



12979 - The Stellar Population Around the Intermediate Mass Black Hole ESO 243-49 HLX-1

Cycle: 20, 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) HLX-1	ACS/SBC	1	26-Sep-2012 21:35:12.0	yes
02	(1) HLX-1	WFC3/IR WFC3/UVIS	4	26-Sep-2012 21:35:39.0	yes
03	(1) HLX-1	ACS/SBC	1	26-Sep-2012 21:35:54.0	yes
04	(1) HLX-1	WFC3/IR WFC3/UVIS	4	26-Sep-2012 21:36:18.0	yes

10 Total Orbits Used

ABSTRACT

We request joint XMM-Newton and HST observations of the best intermediate mass black hole candidate HLX-1. Recent HST and Swift observations found the broadband spectral energy distribution was well described by an irradiated accretion disc plus a stellar population. However, degeneracies in the models resulted in two acceptable solutions with dramatically different parameter values. We request two observations to be performed with XMM-Newton and the HST at different X-ray luminosities in order to break these model degeneracies using the variability of the disc emission. With these two 5 orbit observations we will be able to determine the nature of the environment around the black hole, test formation theories for HLX-1, and rule out beaming as the origin of the extreme luminosities.

OBSERVING DESCRIPTION

We have been awarded 10 orbits of HST time with the ACS/SBC, WFC3/UVIS, and WFC3/IR cameras. We will observe the candidate intermediate mass black hole HLX-1 in the galaxy ESO 243-49 with simultaneous X-ray observations to be performed with the XMM-Newton telescope. We will split our orbits as such: 5 orbits during the mid-luminosity X-ray state and 5 orbits during the low-luminosity X-ray state.

REAL TIME JUSTIFICATION

We request that our HST and XMM-Newton observations be performed as close together as possible (preferably within +/- 2 days).

ADDITIONAL COMMENTS

During a previous set of HST observations of this source with a similar instrument setup, we were advised that there were issues with suitable guide stars in the field for both the ACS/SBC and WFC3/UVIS/IR cameras. To avoid this problem we assigned the ACS/SBC exposure to a separate visit that was performed 10 days apart from the WFC3 exposures. Our previous observation was triggered at short notice following an X-ray outburst. The new observations in this program will not be triggered, but will instead be scheduled during specific time windows when the source is expected to be in the mid and low luminosity X-ray states. We have separated our ACS/SBC and WFC3 exposures in a similar way as previously in order to maximise schedulability, but we request that if possible they be performed within +/- 2 days of each other (i.e. +/-2 days between visit 1 and visit 2, and +/- 2 days between visit 3 and visit 4). If this is not feasible, for example due to a lack of guide stars, please let us know so we can investigate alternative possibilities.

Proposal 12979 - FUV visit 1 (01) - The Stellar Population Around the Intermediate Mass Black Hole ESO 243-49 HLX-1

