11791 - The Wavelength Dependence of Accretion Disk Structure

Cycle: 17, 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) Q2237+0305	ACS/SBC	1	21-Oct-2010 21:00:55.0	yes
02	(1) Q2237+0305	WFC3/UVIS	1	21-Oct-2010 21:00:59.0	yes
03	(1) Q2237+0305	ACS/SBC	1	21-Oct-2010 21:01:02.0	yes
04	(1) Q2237+0305	ACS/SBC	1	21-Oct-2010 21:01:05.0	yes
05	(2) RXJ1131-1231	ACS/SBC	1	21-Oct-2010 21:01:07.0	yes
06	(2) RXJ1131-1231	ACS/SBC	1	21-Oct-2010 21:01:10.0	yes

6 Total Orbits Used

ABSTRACT

We can now routinely measure the size of quasar accretion disks using gravitational microlensing of lensed quasars. The next

step to testing accretion disk models is to measure the size of accretion disks as a function of wavelength, particularly at the UV and X-ray wavelengths that should probe the inner, strong gravity regime. Here we focus on two four-image quasar lenses that already have optical (R band) and X-ray size measurements using microlensing. We will combine the HST observations with ground-based monitoring to measure the disk size as a function of wavelength from the near-IR to the UV. We require HST to measure the image flux ratios in the ultraviolet continuum near the Lyman limit of the quasars. The selected targets have estimated black hole masses that differ by an order of magnitude, and we should find wavelength scalings for the two systems that are very different because the Blue/UV wavelengths should correspond to parts of the disk near the inner edge for the high mass system but not in the low mass system. The results will be modeled using a combination of simple thin disk models and complete relativistic disk models. While requiring only 18 orbits, success for one system requires observations in both Cycles 16 and 17.

OBSERVING DESCRIPTION

We will be monitoring two gravitational lenses with the SBC/F165LP. The epochs should be spaced to span the visibility periods with roughly equal time periods between the observations. The visibility periods are May-September for Q2237 and December-March for RXJ1131. There are a further 6 epochs approved for Q2237 in Cycle 17, but not scheduled here.

The observations themselves are simple single orbit, 4 position dithered SBC/F165LP observations. We have one such image of RXJ1131 already,

and the
results are as expected.

Visit

Proposal 11791, Visit 01, completed Fri Oct 22 01:01:13 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/SBC

Special Requirements: BETWEEN 01-AUG-2008:00:00:00 AND 30-AUG-2008:00:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-SBC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.179 Line Spacing=0.116	Coordinate Frame=POS-TARG Pattern Orientation=20.02 Angle Between Sides=63.65 Center Pattern=false		(1)

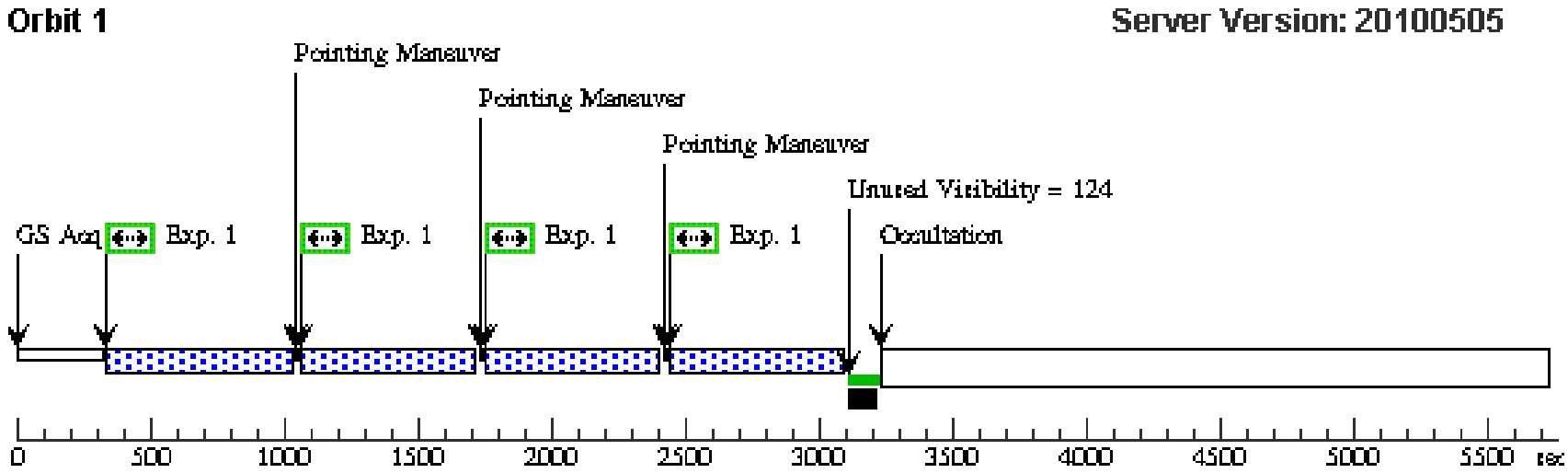
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	Q2237+0305	RA: 22 40 30.3400 (340.1264167d) Dec: +03 21 28.80 (3.35800d) Equinox: J2000		V=17	Reference Frame: previous HST observations

