



12759 - A Chandra Legacy Project to Resolve the Accretion Flow of Gas Captured by a Supermassive Black Hole

Cycle: 19, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) NGC3115-POS1	ACS/WFC	1	17-Oct-2011 21:16:12.0	yes
02	(2) NGC3115-POS2	ACS/WFC	1	17-Oct-2011 21:16:17.0	yes
03	(3) NGC3115-POS3	ACS/WFC	1	17-Oct-2011 21:16:22.0	yes
04	(4) NGC3115-POS4	ACS/WFC	1	17-Oct-2011 21:16:26.0	yes

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
05	(5) NGC3115-POS5	ACS/WFC	1	17-Oct-2011 21:16:30.0	yes
06	(6) NGC3115-POS6	ACS/WFC	1	17-Oct-2011 21:16:34.0	yes

6 Total Orbits Used

ABSTRACT

We propose a 1 Msec observation of the hot gas around the supermassive black hole at the center of the nearby S0 galaxy NGC3115 in order to place the first direct observational constraints on the temperature and density structure of an accretion flow inside the Bondi radius of a black hole. These temperature/density constraints will provide a critical test for competing inefficient accretion flow theories. The large angular Bondi radius of this black hole provides the **only** opportunity to perform such a test of inefficient accretion flow theory in the Chandra era and the foreseeable future. An additional benefit of this long observation is that it will also provide the deepest look of the X-ray binary population of a normal early-type galaxy to date.

OBSERVING DESCRIPTION

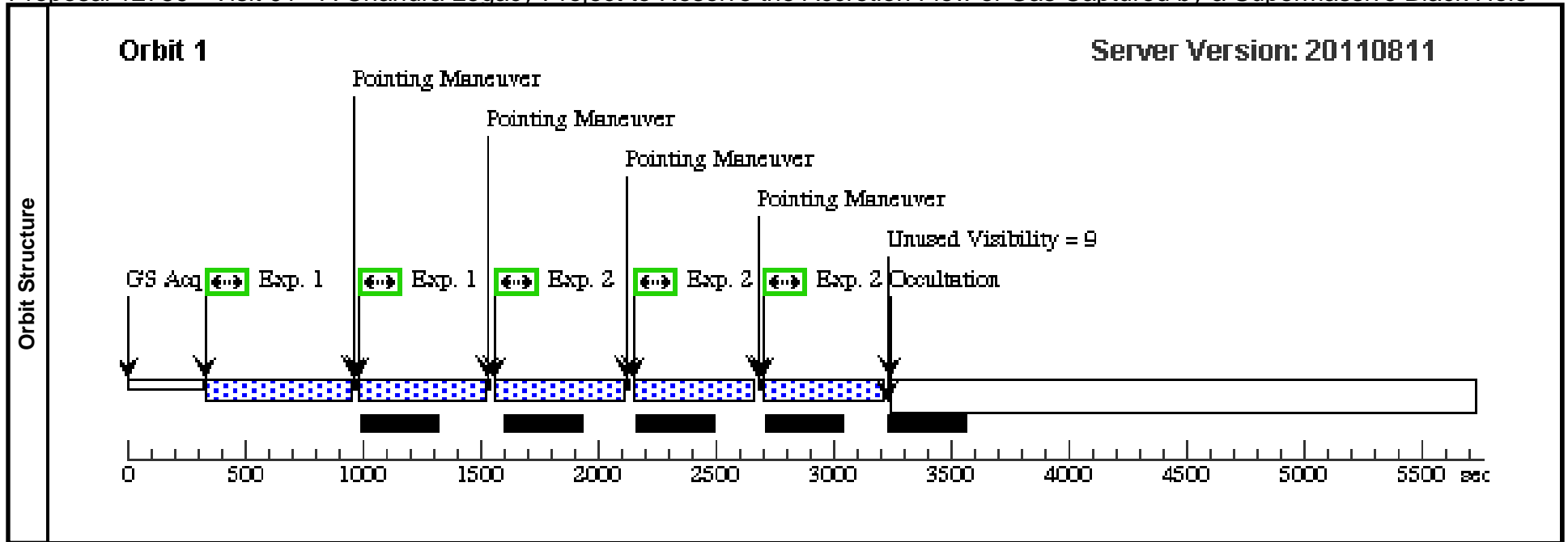
The primary observations with ACS/WFC are designed for photometry in F475W and F850LP of globular clusters in the massive S0 galaxy NGC 3115. These observations complement extremely deep Chandra imaging and the goal is to cross-match X-ray sources with HST-identified clusters (a secondary goal is to match X-ray sources with background galaxies, to help isolate field sources with no counterparts). The use of two filters gives color information used to estimate rough metallicities of the clusters. Depending on the filter, we use two or three exposures and a simple line dither to cover the chip gap and correct pixel-level defects and cosmic rays. Given 54 min of visibility per orbit, about 33 min are available after overheads for science exposures. Exposure times of 820 sec in F475W and 1170 sec in F850LP give approximately equal signal-to-noise in the two bands. For one pointing covering the galaxy nucleus, we take a short exposure in F850LP because of the possibility of saturation in the center.