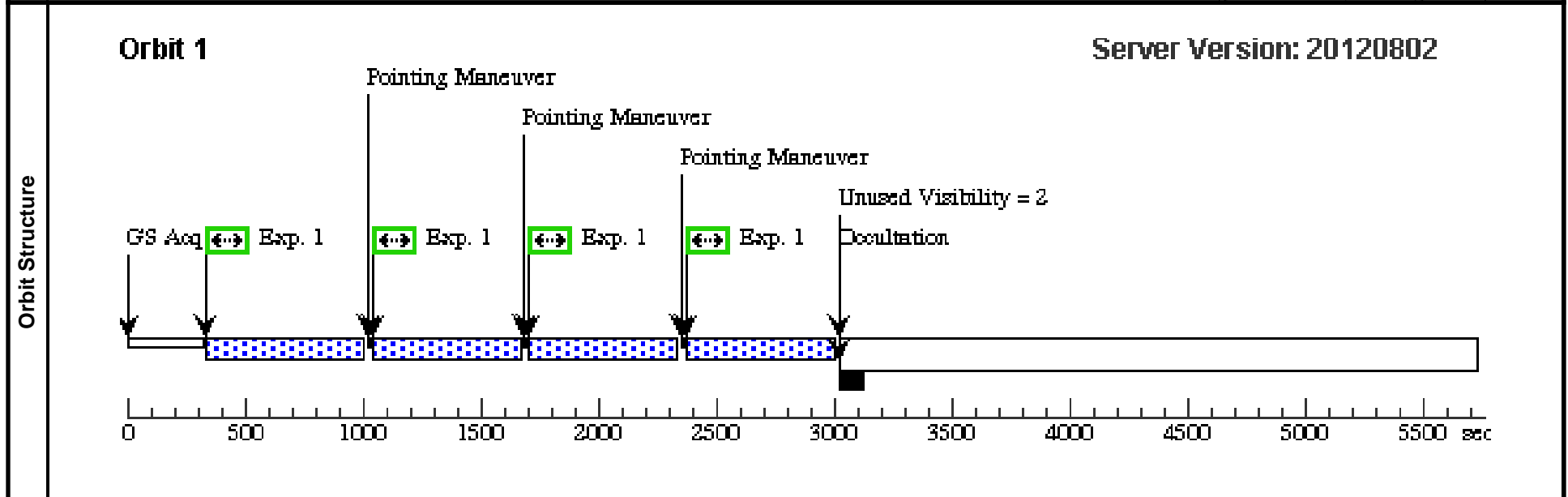
Thu Sep 27 01:36:31 GMT 2012

Visit	Proposal 12979, FUV visit 1 (01), implementation Diagnostic Status: No Diagnostics Scientific Instruments: ACS/SBC Special Requirements: SCHED 100%; BETWEEN 15-NOV-2012:00:00:00 AND 15-DEC-2012:00:00:00; GROUP 01,02 WITHIN 2D Comments: First far-UV exposure with the ACS/SBV during the mid-luminosity state.		

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)	HLX-1	RA: 01 10 28.3000 (17.6179167d) Dec: -46 04 22.30 (-46.07286d) Equinox: J2000	