



13639 - Resolving Lyman-alpha Emission On Physical Scales < 270 pc at $z > 4$

Cycle: 22, 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) SGASJ091541+382655	ACS/WFC	3	29-Aug-2015 21:00:52.0	yes
02	(2) SGASJ115201+331347	ACS/WFC	3	29-Aug-2015 21:00:54.0	yes
03	(3) SGASJ134331+415455	ACS/WFC	2	29-Aug-2015 21:00:56.0	yes
04	(4) SGASJ162132+060705	ACS/WFC	3	29-Aug-2015 21:00:57.0	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) RCS1J022431-0002.5C	ACS/WFC	2	29-Aug-2015 21:00:59.0	yes
06	(6) SGASJ105038+001715	ACS/WFC	2	29-Aug-2015 21:01:00.0	yes

15 Total Orbits Used

ABSTRACT

We propose ACS-WFC Ramp narrowband imaging of six strongly lensed Lyman-alpha Emitters (LAEs) at $z > 4$ that will spatially resolve the Lyman-alpha line emitting regions on scales < 270 pc. The best available observations (HST, Spitzer, 10m ground based telescopes) are unable to provide robust measurements of the structure of these galaxies from blank field studies, but strong gravitational lensing provides a unique opportunity to peer into the heart of young star forming galaxies at high redshift and address outstanding questions regarding their morphology and evolution. Strong lensing magnifies each of our target LAEs, increasing the effective spatial resolution of ACS-WFC such that the point spread function will correspond to physical scales < 270 parsecs within all six $z > 4$ galaxies. Additionally, the boost in flux due to gravitational lensing makes our proposed targets the brightest sources of their kind at these redshifts, in spite of the fact that they are intrinsically $\sim L^*$ LAEs. The proposed observations will probe the morphological properties of Lyman-alpha and UV continuum emission in typical/representative high-redshift LAEs with signal-to-noise and spatial resolution comparable to studies of Lyman-alpha emitting galaxies in the $z \sim 0.1$ universe. The resulting data will bridge the gap between deep ground-based studies of blank field LAEs at high redshift, and detailed studies of low-redshift LAEs.

OBSERVING DESCRIPTION

We will be acquiring ACS-WFC Ramp Filter observations of six strongly lensed Lyman Alpha Emitters (LAEs). One of the six targets will also require broadband F850LP observations. Each target will be observed for either 2 or 3 orbits. The three targets with 2 orbits will have 4 individual exposures in each filter (this includes the one target that will have both Ramp Filter and broadband observations). The three targets with 3 orbits will have 6 individual Ramp Filter exposures (2/orbit). From these data we will measure the spatial extent and morphology of Lyman-alpha and rest-frame UV emission emitting regions on physical scales of < 270 pc, where the high spatial resolution is achieved via the combination of superb HST image quality and magnification from gravitational lensing.

We optimize ramp filter wavelength settings to match the Lyman-alpha line emission for each target. From the available imaging and spectroscopy we generate precise estimates of the integration times necessary to achieve good S/N in the ramp narrowband imaging for each source. We calculate the necessary integration times to achieve a minimum S/N of ~ 30 per LAE using the ACS/Ramp and ACS/imaging exposure time calculator

Proposal 13639 (STScI Edit Number: 2, Created: Saturday, August 29, 2015 8:01:01 PM EST) - Overview

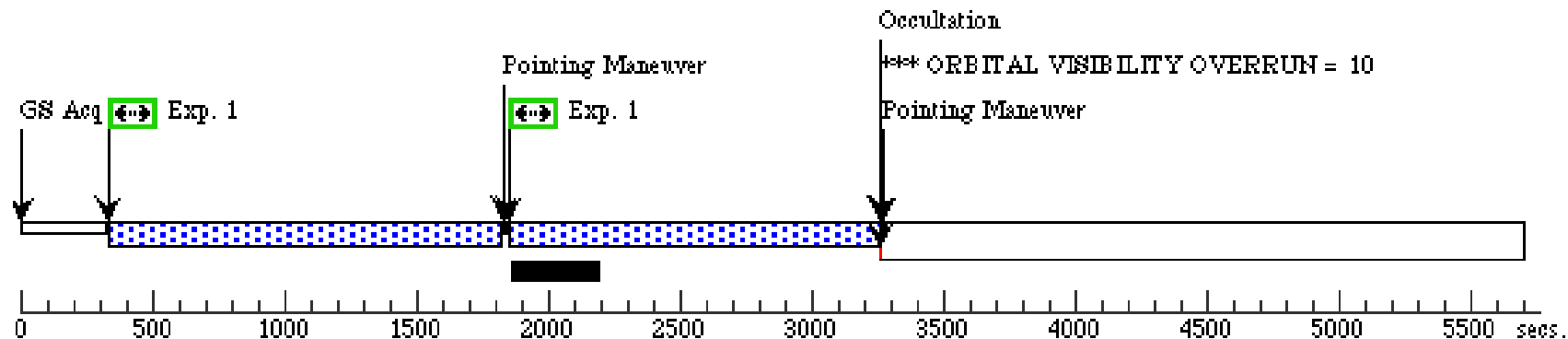
(ETC). The choice of minimum S/N ensures that we can measure a robust radial light profile for these sources regardless of whether they are highly compact, or extended in Lyman-alpha. The orbit packing for these observations is straightforward, and for all targets we will employ a dither pattern with a minimum of four individual exposures per source, per filter in order to facilitate cosmic ray rejection. The dithering uses dither steps intended to subsample the pixel array to improve the quality of the final PSF reconstruction, post drizzling, and to help mitigate the impact of any chip defects. Due to the low background (between ~8-20 e- per pixel for our various exposures) expected in our data, we also apply a post-flash to each exposure in order to facilitate charge transfer efficiency (CTE) corrections.

