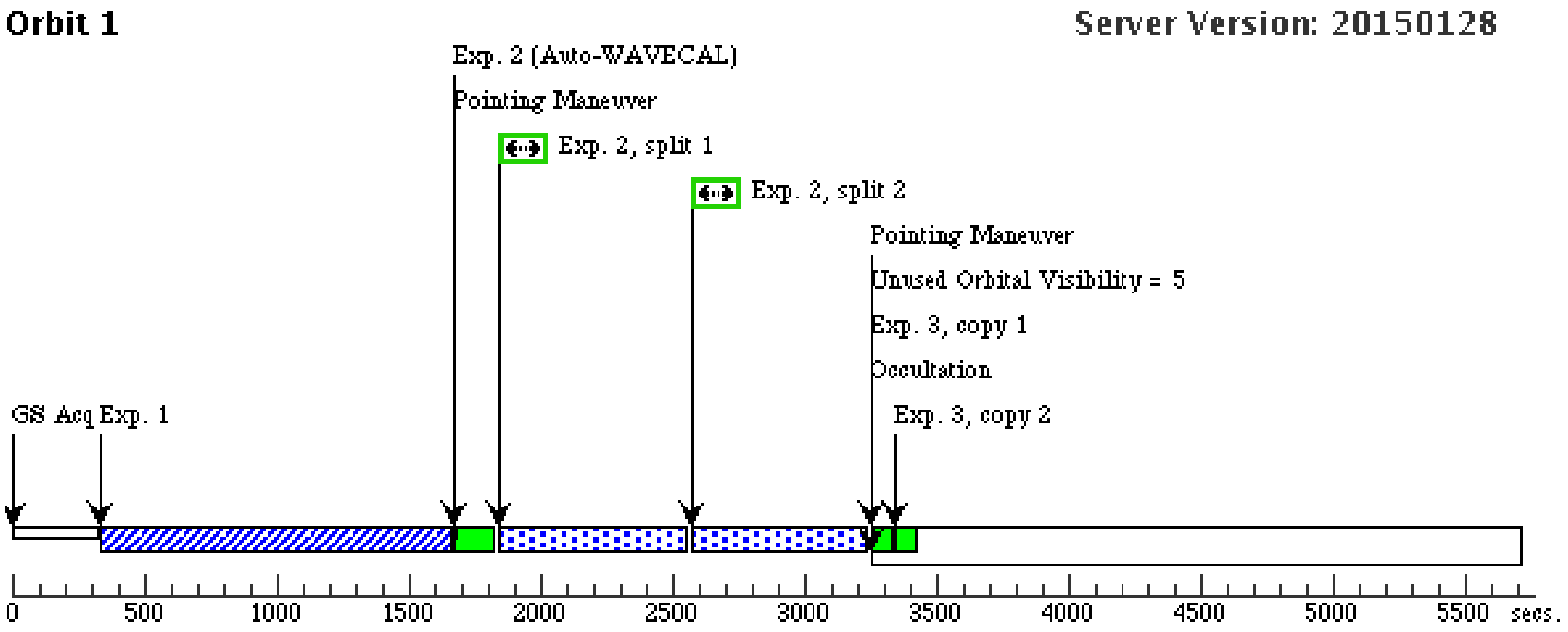
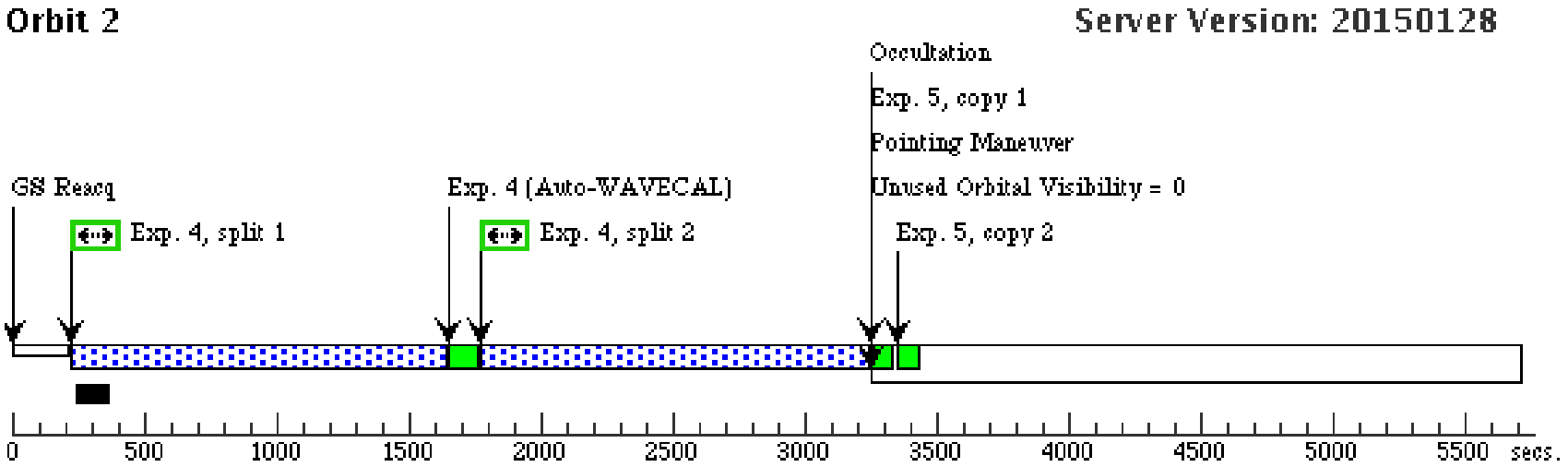
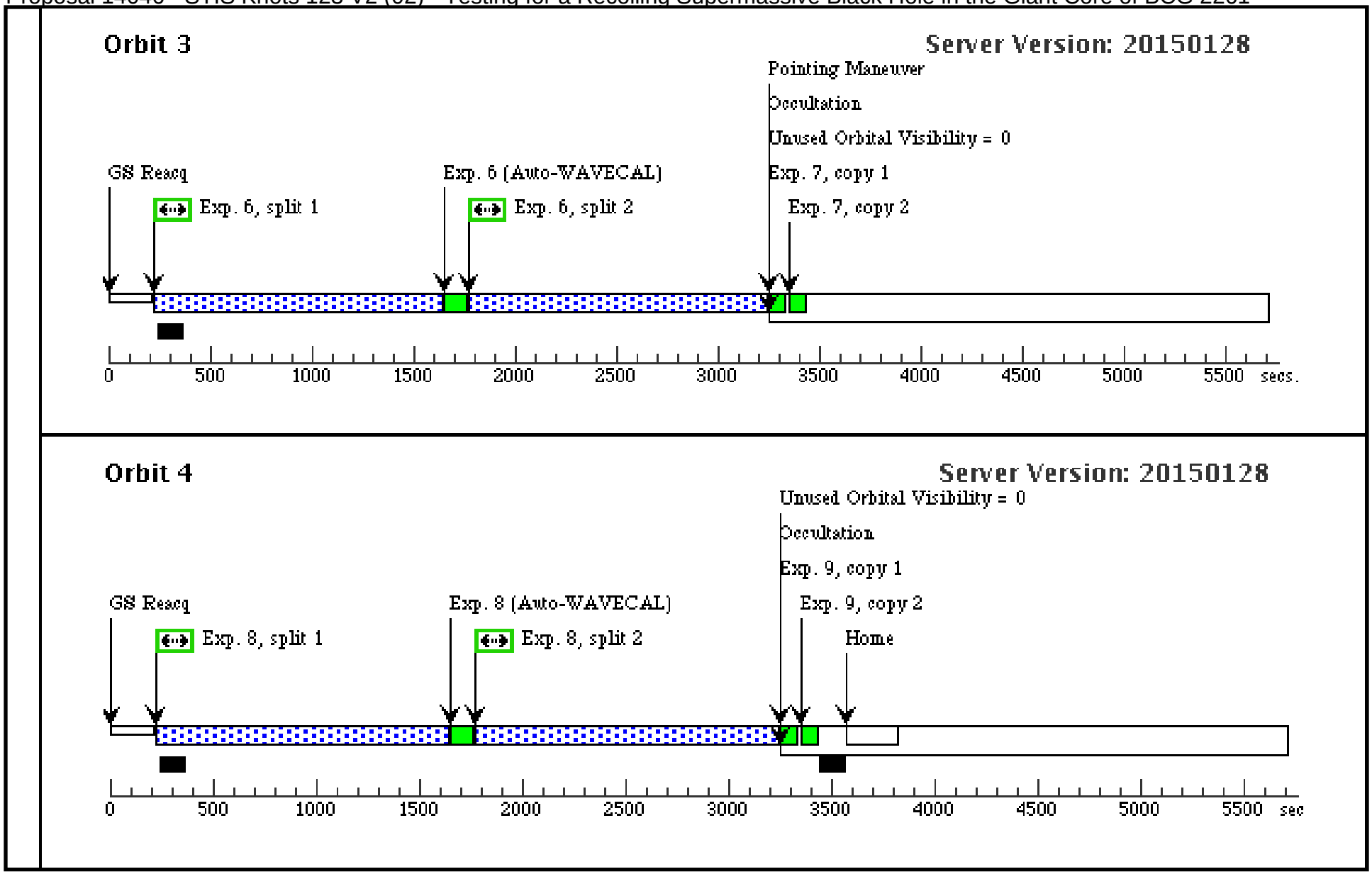
3	Fringe Frame 1	CCDFLAT	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[1]***
4	Knots123	(1) BCGKNOTS123	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A	CR-SPLIT=2	POS TARG null,0.2		2400 Secs (2762 Secs) *[==>1381.0 Secs (Split 1)]* *[==>1381.0 Secs (Split 2)]*	***[2]***
5	Fringe Frame 2	CCDFLAT	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***
6	Knots123	(1) BCGKNOTS123	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A	CR-SPLIT=2	POS TARG null,-0.2		2400 Secs (2762 Secs) *[==>1381.0 Secs (Split 1)]* *[==>1381.0 Secs (Split 2)]*	***[3]***
7	Fringe Frame 3	CCDFLAT	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[3]***
8	Knots123	(1) BCGKNOTS123	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A	CR-SPLIT=2	POS TARG null,-0.4		1000 Secs (2762 Secs) *[==>1381.0 Secs (Split 1)]* *[==>1381.0 Secs (Split 2)]*	***[4]***
9	Fringe Frame 4	CCDFLAT	STIS/CCD, ACCUM, 52X0.5	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[4]***

Orbit Structure






Orbit 3
Server Version: 20150128
Pointing Maneuver
Occultation
Unused Orbital Visibility = 0
GS Reacq
Exp. 6, split 1
Exp. 6 (Auto-WAVECAL)
Exp. 6, split 2
Exp. 7, copy 1
Exp. 7, copy 2
0
500
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5500
secs.
Orbit 4
Server Version: 20150128
Unused Orbital Visibility = 0
Occultation
Exp. 9, copy 1
GS Reacq
Exp. 8 (Auto-WAVECAL)
Exp. 9, copy 2
Exp. 8, split 1
Exp. 8, split 2
Home
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1000
1500
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sec