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) Q2237+0305	ACS/SBC, ACCUM, SBC	F165LP			Pattern 1, Exps 1-1 (1)	600.0 Secs *[==>629.0 Secs (Pattern 1)]* *[==>629.0 Secs (Pattern 2)]* *[==>629.0 Secs (Pattern 3)]* *[==>629.0 Secs (Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 11791, Visit 02, implementation Fri Oct 22 01:01:14 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 01-SEP-2010:00:00:00 AND 31-MAR-2011:00:00:00

Patterns

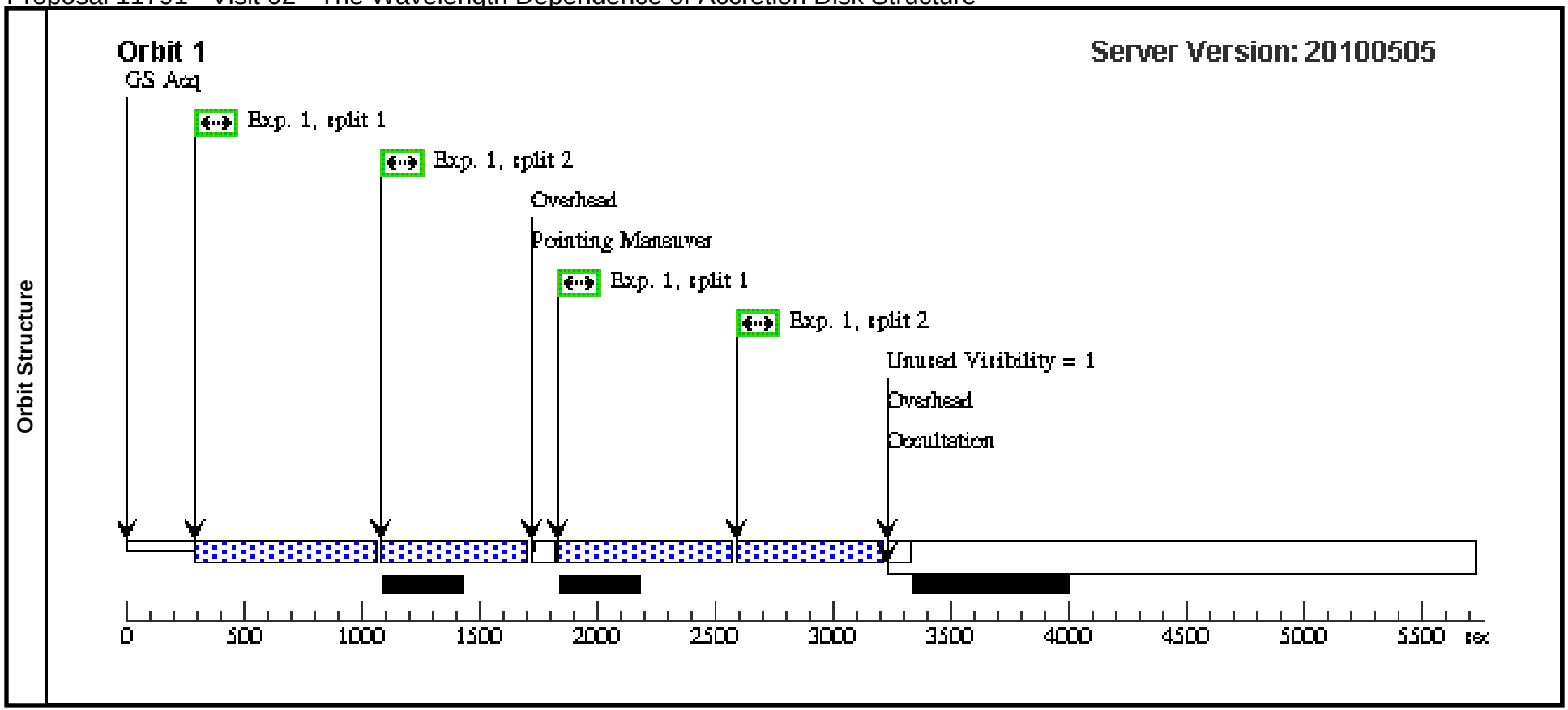
#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	Q2237+0305	RA: 22 40 30.3400 (340.1264167d) Dec: +03 21 28.80 (3.35800d) Equinox: J2000		V=17	Reference Frame: previous HST observations