NGC 3115 has no archival ACS data. The six pointings in this proposals are arranged in a mosaic, stretched to maximizing joint coverage of the galaxy and the Chandra ACIS FOV chip. The need to match the Chandra data leads to the restrictive orientation requirements.

Proposal 12759 - Visit 01 - A Chandra Legacy Project to Resolve the Accretion Flow of Gas Captured by a Supermassive Black Hole

Tue Oct 18 01:16:38 GMT 2011

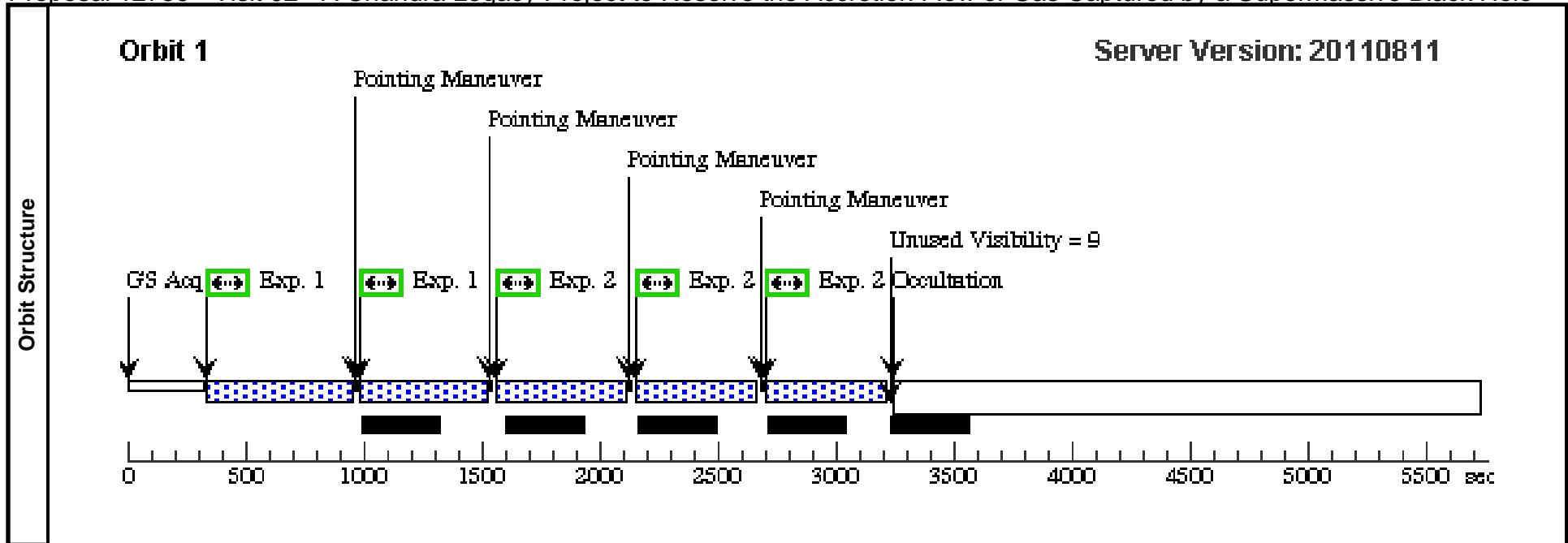
Visit	Proposal 12759, Visit 01, pi Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ORIENT 46.0D TO 54 D									
	#	Primary Pattern			Secondary Pattern			Exposures		
Patterns	(4)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false							(1)
	(5)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false							(2)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	NGC3115-POS1	RA: 10 05 26.4340 (151.3601417d) Dec: -07 42 18.14 (-7.70504d) Equinox: J2000	Radial Velocity: 663 km/sec	V=10	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(1) NGC3115-POS1	ACS/WFC, ACCUM, WFCENTER	F475W	CR-SPLIT=NO	GS ACQ SCENARI O BASE1B3	Pattern 4, Exps 1-1 i n Visit 01 (4)	410 Secs [==>412.0 Secs (Pattern 1)] [==>412.0 Secs (Pattern 2)]	[1]	
2	(1) NGC3115-POS1	ACS/WFC, ACCUM, WFCENTER	F850LP	CR-SPLIT=NO		Pattern 5, Exps 2-2 i n Visit 01 (5)	390 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]		