Proposal 13639 - SGAS0915 (01) - Resolving Lyman-alpha Emission On Physical Scales < 270 pc at z > 4

Visit	Proposal 13639, SGAS0915 (01), scheduling Sun Aug 30 01:01:01 GMT 2015									
	Diagnostic Status: Warning Scientific Instruments: ACS/WFC Special Requirements: (none)									
Diagnostics	(SGAS0915 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN									
	(SGAS0915 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN									
	(SGAS0915 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN									
	(SGAS0915 ramp1 (01.001)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.									
	(SGAS0915 ramp1 (01.002)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.									
Patterns	#	Primary Pattern				Secondary Pattern				Exposures
	(5)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187				Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false				(1)
	(6)	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				(2)
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(1)	SGASJ091541+382655	RA: 09 15 41.0300 (138.9209583d) Dec: +38 26 53.50 (38.44819d) Equinox: J2000				V=24.0+/-1.0 i = 22.8, z = 23.3		Reference Frame: ICRS	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	SGAS0915 r amp1	(1) SGASJ091541+3 82655	ACS/WFC, ACCUM, WFC2-ORAMP	FR782N 7510 A	FLASH=25		Pattern 5, Exps 1-1 i n SGAS0915 (01) (5)	1300 Secs (5302 Secs) [=>1277.0 Secs (Pattern 1)] [=>1277.0 Secs (Pattern 2)]	[1]
									[=>1374.0 Secs (Pattern 3)] [=>1374.0 Secs (Pattern 4)]	[2]
	2	SGAS0915 r amp1	(1) SGASJ091541+3 82655	ACS/WFC, ACCUM, WFC2-ORAMP	FR782N 7510 A	FLASH=25		Pattern 6, Exps 2-2 i n SGAS0915 (01) (6)	1300 Secs (2744 Secs) [=>1383.0 Secs (Pattern 1)] [=>1361.0 Secs (Pattern 2)]	[3]