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) Q2237+0305	WFC3/UVIS, ACCUM, UVIS1	F218W			Pattern 2, Exps 1-1 (2)	600.0 Secs *[==>627.0 Secs (Pattern 1, Split 1)]* *[==>627.0 Secs (Pattern 1, Split 2)]* *[==>627.0 Secs (Pattern 2, Split 1)]* *[==>627.0 Secs (Pattern 2, Split 2)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20100505
GS Acq
Exp. 1, split 1
Exp. 1, split 2
Overhead
Pointing Maneuver
Exp. 1, split 1
Exp. 1, split 2
Unused Visibility = 1
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11791, Visit 03, completed Fri Oct 22 01:01:15 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/SBC

Special Requirements: BETWEEN 01-SEP-2009:15:55:09 AND 31-OCT-2009:15:55:09

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-SBC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.179 Line Spacing=0.116	Coordinate Frame=POS-TARG Pattern Orientation=20.02 Angle Between Sides=63.65 Center Pattern=false		(1)

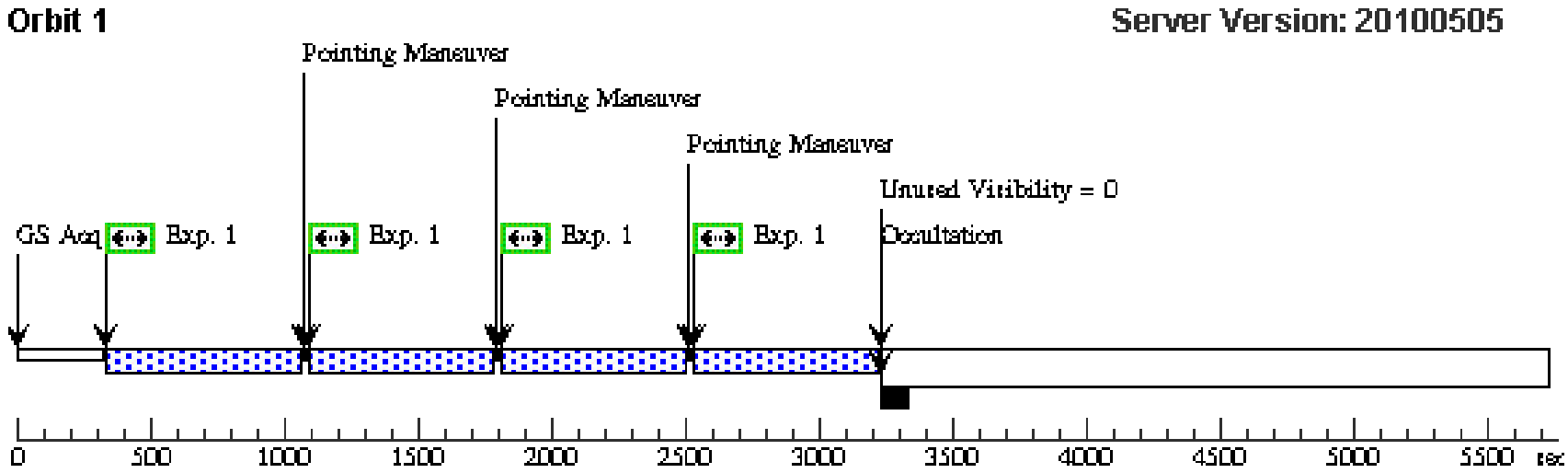
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	Q2237+0305	RA: 22 40 30.3400 (340.1264167d) Dec: +03 21 28.80 (3.35800d) Equinox: J2000		V=17	Reference Frame: previous HST observations