Proposal 12759 - Visit 02 - A Chandra Legacy Project to Resolve the Accretion Flow of Gas Captured by a Supermassive Black Hole

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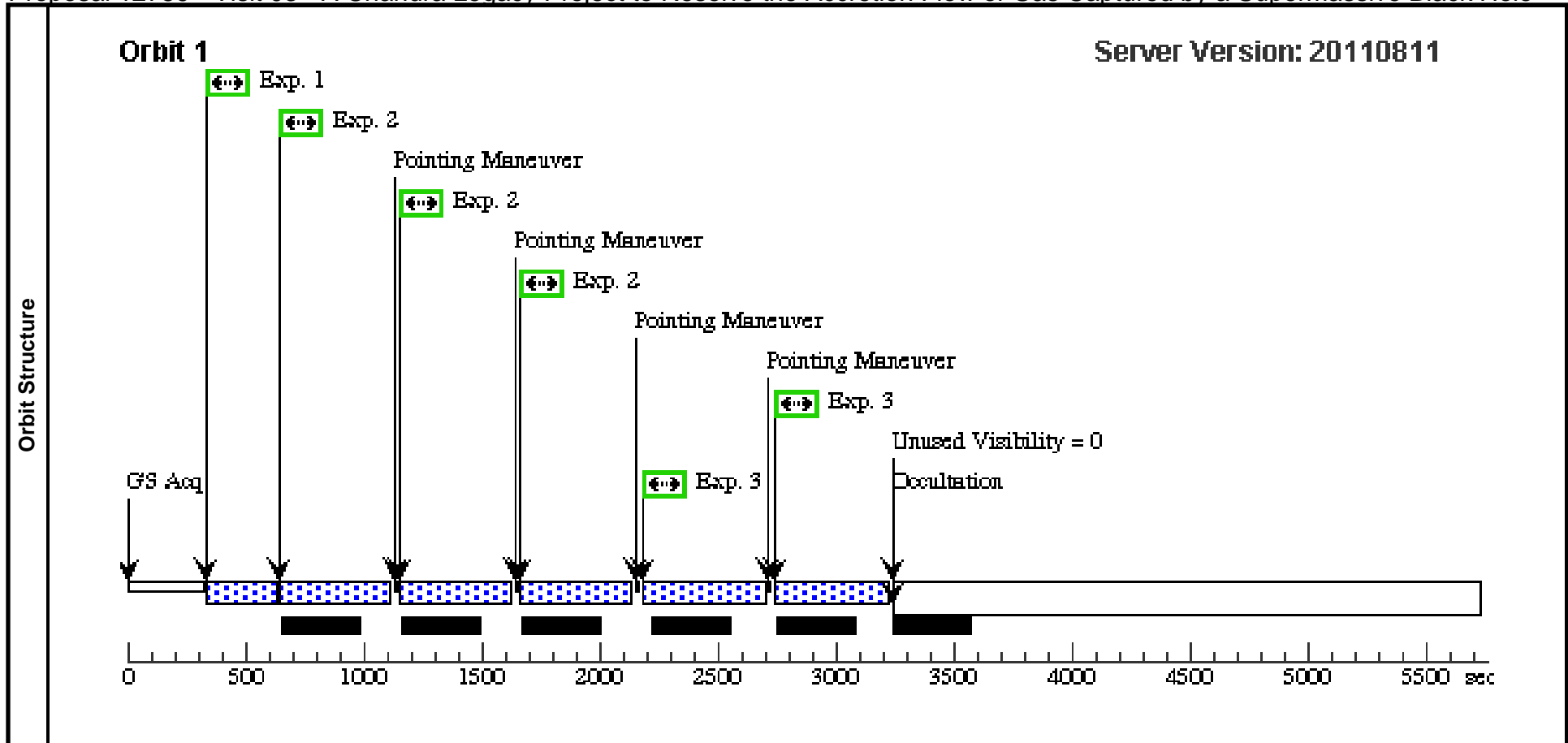
Visit	Proposal 12759, Visit 02, pi Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01									
	#	Primary Pattern	Secondary Pattern	Exposures						
Patterns	(4)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1)						
	(5)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.011 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(2)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	NGC3115-POS2	RA: 10 05 17.8150 (151.3242292d) Dec: -07 39 47.08 (-7.66308d) Equinox: J2000	Radial Velocity: 663 km/sec	V=10	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(2) NGC3115-POS2	ACS/WFC, ACCUM, WFCENTER	F475W	CR-SPLIT=NO	GS ACQ SCENARI O BASE1B3	Pattern 4, Exps 1-1 i n Visit 02 (4)	410 Secs [==>412.0 Secs (Pattern 1)] [==>412.0 Secs (Pattern 2)]	[1]
2		(2) NGC3115-POS2	ACS/WFC, ACCUM, WFCENTER	F850LP	CR-SPLIT=NO		Pattern 5, Exps 2-2 i n Visit 02 (5)	390 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]	