Redshift: 0.0223	V=23.83+/-0.08 far-UV=24.11+/-0.05, H=24.4+/-0.3	Reference Frame: ICRS

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(ACS.im.41 3832)	(1) HLX-1	ACS/SBC, ACCUM, SBC	F140LP			Pattern 1, Exps 1-1 in FUV visit 1 (01) (1)	512 Secs [=>607.0 Secs (Pattern 1)] [=>607.0 Secs (Pattern 2)] [=>607.0 Secs (Pattern 3)] [=>607.0 Secs (Pattern 4)]	[1]



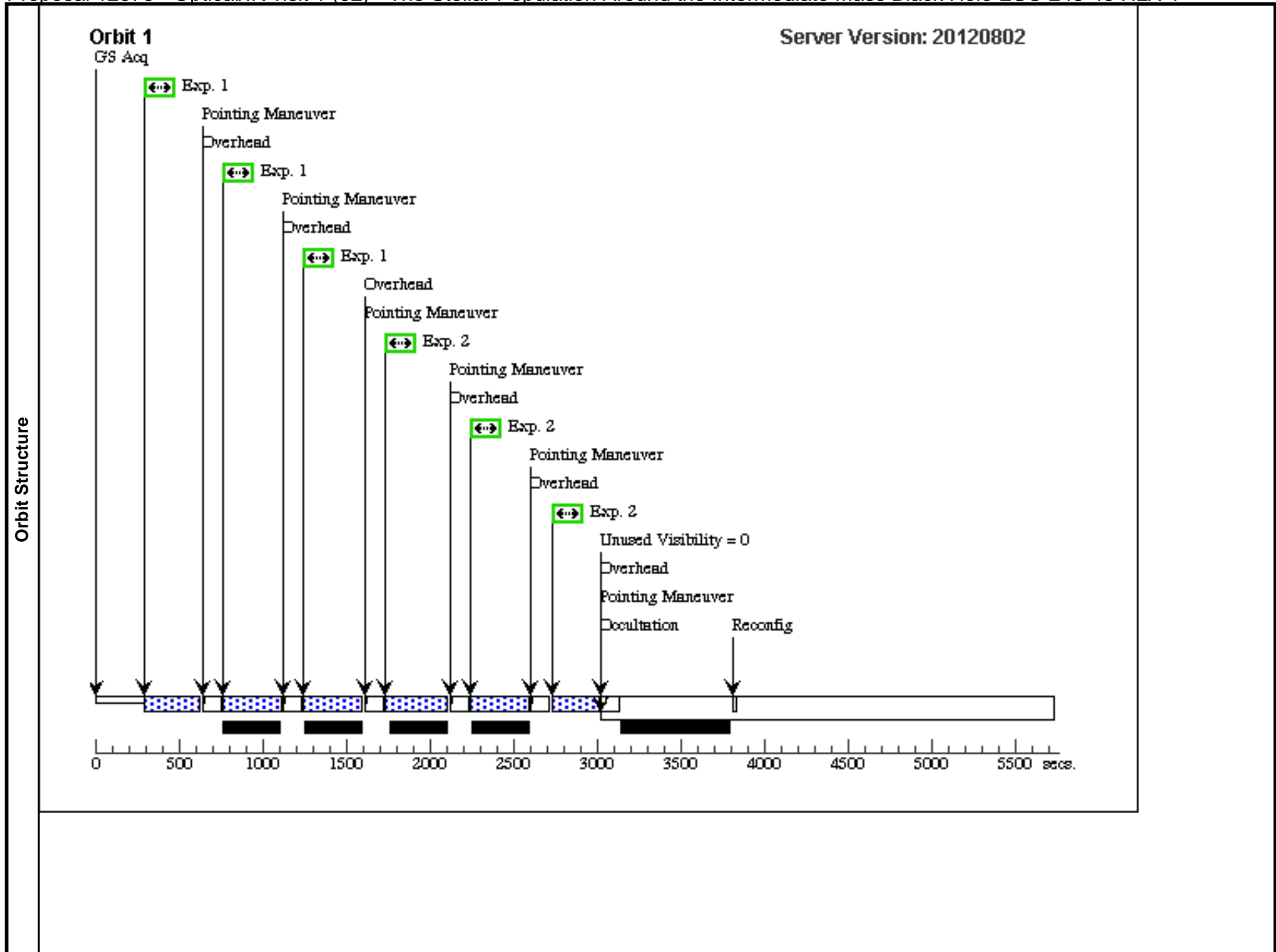
Proposal 12979 - Optical/IR visit 1 (02) - The Stellar Population Around the Intermediate Mass Black Hole ESO 243-49 HLX-1