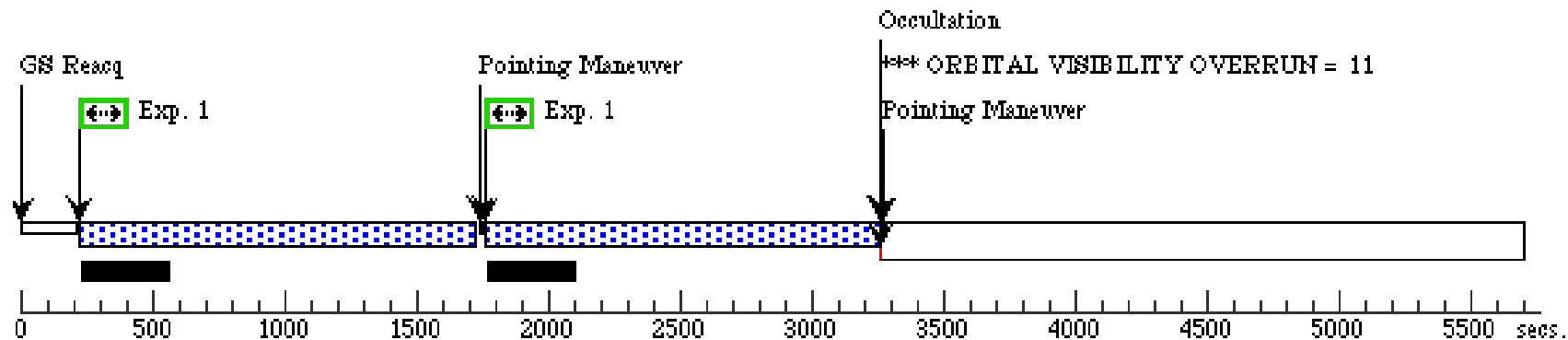
Orbit 1

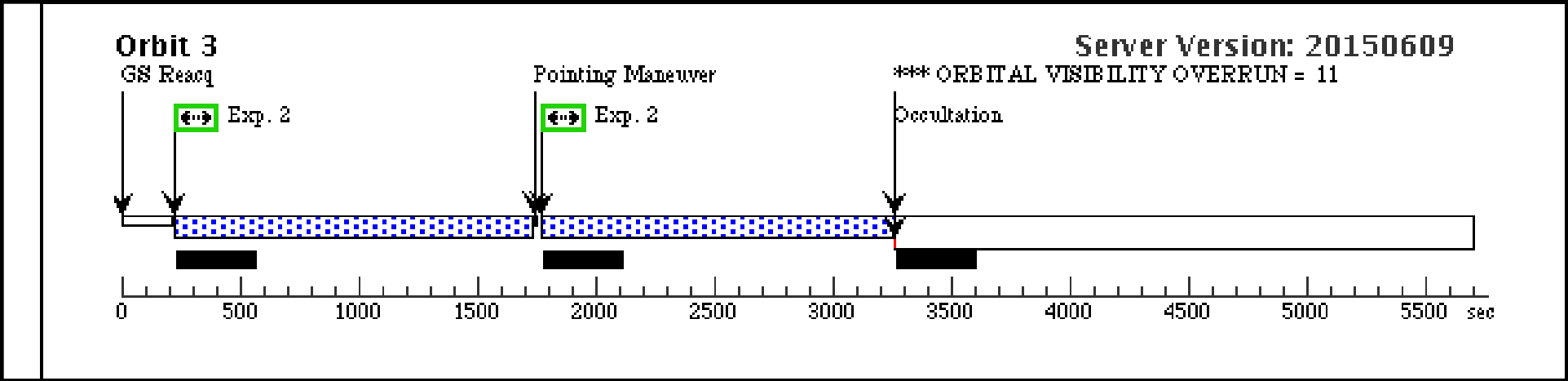
Server Version: 20150609



Orbit 2

Server Version: 20150609



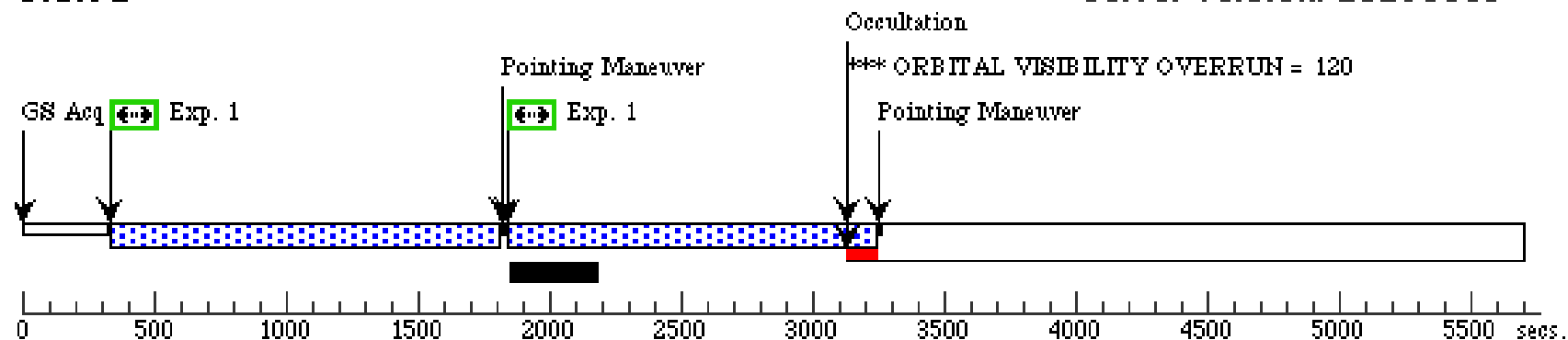


Proposal 13639 - SGAS1152 (02) - Resolving Lyman-alpha Emission On Physical Scales < 270 pc at z > 4

Visit	Proposal 13639, SGAS1152 (02), implementation										Sun Aug 30 01:01:02 GMT 2015			
	Diagnostic Status: Warning													
	Scientific Instruments: ACS/WFC													
	Special Requirements: SCHED 60%													
Diagnostics	(SGAS1152 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN													
	(SGAS1152 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN													
	(SGAS1152 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN													
	(SGAS1152 Ramp (02.001)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.													
	(SGAS1152 Ramp (02.002)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.													
Patterns	#	Primary Pattern					Secondary Pattern					Exposures		
	(5)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187			Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false								(1)	
	(6)	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								(2)	
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections			Fluxes		Miscellaneous			
	(2)	SGASJ115201+331347		RA: 11 52 0.9260 (178.0038583d) Dec: +33 13 43.32 (33.22870d) Equinox: J2000					V=24.0+/-1.0 r = 23.5, i = 24.2		Reference Frame: ICRS			
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit		
	1	SGAS1152 Ramp	(2) SGASJ115201+331347	ACS/WFC, ACCUM, WFC2-ORAMP		FR601N 6235 A	FLASH=25	GS ACQ SCENARIO BASE1B3	Pattern 5, Exps 1-1 in SGAS1152 (02) (5)	1300 Secs (5260 Secs)				
										[==>1267.0 Secs (Pattern 1)]		[1]		
										[==>1267.0 Secs (Pattern 2)]				
										[==>1363.0 Secs (Pattern 3)]		[2]		
		[==>1363.0 Secs (Pattern 4)]												
2	SGAS1152 Ramp	(2) SGASJ115201+331347	ACS/WFC, ACCUM, WFC2-ORAMP		FR601N 6235 A	FLASH=25		Pattern 6, Exps 2-2 in SGAS1152 (02) (6)	1300 Secs (2723 Secs)					
									[==>1367.0 Secs (Pattern 1)]		[3]			
									[==>1356.0 Secs (Pattern 2)]					