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) Q2237+0305	ACS/SBC, ACCUM, SBC	F165LP			Pattern 1, Exps 1-1 (1)	600.0 Secs *[==>660.0 Secs (Pattern 1)]* *[==>660.0 Secs (Pattern 2)]* *[==>660.0 Secs (Pattern 3)]* *[==>660.0 Secs (Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 11791, Visit 04, completed Fri Oct 22 01:01:15 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/SBC

Special Requirements: BETWEEN 01-DEC-2009:15:55:34 AND 15-JAN-2010:15:55:34

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-SBC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.179 Line Spacing=0.116	Coordinate Frame=POS-TARG Pattern Orientation=20.02 Angle Between Sides=63.65 Center Pattern=false		(1)

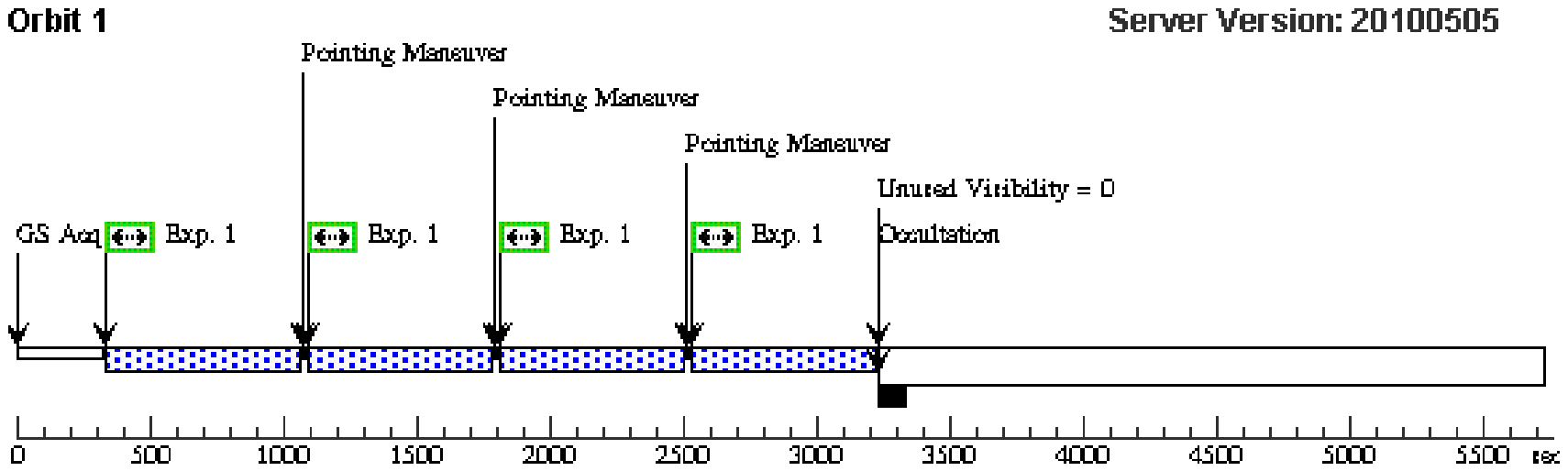
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	Q2237+0305	RA: 22 40 30.3400 (340.1264167d) Dec: +03 21 28.80 (3.35800d) Equinox: J2000		V=17	Reference Frame: previous HST observations