Proposal 12759 - Visit 03 - A Chandra Legacy Project to Resolve the Accretion Flow of Gas Captured by a Supermassive Black Hole

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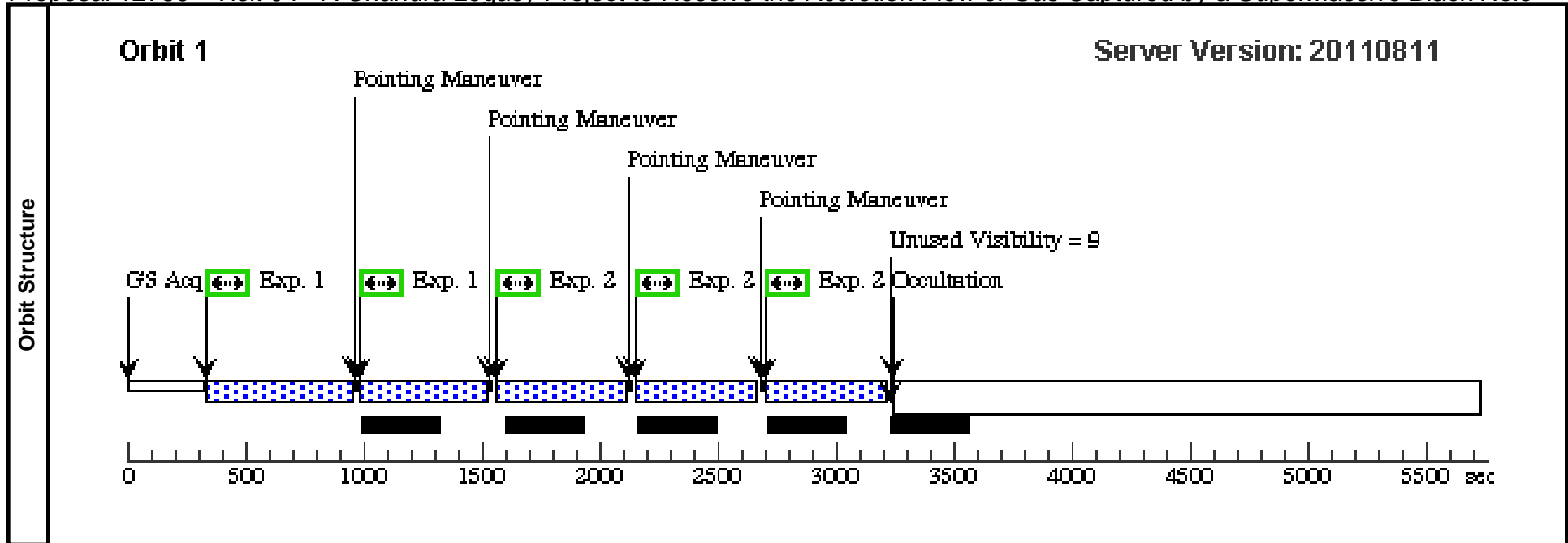
Visit	Proposal 12759, Visit 03, pi Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01									
	Patterns	#	Primary Pattern				Secondary Pattern			
(4)		Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false					(3)		
(5)		Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false					(2)		
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	NGC3115-POS3	RA: 10 05 16.0510 (151.3168792d) Dec: -07 44 10.97 (-7.73638d) Equinox: J2000	Radial Velocity: 663 km/sec	V=10	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(3) NGC3115-POS3	ACS/WFC, ACCUM, WFCENTER	F850LP	CR-SPLIT=NO	GS ACQ SCENARI O BASE1B3		90 Secs	
									[==>]	[1]
	2		(3) NGC3115-POS3	ACS/WFC, ACCUM, WFCENTER	F850LP	CR-SPLIT=NO		Pattern 5, Exps 2-2 in Visit 03 (5)	349 Secs	
								[==>(Pattern 1)]		
								[==>(Pattern 2)]	[1]	
								[==>(Pattern 3)]		
3		(3) NGC3115-POS3	ACS/WFC, ACCUM, WFCENTER	F475W		CR-SPLIT=NO		Pattern 4, Exps 3-3 in Visit 03 (4)	361 Secs	
								[==>(Pattern 1)]		
								[==>(Pattern 2)]	[1]	