Thu Sep 27 01:36:33 GMT 2012

Visit	Proposal 12979, Optical/IR visit 1 (02), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: SCHED 100%; BETWEEN 15-NOV-2012:00:00:00 AND 15-DEC-2012:00:00:00; GROUP 02,01 WITHIN 2D Comments: First set of optical and near-IR exposures with the WFC3/UVIS and WFC3/IR cameras during the mid-luminosity state.					
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures	
(4)		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		(3), (4)		
(5)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2), (5), (6), (7), (8)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	HLX-1	RA: 01 10 28.3000 (17.6179167d) Dec: -46 04 22.30 (-46.07286d) Equinox: J2000	Redshift: 0.0223	V=23.83+/-0.08 far-UV=24.11+/-0.05, H=24.4+/-0.3	Reference Frame: ICRS

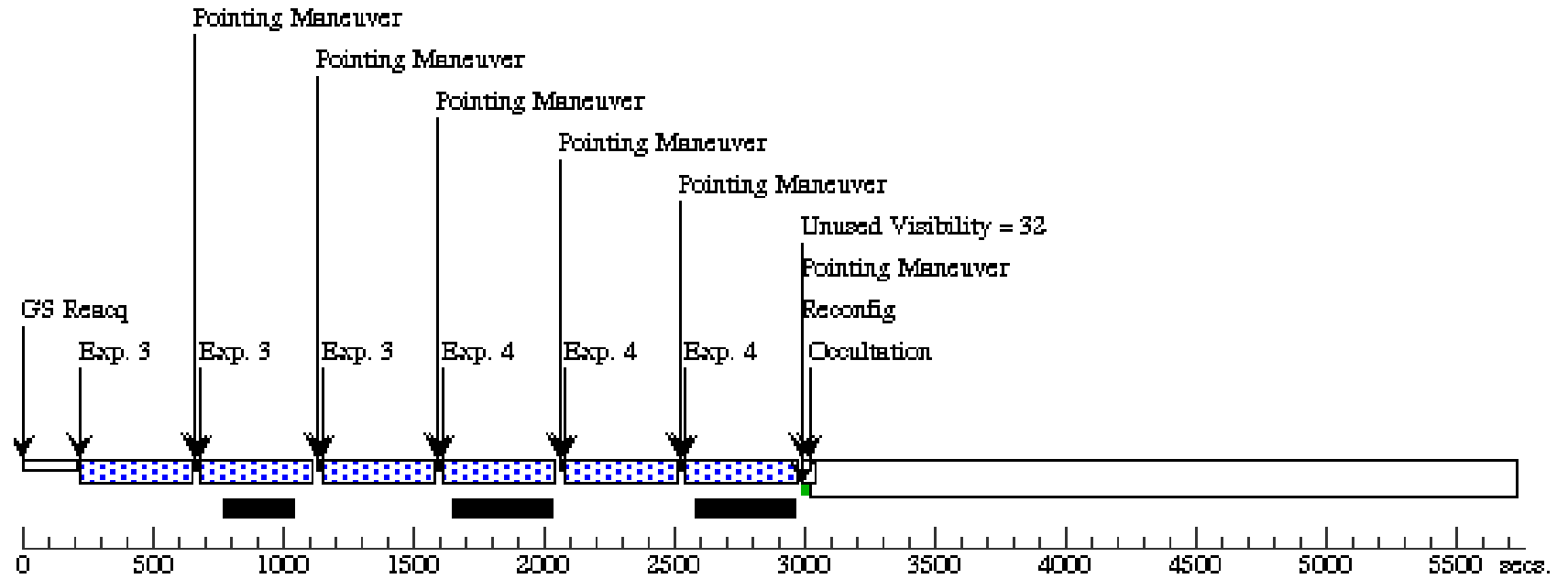
Proposal 12979 - Optical/IR visit 1 (02) - The Stellar Population Around the Intermediate Mass Black Hole ESO 243-49 HLX-1