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) Q2237+0305	ACS/SBC, ACCUM, SBC	F165LP			Pattern 1, Exps 1-1 (1)	600.0 Secs *[==>660.0 Secs (Pattern 1)]* *[==>660.0 Secs (Pattern 2)]* *[==>660.0 Secs (Pattern 3)]* *[==>660.0 Secs (Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 11791, Visit 05, completed Fri Oct 22 01:01:15 GMT 2010

Diagnostic Status: Warning

Scientific Instruments: ACS/SBC

Special Requirements: BETWEEN 15-NOV-2009:00:00:00 AND 15-FEB-2010:00:00:00

Diagnostics

(Visit 05) Warning (Orbit Planner): VISIBILITY OVERRUN

Patterns

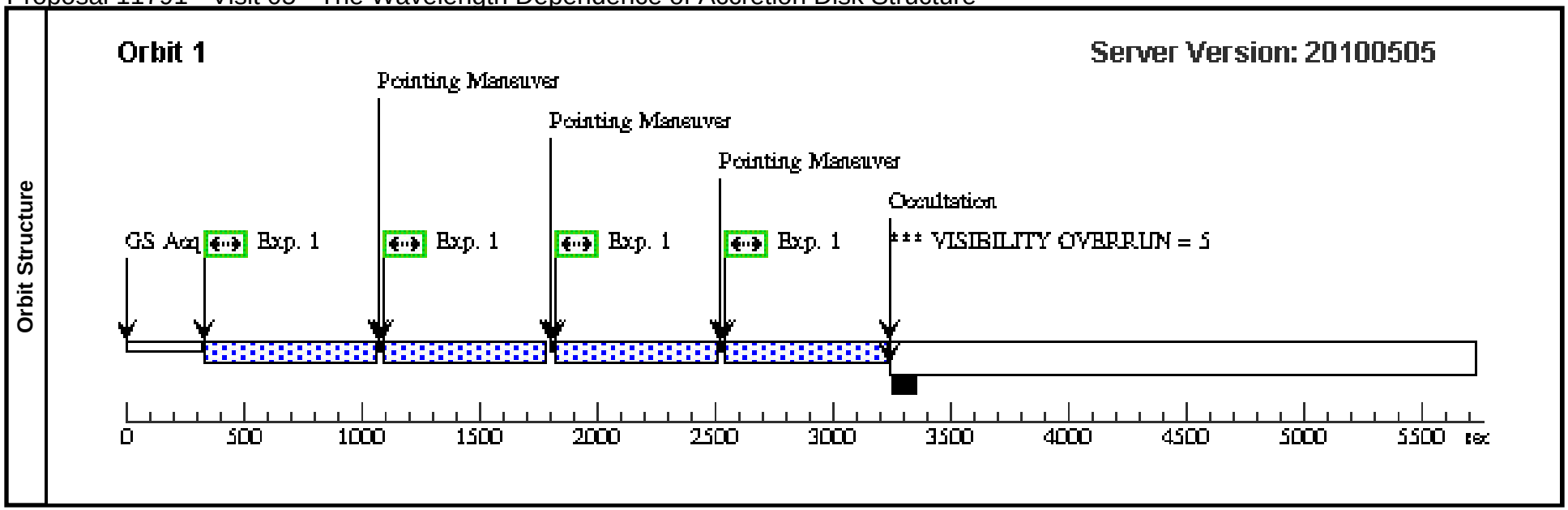
#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-SBC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.179 Line Spacing=0.116	Coordinate Frame=POS-TARG Pattern Orientation=20.02 Angle Between Sides=63.65 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	RXJ1131-1231	RA: 11 31 51.6000 (172.9650000d) Dec: -12 31 57.00 (-12.53250d) Equinox: J2000		V=18	Reference Frame: previous HST observations

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(2) RXJ1131-1231	ACS/SBC, ACCUM, SBC	F165LP			Pattern 1, Exps 1-1 (1)	600.0 Secs *[==>664.0 Secs (Pattern 1)]* *[==>664.0 Secs (Pattern 2)]* *[==>664.0 Secs (Pattern 3)]* *[==>664.0 Secs (Pattern 4)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20100505
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Occultation
GS Acq
Exp. 1
Exp. 1
Exp. 1
Exp. 1
*** VISIBILITY OVERRUN = 5
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11791, Visit 06, completed Fri Oct 22 01:01:16 GMT 2010

Diagnostic Status: Warning

Scientific Instruments: ACS/SBC

Special Requirements: GYRO MODE 2G; BETWEEN 01-MAR-2009:00:00:00 AND 30-MAR-2009:00:00:00

Diagnostics

(Visit 06) Warning (Form): Gyro Mode overrides default value of 3GOBAD.