Proposal 12759 - Visit 04 - A Chandra Legacy Project to Resolve the Accretion Flow of Gas Captured by a Supermassive Black Hole

Tue Oct 18 01:16:40 GMT 2011

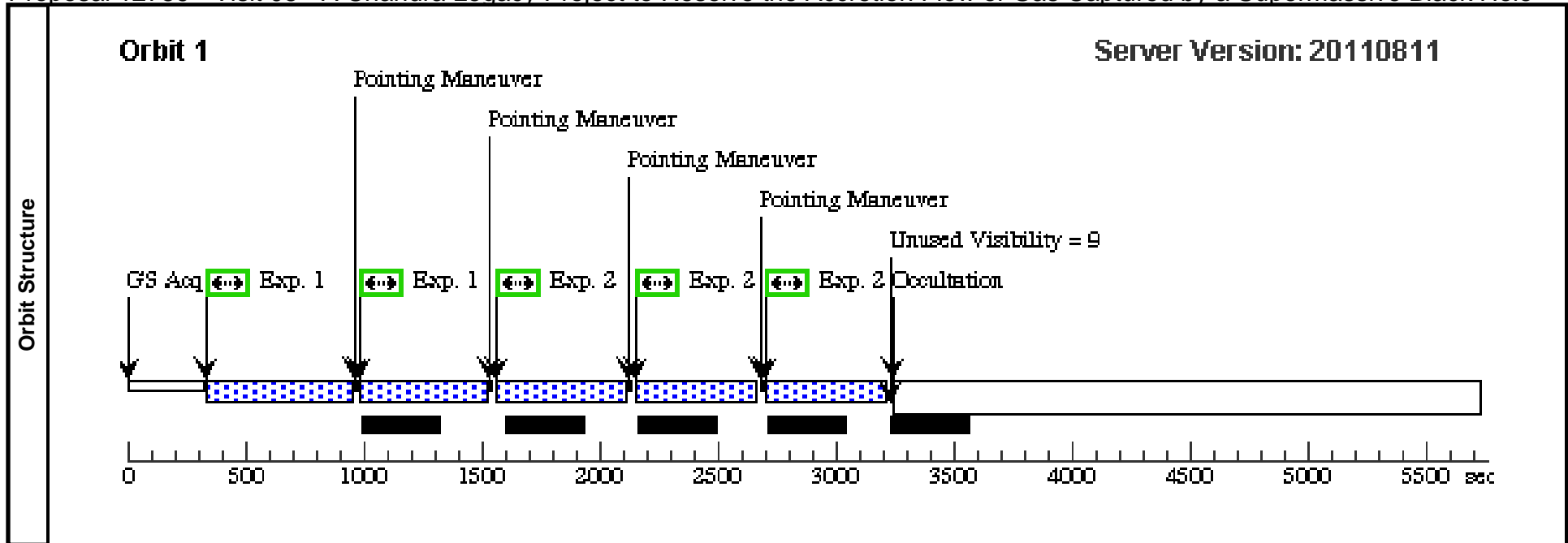
Visit	Proposal 12759, Visit 04, pi Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01									
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures
(4)		Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false				(1)			
(5)		Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false				(2)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(4)	NGC3115-POS4	RA: 10 05 10.4850 (151.2936875d) Dec: -07 42 34.29 (-7.70952d) Equinox: J2000	Radial Velocity: 663 km/sec	V=10	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(4) NGC3115-POS4	ACS/WFC, ACCUM, WFCENTER	F475W	CR-SPLIT=NO	GS ACQ SCENARI O BASE1B3	Pattern 4, Exps 1-1 i n Visit 04 (4)	410 Secs [==>412.0 Secs (Pattern 1)] [==>412.0 Secs (Pattern 2)]	[1]
	2		(4) NGC3115-POS4	ACS/WFC, ACCUM, WFCENTER	F850LP	CR-SPLIT=NO		Pattern 5, Exps 2-2 i n Visit 04 (5)	390 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]



Proposal 12759 - Visit 05 - A Chandra Legacy Project to Resolve the Accretion Flow of Gas Captured by a Supermassive Black Hole

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Visit	Proposal 12759, Visit 05, pi Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01									
	Patterns	#	Primary Pattern				Secondary Pattern			
(4)		Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false							(1)
(5)		Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false							(2)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(5)	NGC3115-POS5	RA: 10 05 10.0110 (151.2917125d) Dec: -07 46 34.01 (-7.77611d) Equinox: J2000	Radial Velocity: 663 km/sec	V=10	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(5) NGC3115-POS5	ACS/WFC, ACCUM, WFCENTER	F475W	CR-SPLIT=NO	GS ACQ SCENARI O BASE1B3	Pattern 4, Exps 1-1 i n Visit 05 (4)	410 Secs [==>412.0 Secs (Pattern 1)] [==>412.0 Secs (Pattern 2)]	[1]
	2		(5) NGC3115-POS5	ACS/WFC, ACCUM, WFCENTER	F850LP	CR-SPLIT=NO		Pattern 5, Exps 2-2 i n Visit 05 (5)	390 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]



Proposal 12759 - Visit 06 - A Chandra Legacy Project to Resolve the Accretion Flow of Gas Captured by a Supermassive Black Hole

Tue Oct 18 01:16:41 GMT 2011

Visit	Proposal 12759, Visit 06, pi Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01									
	Patterns	#	Primary Pattern				Secondary Pattern			
(4)		Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false				(1)			
(5)		Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false				(2)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(6)	NGC3115-POS6	RA: 10 05 1.4570 (151.2560708d) Dec: -07 44 3.93 (-7.73442d) Equinox: J2000	Radial Velocity: 663 km/sec	V=10	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(6) NGC3115-POS6	ACS/WFC, ACCUM, WFCENTER	F475W	CR-SPLIT=NO	GS ACQ SCENARI O BASE1B3	Pattern 4, Exps 1-1 i n Visit 06 (4)	410 Secs [==>412.0 Secs (Pattern 1)] [==>412.0 Secs (Pattern 2)]	[1]	
	2	(6) NGC3115-POS6	ACS/WFC, ACCUM, WFCENTER	F850LP	CR-SPLIT=NO		Pattern 5, Exps 2-2 i n Visit 06 (5)	390 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]	