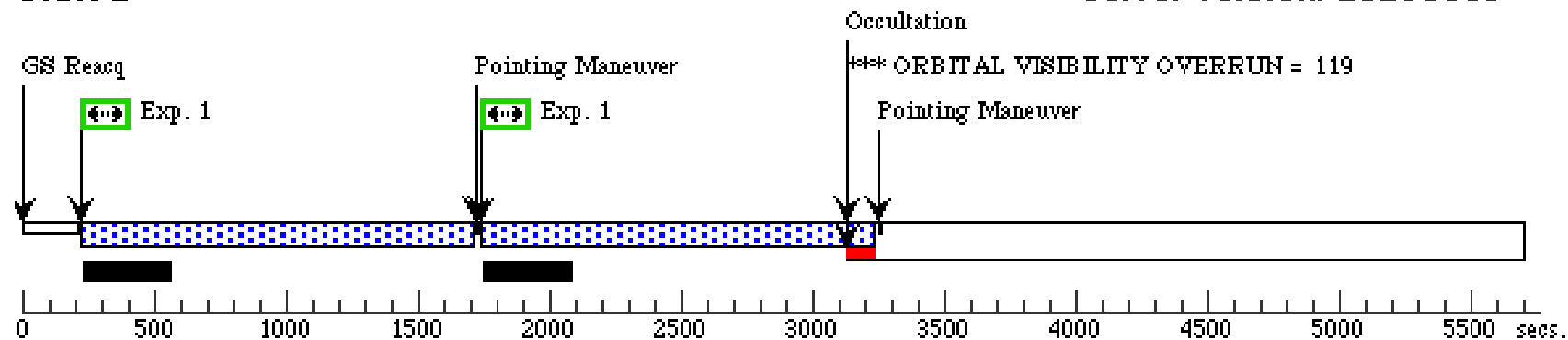
Orbit 1

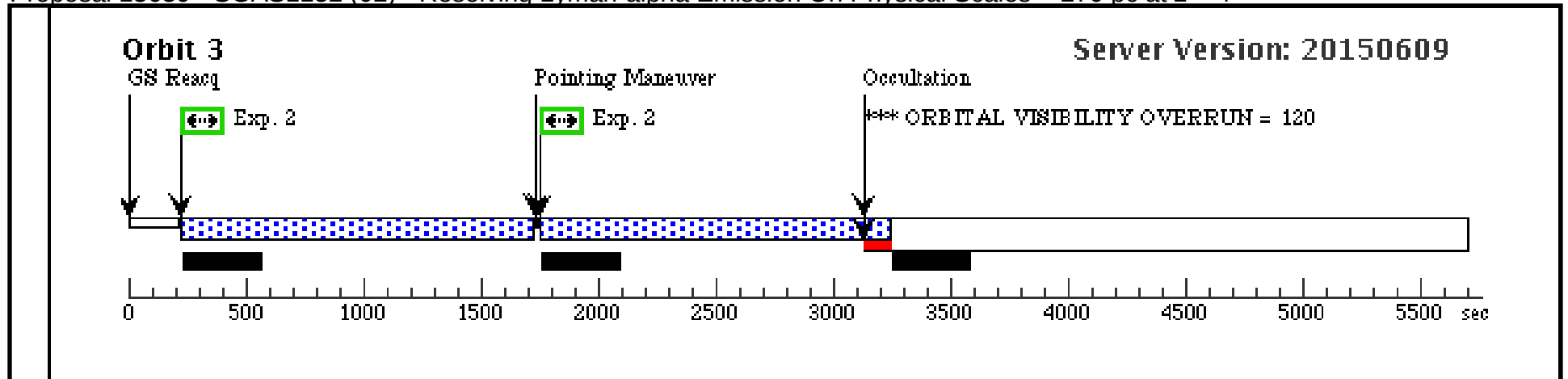
Server Version: 20150609



Orbit 2

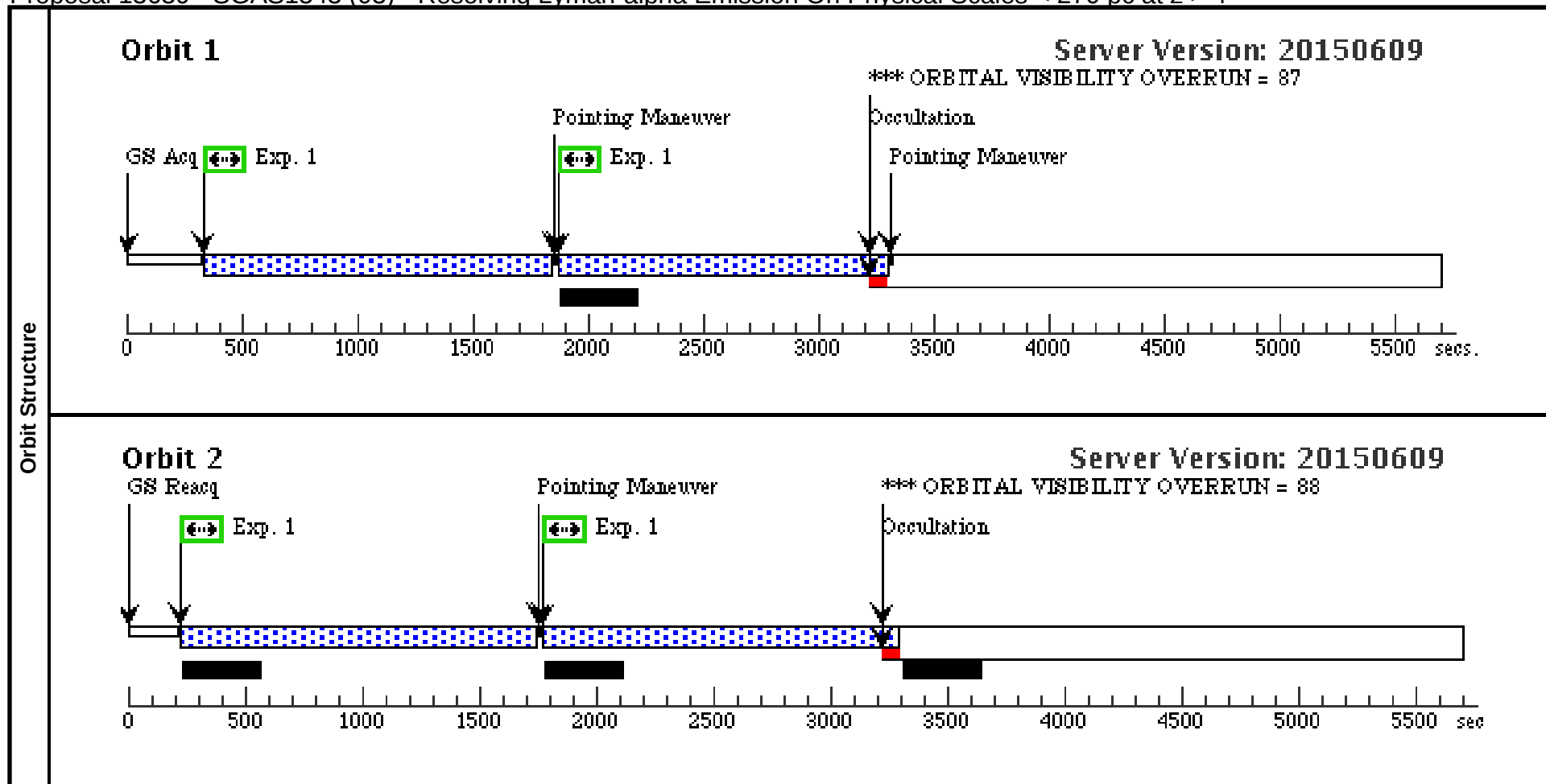
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Proposal 13639 - SGAS1343 (03) - Resolving Lyman-alpha Emission On Physical Scales < 270 pc at z > 4

Visit	Proposal 13639, SGAS1343 (03), implementation Sun Aug 30 01:01:02 GMT 2015									
	Diagnostic Status: Warning Scientific Instruments: ACS/WFC Special Requirements: SCHED 50%									
Diagnostics	(SGAS1343 (03)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (SGAS1343 (03)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (SGAS1343 Ramp (03.001)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.									
Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
	(5)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187				Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false			(1)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(3)	SGASJ134331+415455	RA: 13 43 30.6680 (205.8777833d) Dec: +41 54 55.00 (41.91528d) Equinox: J2000				V=24.0+/-1.0 i = 23.3, z=23.3		Reference Frame: ICRS	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	SGAS1343 Ramp	(3) SGASJ134331+415455	ACS/WFC, ACCUM, WFC1-IRAMP	FR716N 7270 A	FLASH=25	GS ACQ SCENARIO BASE1B3	Pattern 5, Exps 1-1 in SGAS1343 (03) (5)	1320 Secs (5378 Secs)	
									[=>1296.0 Secs (Pattern 1)]	[1]
									[=>1296.0 Secs (Pattern 2)]	
									[=>1393.0 Secs (Pattern 3)]	
									[=>1393.0 Secs (Pattern 4)]	[2]

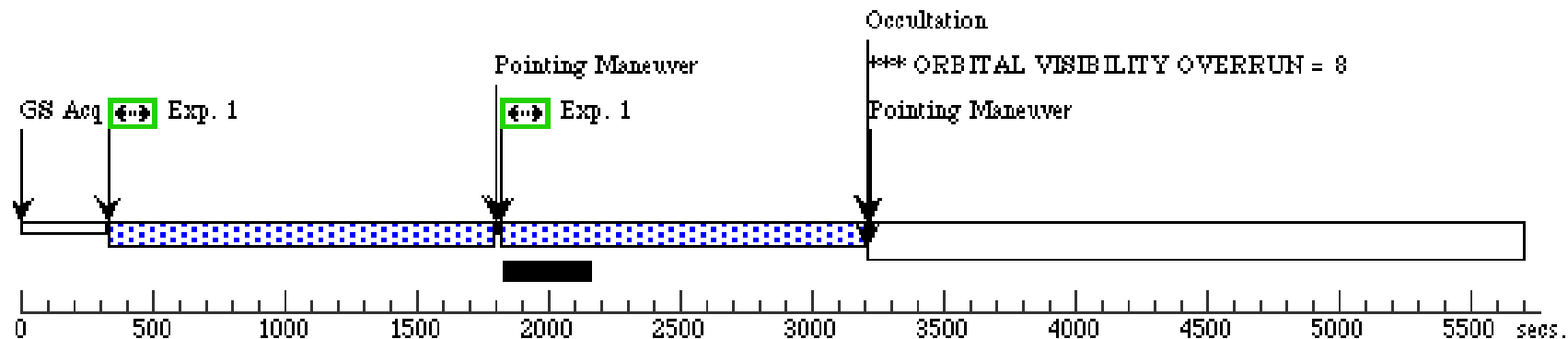


Proposal 13639 - SGAS1621 (04) - Resolving Lyman-alpha Emission On Physical Scales < 270 pc at z > 4

Visit	Proposal 13639, SGAS1621 (04), completed										Sun Aug 30 01:01:02 GMT 2015
	Diagnostic Status: Warning										
	Scientific Instruments: ACS/WFC										
	Special Requirements: (none)										
Diagnostics	(SGAS1621 (04)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN										
	(SGAS1621 (04)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN										
	(SGAS1621 (04)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN										
	(SGAS1621 Ramp1 (04.001)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.										
	(SGAS1621 Ramp1 (04.002)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.										
Patterns	#	Primary Pattern					Secondary Pattern				Exposures
	(5)	Pattern Type=ACS-WFC-DITHER-BOX		Coordinate Frame=POS-TARG							(1)
		Purpose=DITHER		Pattern Orientation=20.67							
	Number Of Points=4		Angle Between Sides=69.05								
	Point Spacing=0.265		Center Pattern=false								
	Line Spacing=0.187										
	(6)	Pattern Type=ACS-WFC-DITHER-LINE		Coordinate Frame=POS-TARG							(2)
		Purpose=DITHER		Pattern Orientation=85.28							
		Number Of Points=2		Angle Between Sides=							
		Point Spacing=3.011		Center Pattern=false							
		Line Spacing=									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(4)	SGASJ162132+060705	RA: 16 21 32.8460 (245.3868583d) Dec: +06 07 7.97 (6.11888d) Equinox: J2000				V=22.7+/-0.2 r = 22.2, i = 22.3		Reference Frame: ICRS		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	SGAS1621 Ramp1	(4) SGASJ162132+060705	ACS/WFC, ACCUM, WFC2-ORAMP	FR601N 6230 A	FLASH=25		Pattern 5, Exps 1-1 in SGAS1621 (04) (5)	1300 Secs (5190 Secs)		
									[==>1249.0 Secs (Pattern 1)]		[1]
									[==>1249.0 Secs (Pattern 2)]		
									[==>1346.0 Secs (Pattern 3)]		[2]
		[==>1346.0 Secs (Pattern 4)]									
2	SGAS1621 Ramp1	(4) SGASJ162132+060705	ACS/WFC, ACCUM, WFC2-ORAMP	FR601N 6230 A	FLASH=25		Pattern 6, Exps 2-2 in SGAS1621 (04) (6)	1300 Secs (2688 Secs)			
								[==>1341.0 Secs (Pattern 1)]		[3]	
								[==>1347.0 Secs (Pattern 2)]			

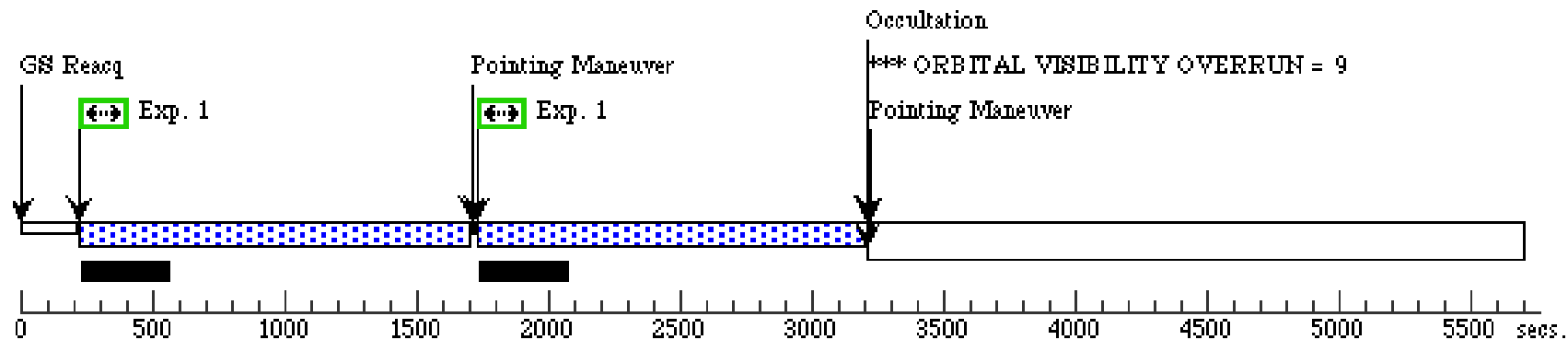
Orbit 1

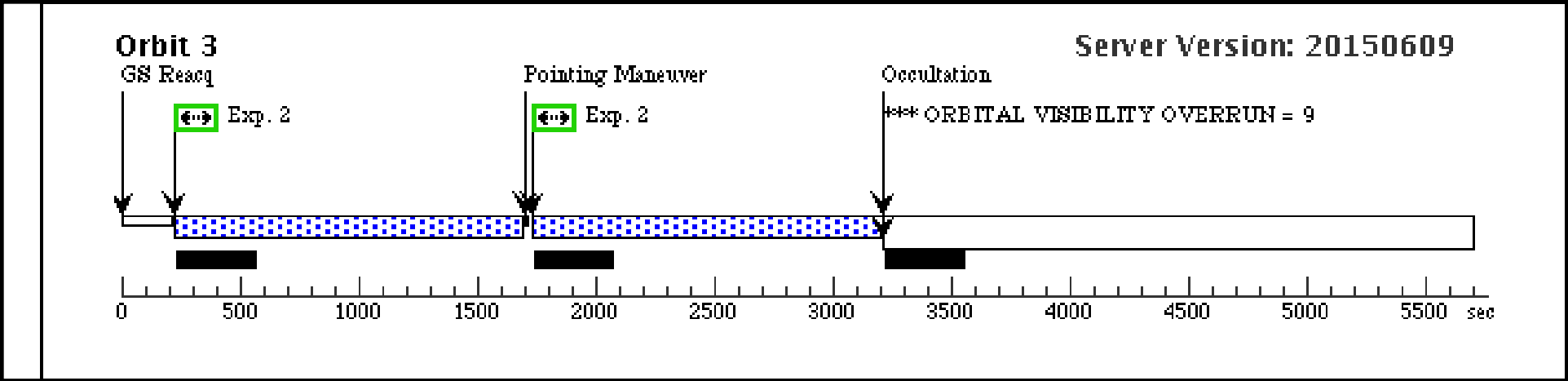
Server Version: 20150609



Orbit 2

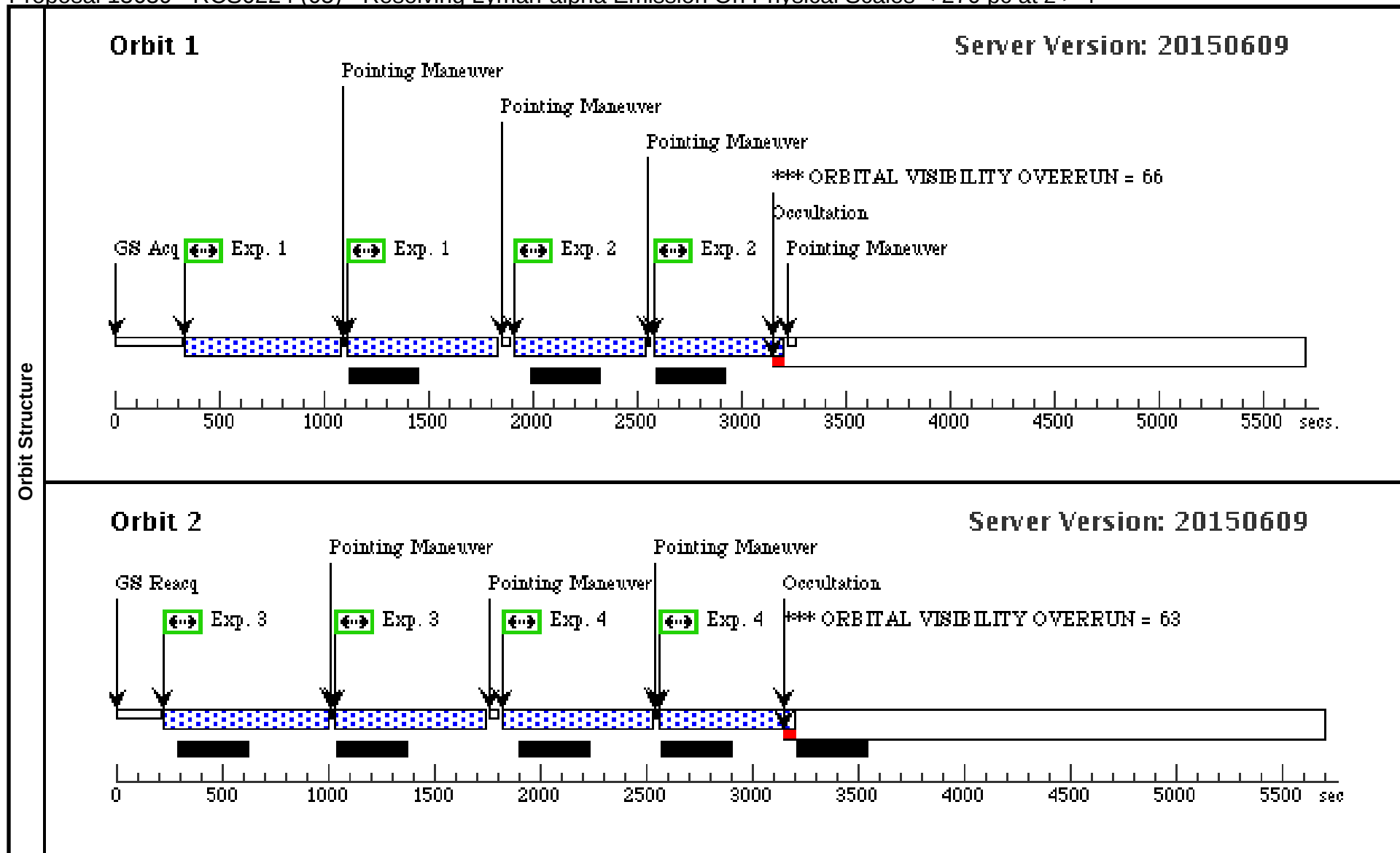
Server Version: 20150609





Proposal 13639 - RCS0224 (05) - Resolving Lyman-alpha Emission On Physical Scales < 270 pc at z > 4

Visit	Proposal 13639, RCS0224 (05), implementation										Sun Aug 30 01:01:02 GMT 2015
	Diagnostic Status: Warning										
	Scientific Instruments: ACS/WFC										
	Special Requirements: SCHED 40%										
Comments: This target/visit is the one that I am most uncertain about re: the dither patterns, as I had to create a second small-scale dither line pattern. My goal (in using Pattern 7 here) was to achieve a subpixel dither that is orthogonal to the pre-defined "ACS-WFC-DITHER-LINE" pattern.											
Diagnostics	(RCS0224 (05)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN										
	(RCS0224 (05)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN										
	(RCS0224 Ramp (05.001)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.										
	(RCS0224 Ramp (05.003)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.										
Patterns	#	Primary Pattern				Secondary Pattern				Exposures	
	(6)	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), (2)	
	(7)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.187 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=175.28 Angle Between Sides= Center Pattern=false						(3), (4)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(5)	RCS1J022431-0002.5C	RA: 02 24 33.5430 (36.1397625d) Dec: -00 02 21.77 (-.03938d) Equinox: J2000				V=24.22+/-0.24 F814W = 22.1, Rc=22.4		Reference Frame: ICRS		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	RCS0224 R amp	(5) RCS1J022431-00 02.5C	ACS/WFC, ACCUM, WFC1-IRAMP	FR716N 7149 A	FLASH=25	GS ACQ SCENARI O BASE1B3	Pattern 6, Exps 1-1 i n RCS0224 (05) (6)	600 Secs (1129 Secs) [==>534.0 Secs (Pattern 1)] [==>595.0 Secs (Pattern 2)]		[1]
	2	RCS0224 Br oadband	(5) RCS1J022431-00 02.5C	ACS/WFC, ACCUM, WFC	F850LP	FLASH=25		Pattern 6, Exps 2-2 i n RCS0224 (05) (6)	500 Secs (929 Secs) [==>434.0 Secs (Pattern 1)] [==>495.0 Secs (Pattern 2)]		[1]
	3	RCS0224 R amp	(5) RCS1J022431-00 02.5C	ACS/WFC, ACCUM, WFC1-IRAMP	FR716N 7149 A	FLASH=25		Pattern 7, Exps 3-3 i n RCS0224 (05) (7)	600 Secs (1170 Secs) [==>585.0 Secs (Pattern 1)] [==>585.0 Secs (Pattern 2)]		[2]
	4	RCS0224 Br oadband	(5) RCS1J022431-00 02.5C	ACS/WFC, ACCUM, WFC	F850LP	FLASH=25		Pattern 7, Exps 4-4 i n RCS0224 (05) (7)	525 Secs (1020 Secs) [==>510.0 Secs (Pattern 1)] [==>510.0 Secs (Pattern 2)]		[2]



Proposal 13639 - SGAG1050 (06) - Resolving Lyman-alpha Emission On Physical Scales < 270 pc at z > 4

Visit	Proposal 13639, SGAG1050 (06), completed Sun Aug 30 01:01:02 GMT 2015									
	Diagnostic Status: Warning Scientific Instruments: ACS/WFC Special Requirements: (none)									
Diagnostics	(SGAG1050 (06)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (SGAG1050 (06)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (SGAS1050 Ramp (06.001)) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp or WFC3 quad filters as central wavelengths & transmission efficiencies vary within the apertures.									
Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
	(5)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187				Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false			(1)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(6)	SGASJ105038+001715	RA: 10 50 38.6000 (162.6608333d) Dec: +00 17 11.38 (.28649d) Equinox: J2000				V=24.4+/-0.5 i =22.7		Reference Frame: ICRS	
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	SGAS1050 Ramp	(6) SGASJ105038+001715	ACS/WFC, ACCUM, WFC1-IRAMP	FR716N 7134 A	FLASH=25		Pattern 5, Exps 1-1 in SGAG1050 (06) (5)	1350 Secs (5190 Secs)	
									[==>1249.0 Secs (Pattern 1)]	[1]
									[==>1249.0 Secs (Pattern 2)]	
									[==>1346.0 Secs (Pattern 3)]	
									[==>1346.0 Secs (Pattern 4)]	[2]