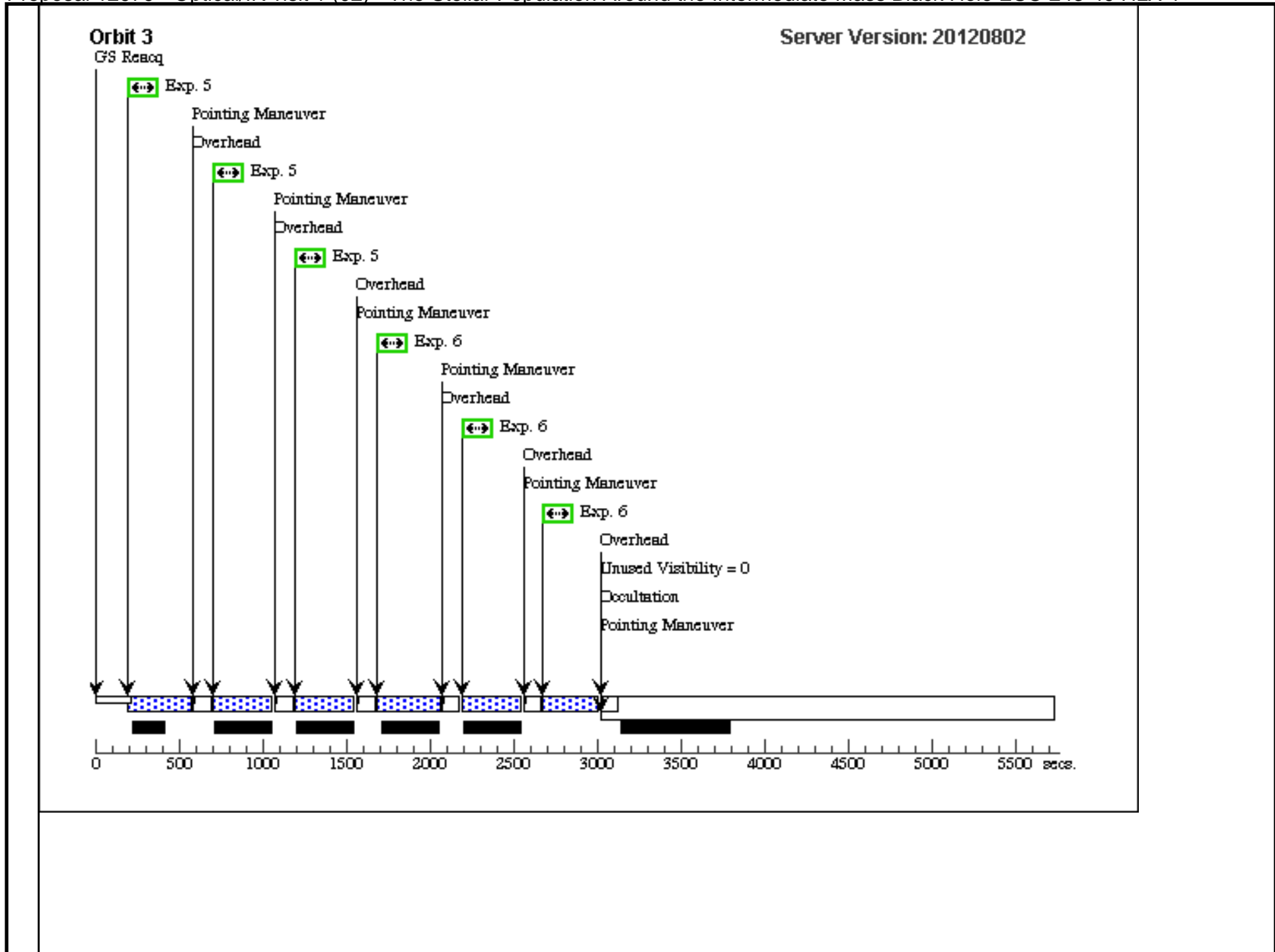
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	NUV	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F300X	FLASH=11		Pattern 5, Exps 1-1 in Optical/IR visit 1 (02) (5)	354 Secs [==>299.0 Secs (Pattern 1)] [==>351.0 Secs (Pattern 2)] [==>351.0 Secs (Pattern 3)]	[1]
	2	U-band	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F336W	FLASH=10		Pattern 5, Exps 2-2 in Optical/IR visit 1 (02) (5)	354 Secs [==>351.0 Secs (Pattern 1)] [==>351.0 Secs (Pattern 2)] [==>281.0 Secs (Pattern 3)]	[1]
	3	Z-band	(1) HLX-1	WFC3/IR, MULTIACCUM, IR	F105W	NSAMP=9; SAMP-SEQ=SPAR S50		Pattern 4, Exps 3-3 in Optical/IR visit 1 (02) (4)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]
	4	H-band	(1) HLX-1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=9; SAMP-SEQ=SPAR S50		Pattern 4, Exps 4-4 in Optical/IR visit 1 (02) (4)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]
	5	C-band	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F390W	FLASH=8		Pattern 5, Exps 5-5 in Optical/IR visit 1 (02) (5)	354 Secs [==>356.0 Secs (Pattern 1)] [==>356.0 Secs (Pattern 2)] [==>356.0 Secs (Pattern 3)]	[3]
	6	V-band	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F555W			Pattern 5, Exps 6-6 in Optical/IR visit 1 (02) (5)	354 Secs [==>356.0 Secs (Pattern 1)] [==>356.0 Secs (Pattern 2)] [==>333.0 Secs (Pattern 3)]	[3]
	7	R-band	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F621M	FLASH=7		Pattern 5, Exps 7-7 in Optical/IR visit 1 (02) (5)	354 Secs [==>355.0 Secs (Pattern 1)] [==>355.0 Secs (Pattern 2)] [==>355.0 Secs (Pattern 3)]	[4]
	8	I-band	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F775W	FLASH=4		Pattern 5, Exps 8-8 in Optical/IR visit 1 (02) (5)	354 Secs [==>355.0 Secs (Pattern 1)] [==>355.0 Secs (Pattern 2)] [==>330.0 Secs (Pattern 3)]	[4]

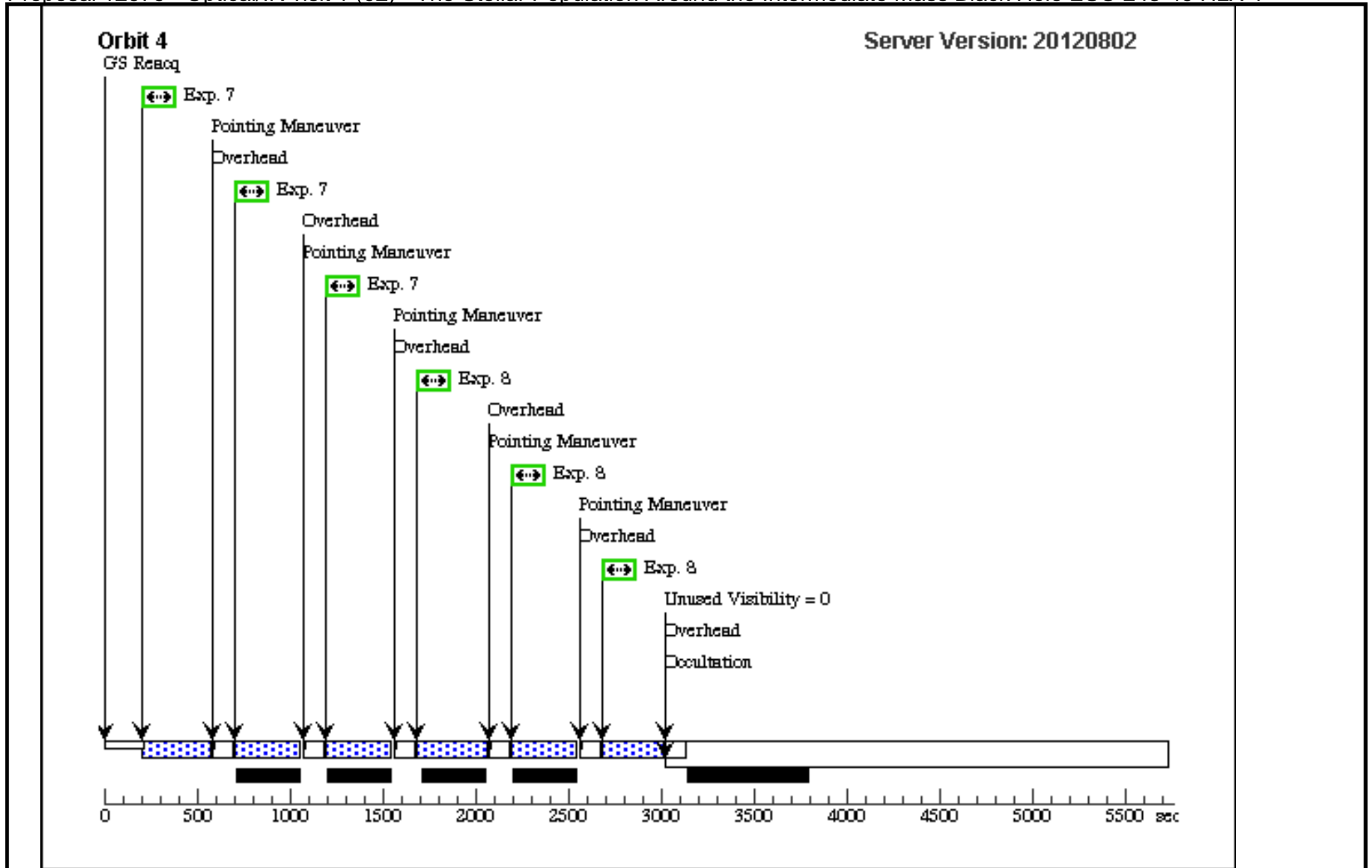


Orbit 2

Server Version: 20120802







Proposal 12979 - FUV visit 2 (03) - The Stellar Population Around the Intermediate Mass Black Hole ESO 243-49 HLX-1

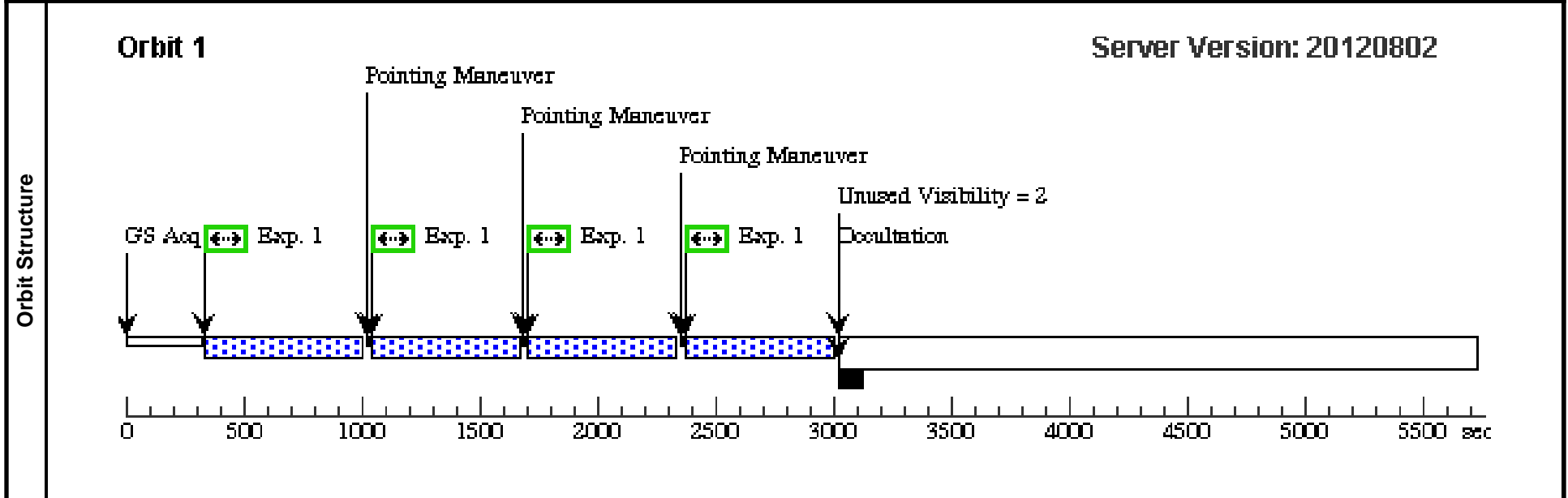
Thu Sep 27 01:36:40 GMT 2012

Visit	Proposal 12979, FUV visit 2 (03), implementation Diagnostic Status: No Diagnostics Scientific Instruments: ACS/SBC Special Requirements: SCHED 100%; BETWEEN 14-MAY-2013:00:00:00 AND 11-JUL-2013:00:00:00; GROUP 03,04 WITHIN 2D Comments: First far-UV exposure with the ACS/SBV during the low-luminosity state.		

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)	HLX-1	RA: 01 10 28.3000 (17.6179167d) Dec: -46 04 22.30 (-46.07286d) Equinox: J2000	Redshift: 0.0223	V=23.83+/-0.08 far-UV=24.11+/-0.05, H=24.4+/-0.3	Reference Frame: ICRS

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(ACS.im.41 3832)	(1) HLX-1	ACS/SBC, ACCUM, SBC	F140LP			Pattern 1, Exps 1-1 in FUV visit 2 (03) (1)	512 Secs [=>607.0 Secs (Pattern 1)] [=>607.0 Secs (Pattern 2)] [=>607.0 Secs (Pattern 3)] [=>607.0 Secs (Pattern 4)]	[1]



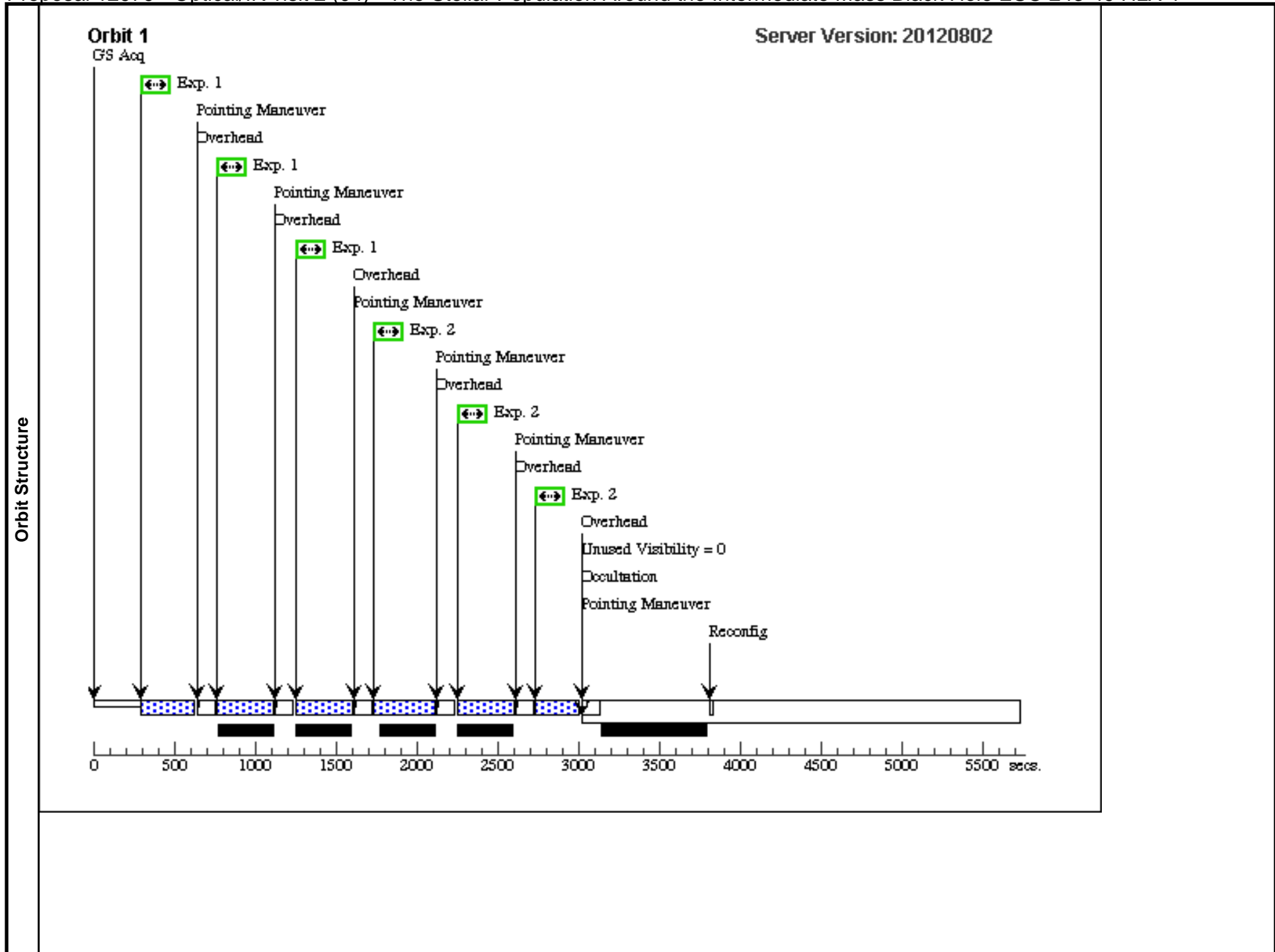
Proposal 12979 - Optical/IR visit 2 (04) - The Stellar Population Around the Intermediate Mass Black Hole ESO 243-49 HLX-1

Thu Sep 27 01:36:41 GMT 2012

Visit	Proposal 12979, Optical/IR visit 2 (04), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: SCHED 100%; BETWEEN 14-MAY-2013:00:00:00 AND 11-JUL-2013:00:00:00; GROUP 04,03 WITHIN 2D Comments: First set of optical and near-IR exposures with the WFC3/UVIS and WFC3/IR cameras during the low-luminosity state.					
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures	
(4)		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		(3), (4)		
(5)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2), (5), (6), (7), (8)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	HLX-1	RA: 01 10 28.3000 (17.6179167d) Dec: -46 04 22.30 (-46.07286d) Equinox: J2000	Redshift: 0.0223	V=23.83+/-0.08 far-UV=24.11+/-0.05, H=24.4+/-0.3	Reference Frame: ICRS

Proposal 12979 - Optical/IR visit 2 (04) - The Stellar Population Around the Intermediate Mass Black Hole ESO 243-49 HLX-1

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	NUV	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F300X	FLASH=11		Pattern 5, Exps 1-1 in Optical/IR visit 2 (04) (5)	354 Secs [==>300.0 Secs (Pattern 1)] [==>352 Secs (Pattern 2)] [==>352 Secs (Pattern 3)]	[1]
	2	U-band	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F336W	FLASH=10		Pattern 5, Exps 2-2 in Optical/IR visit 2 (04) (5)	354 Secs [==>352.0 Secs (Pattern 1)] [==>352.0 Secs (Pattern 2)] [==>276.0 Secs (Pattern 3)]	[1]
	3	Z-band	(1) HLX-1	WFC3/IR, MULTIACCUM, IR	F105W	NSAMP=9; SAMP-SEQ=SPAR S50		Pattern 4, Exps 3-3 in Optical/IR visit 2 (04) (4)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]
	4	H-band	(1) HLX-1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=9; SAMP-SEQ=SPAR S50		Pattern 4, Exps 4-4 in Optical/IR visit 2 (04) (4)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]
	5	C-band	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F390W	FLASH=8		Pattern 5, Exps 5-5 in Optical/IR visit 2 (04) (5)	354 Secs [==>358.0 Secs (Pattern 1)] [==>358.0 Secs (Pattern 2)] [==>358.0 Secs (Pattern 3)]	[3]
	6	V-band	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F555W			Pattern 5, Exps 6-6 in Optical/IR visit 2 (04) (5)	354 Secs [==>358.0 Secs (Pattern 1)] [==>358.0 Secs (Pattern 2)] [==>323.0 Secs (Pattern 3)]	[3]
	7	R-band	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F621M	FLASH=7		Pattern 5, Exps 7-7 in Optical/IR visit 2 (04) (5)	354 Secs [==>359.0 Secs (Pattern 1)] [==>359.0 Secs (Pattern 2)] [==>359.0 Secs (Pattern 3)]	[4]
	8	I-band	(1) HLX-1	WFC3/UVIS, ACCUM, UVIS2	F775W	FLASH=4		Pattern 5, Exps 8-8 in Optical/IR visit 2 (04) (5)	354 Secs [==>359.0 Secs (Pattern 1)] [==>359.0 Secs (Pattern 2)] [==>310.0 Secs (Pattern 3)]	[4]



Orbit 2

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