Patterns

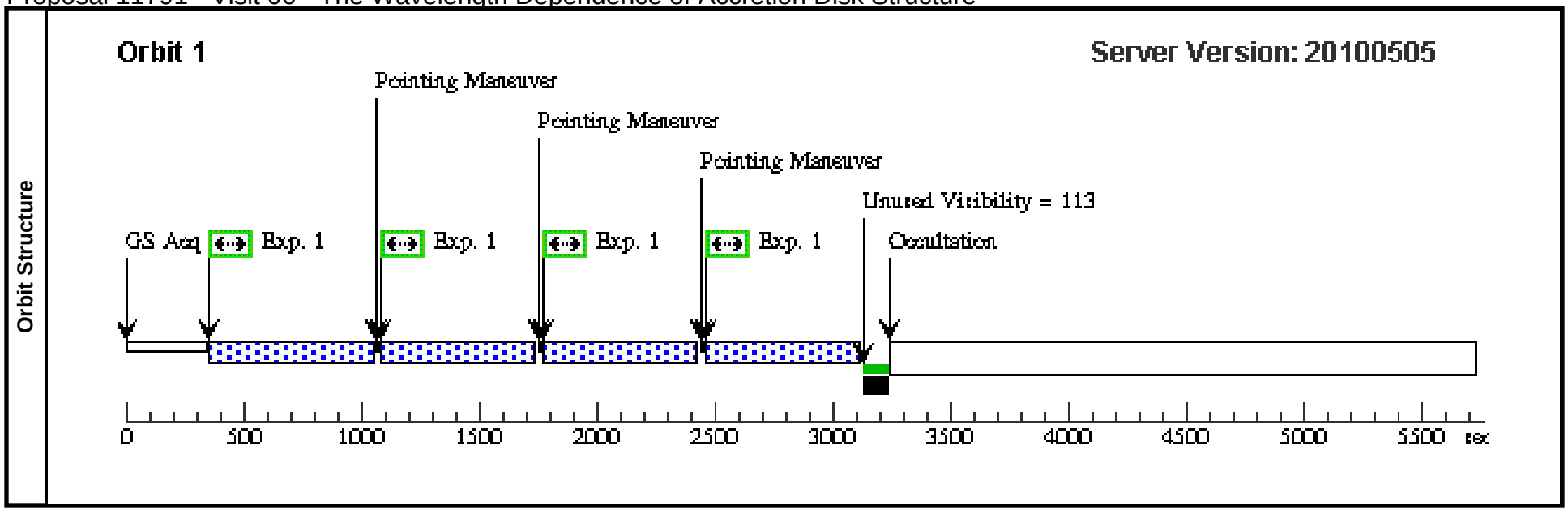
#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-SBC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.179 Line Spacing=0.116	Coordinate Frame=POS-TARG Pattern Orientation=20.02 Angle Between Sides=63.65 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	RXJ1131-1231	RA: 11 31 51.6000 (172.9650000d) Dec: -12 31 57.00 (-12.53250d) Equinox: J2000		V=18	Reference Frame: previous HST observations

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(2) RXJ1131-1231	ACS/SBC, ACCUM, SBC	F165LP		GS ACQ SCENARIO BASE1T3	Pattern 1, Exps 1-1 (1)	600.0 Secs	
								[==>629.0 Secs (Pattern 1)] *[==>629.0 Secs (Pattern 2)]* *[==>629.0 Secs (Pattern 3)]* *[==>629.0 Secs (Pattern 4)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20100505
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Unused Visibility = 113
GS Acq
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec