



12266 - Lyman Continuum Escape Fractions with a Lensed LBG in the 'Sweet Spot'

Cycle: 18, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Ms. Anna M. Quider (PI) (ESA Member)	University of Cambridge	aquider@ast.cam.ac.uk
Dr. Vasily Belokurov (CoI) (ESA Member)	University of Cambridge	vasily@ast.cam.ac.uk
Dr. Brian Siana (CoI) (Contact)	University of California - Riverside	brian.siana@ucr.edu
Prof. Alice E. Shapley (CoI) (AdminUSPI)	University of California - Los Angeles	aes@astro.ucla.edu
Prof. Charles C. Steidel (CoI)	California Institute of Technology	ccs@astro.caltech.edu
Prof. Max Pettini (CoI) (ESA Member)	University of Cambridge	pettini@ast.cam.ac.uk
Dr. Brendon Brewer (CoI)	University of California - Santa Barbara	brewer@physics.ucsb.edu
Prof. Geraint F. Lewis (CoI)	University of Sydney	gfl@physics.usyd.edu.au
Prof. Wyn Evans (CoI) (ESA Member)	University of Cambridge	nwe@ast.cam.ac.uk

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) J114833+193003	WFC3/UVIS	5	02-Aug-2011 21:07:27.0	yes
02	(1) J114833+193003	WFC3/UVIS	5	02-Aug-2011 21:07:35.0	yes

10 Total Orbits Used

ABSTRACT

We propose to search for Lyman continuum (LyC) emission from the Cosmic Horseshoe. This star-forming galaxy at $z = 2.38115$ has been strongly lensed into a nearly complete Einstein ring of 10 arcsec diameter and magnified by a factor of 25 to $g=20.1$. The Cosmic Horseshoe is an ideal candidate for finding escaping LyC photons and studying in detail how LyC emission happens within a galaxy. In previous work we have shown that

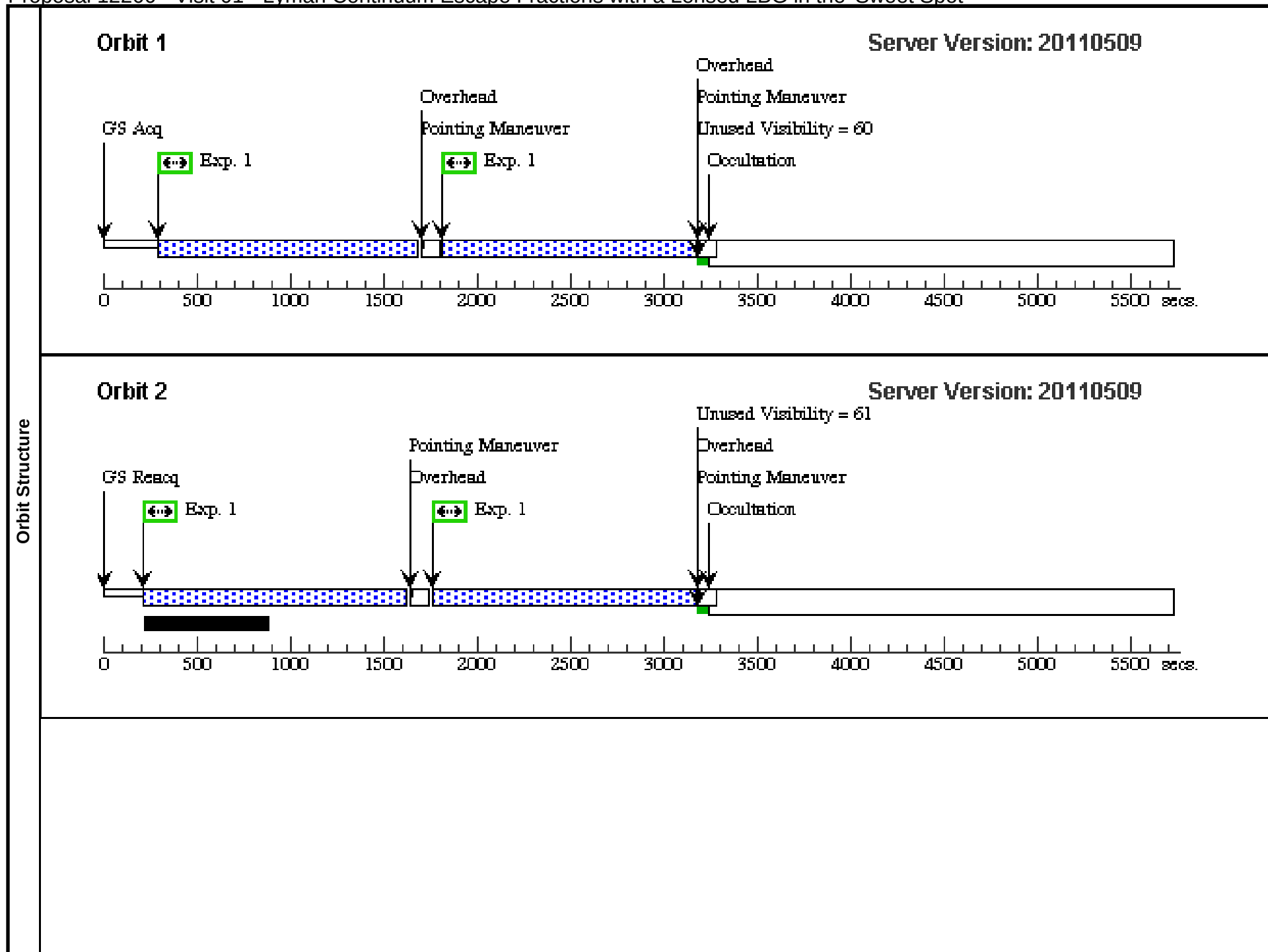
this galaxy has gaps in its interstellar medium, which are strongly correlated with a high escape fraction of LyC photons. We will improve the sensitivity of LyC escape fraction measurements by over an order of magnitude, thanks to the flux and resolution boost from gravitational lensing and the fortuitous location of the HST/UVIS F275W filter in the 'sweet spot' just redward of the Lyman limit. We will probe LyC escape fractions down to $<3\%$ at the 3-sigma level and constrain LyC emission across hundreds of resolution elements, corresponding to galactic structures as small as 100 pc. This galaxy has been well-characterized by studies in multiple wavebands, allowing us to place the LyC emission into the broader context of the Cosmic Horseshoe's properties. These HST observations will allow us to constrain how LyC emission happens within this galaxy and will guide our understanding of cosmic reionization.

OBSERVING DESCRIPTION

We have received 10 orbits and will conduct our observations with HST/UVIS+F275W in a four point box dither pattern and a two point line dither pattern with sub-pixel dithering to better sample the point spread function (PSF). As our observations will be read noise limited, we will take long exposures of half of an orbit per exposure. We will execute two visits of five orbits each, with each visit completing two four-point box dither patterns and a two-point line dither pattern.

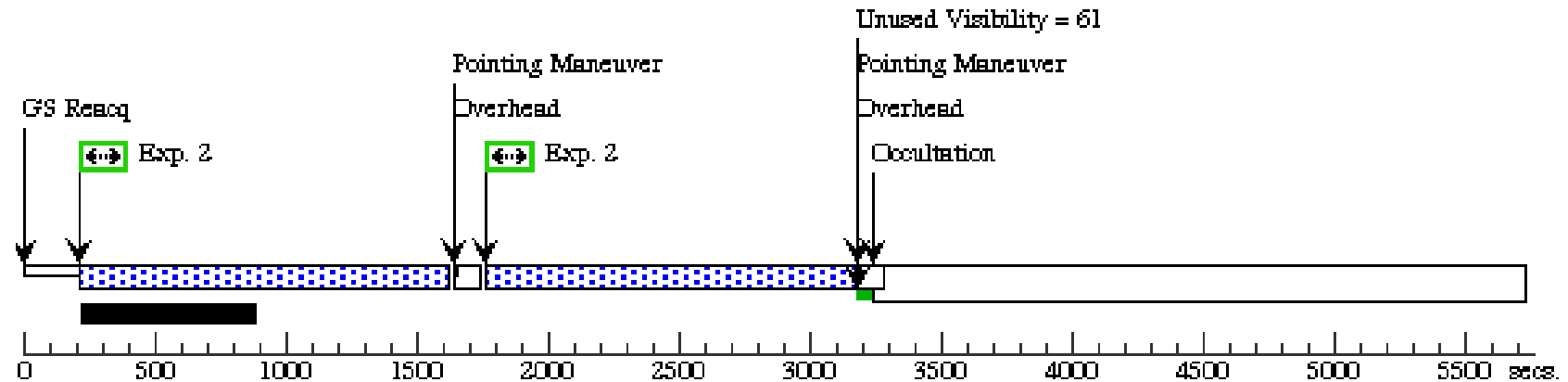
Proposal 12266 - Visit 01 - Lyman Continuum Escape Fractions with a Lensed LBG in the 'Sweet Spot'

Visit	Proposal 12266, Visit 01, implementation					Wed Aug 03 01:07:40 GMT 2011				
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: WFC3/UVIS									
	Special Requirements: (none)									
Patterns	#	Primary Pattern			Secondary Pattern		Exposures			
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112		Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false			(1), (2)			
	(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			(3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	J114833+193003 Alt Name1: COSMIC-HORSESHOE	RA: 11 48 33.1800 (177.1382500d) Dec: +19 30 3.50 (19.50097d) Equinox: J2000	Redshift: 2.38115	V=20.1 u=21.6, g=20.1, i=19.7, E(B-V)=0.15	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) J114833+193003	WFC3/UVIS, ACCUM, UVIS2	F275W		POS TARG 0,-10	Pattern 1, Exps 1-1 in Visit 01 (1)	1250 Secs	
									[==>1360.0 Secs (Pattern 1)]	[1]
									[==>1360 Secs (Pattern 2)]	
									[==>1415.0 Secs (Pattern 3)]	[2]
									[==>1415.0 Secs (Pattern 4)]	
	2		(1) J114833+193003	WFC3/UVIS, ACCUM, UVIS2	F275W		POS TARG 5.00,-10.00	Pattern 1, Exps 2-2 in Visit 01 (1)	1250 Secs	
								[==>1415 Secs (Pattern 1)]	[3]	
								[==>1415 Secs (Pattern 2)]		
								[==>1415 Secs (Pattern 3)]		
								[==>1415 Secs (Pattern 4)]	[4]	
3		(1) J114833+193003	WFC3/UVIS, ACCUM, UVIS2	F275W			POS TARG -5,-10	Pattern 2, Exps 3-3 in Visit 01 (2)	1250 Secs	
									[==>1415 Secs (Pattern 1)]	
									[==>1415 Secs (Pattern 2)]	[5]



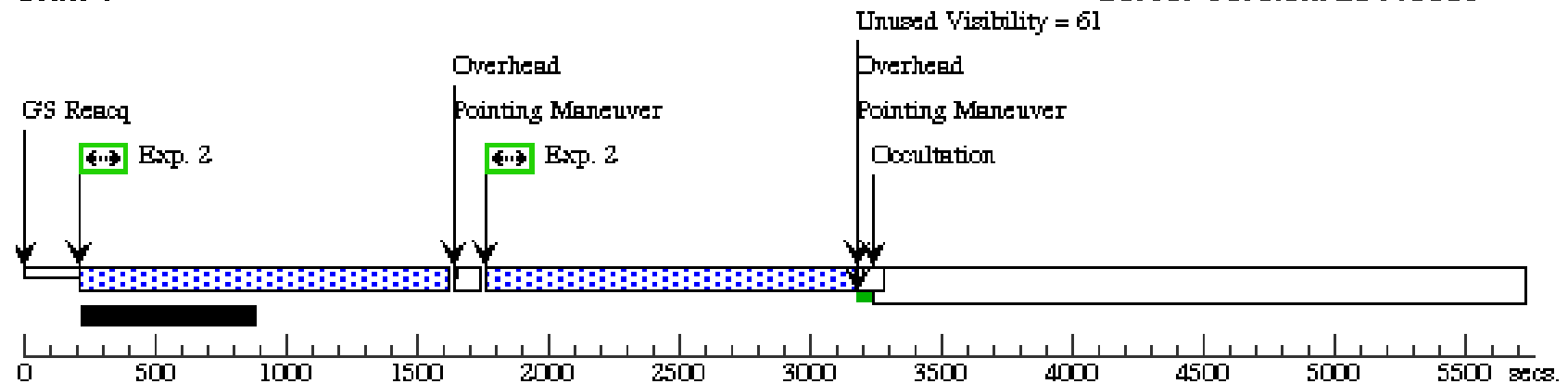
Orbit 3

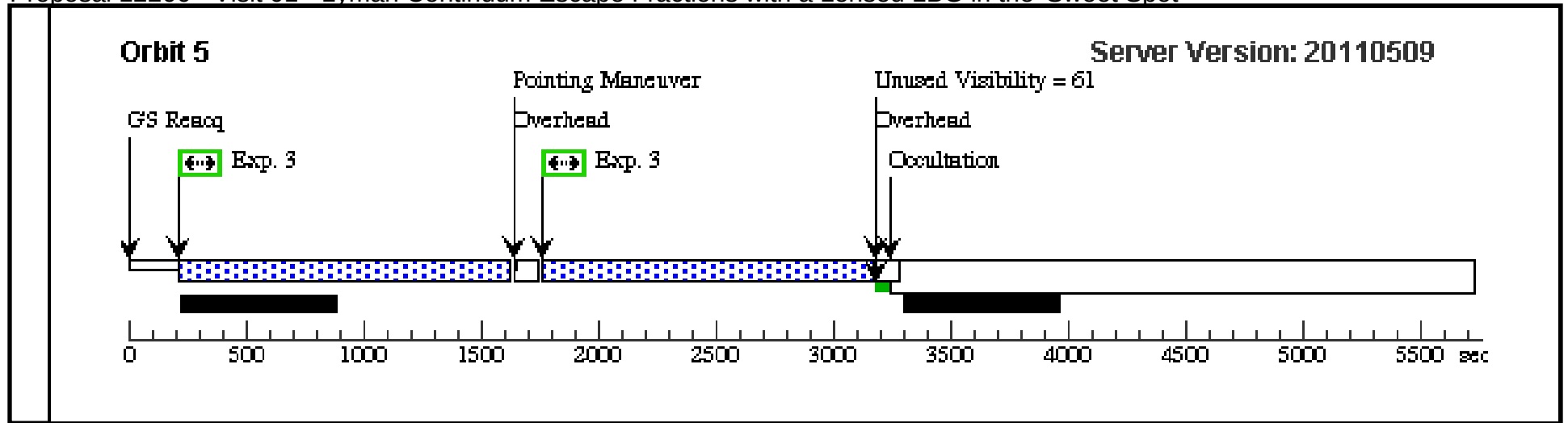
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Orbit 4

Server Version: 20110509



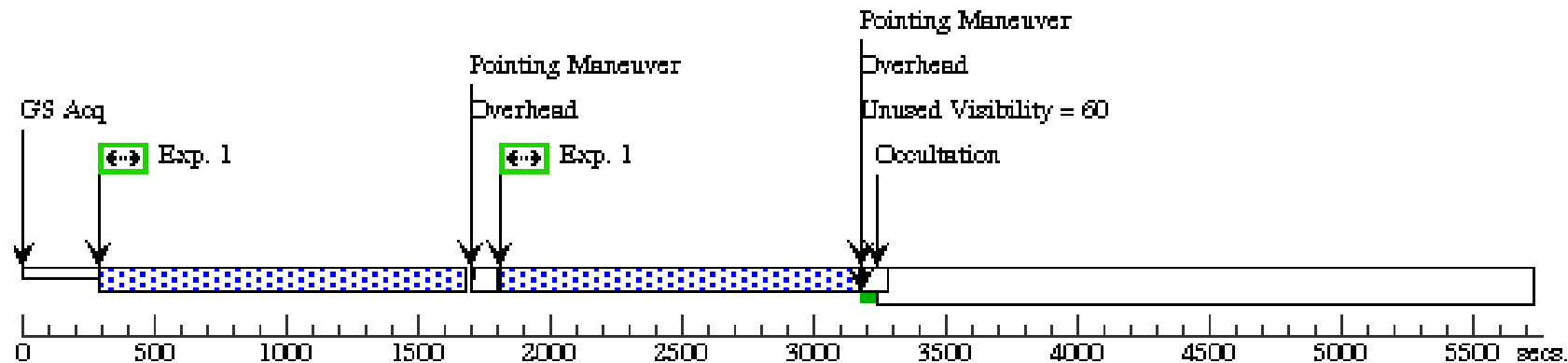


Proposal 12266 - Visit 02 - Lyman Continuum Escape Fractions with a Lensed LBG in the 'Sweet Spot'

Visit	Proposal 12266, Visit 02, implementation					Wed Aug 03 01:07:42 GMT 2011				
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: WFC3/UVIS									
	Special Requirements: SAME ORIENT AS 01									
Patterns	#	Primary Pattern			Secondary Pattern		Exposures			
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112		Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false			(1), (2)			
	(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			(3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	J114833+193003 Alt Name1: COSMIC-HORSESHOE	RA: 11 48 33.1800 (177.1382500d) Dec: +19 30 3.50 (19.50097d) Equinox: J2000	Redshift: 2.38115	V=20.1 u=21.6, g=20.1, i=19.7, E(B-V)=0.15	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) J114833+193003	WFC3/UVIS, ACCUM, UVIS2	F275W		POS TARG 0,-5	Pattern 1, Exps 1-1 i n Visit 02 (1)	1250 Secs	
									[==>1360.0 Secs (Pattern 1)]	[1]
									[==>1360.0 Secs (Pattern 2)]	
									[==>1415.0 Secs (Pattern 3)]	[2]
									[==>1415.0 Secs (Pattern 4)]	
	2		(1) J114833+193003	WFC3/UVIS, ACCUM, UVIS2	F275W		POS TARG +5.00,-5 .00	Pattern 1, Exps 2-2 i n Visit 02 (1)	1250 Secs	
									[==>1415 Secs (Pattern 1)]	[3]
									[==>1415 Secs (Pattern 2)]	
									[==>1415 Secs (Pattern 3)]	[4]
								[==>1415 Secs (Pattern 4)]		
3		(1) J114833+193003	WFC3/UVIS, ACCUM, UVIS2	F275W			POS TARG -5,-5	Pattern 2, Exps 3-3 i n Visit 02 (2)	1250 Secs	
									[==>1415 Secs (Pattern 1)]	[5]
									[==>1415 Secs (Pattern 2)]	

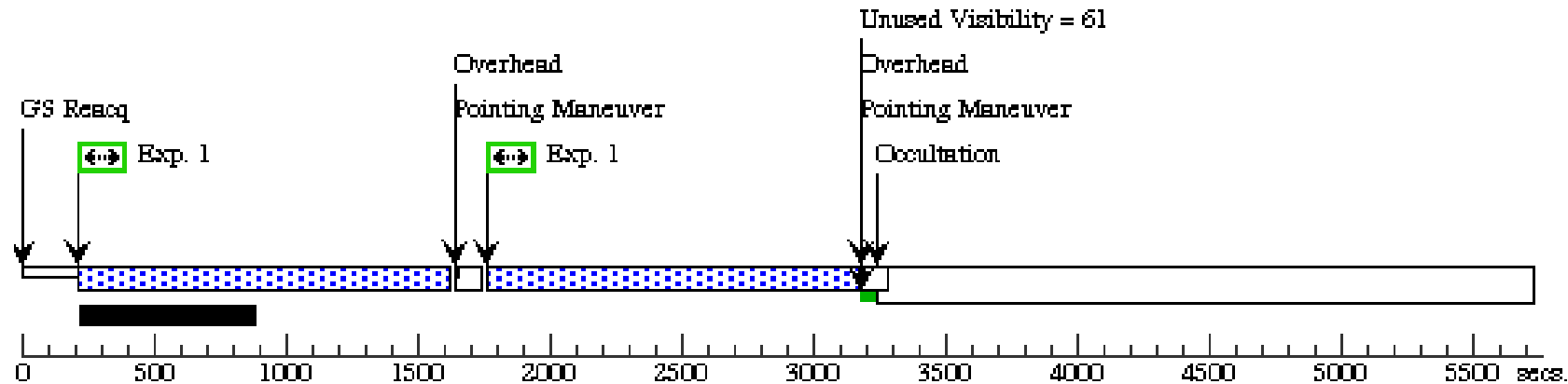
Orbit 1

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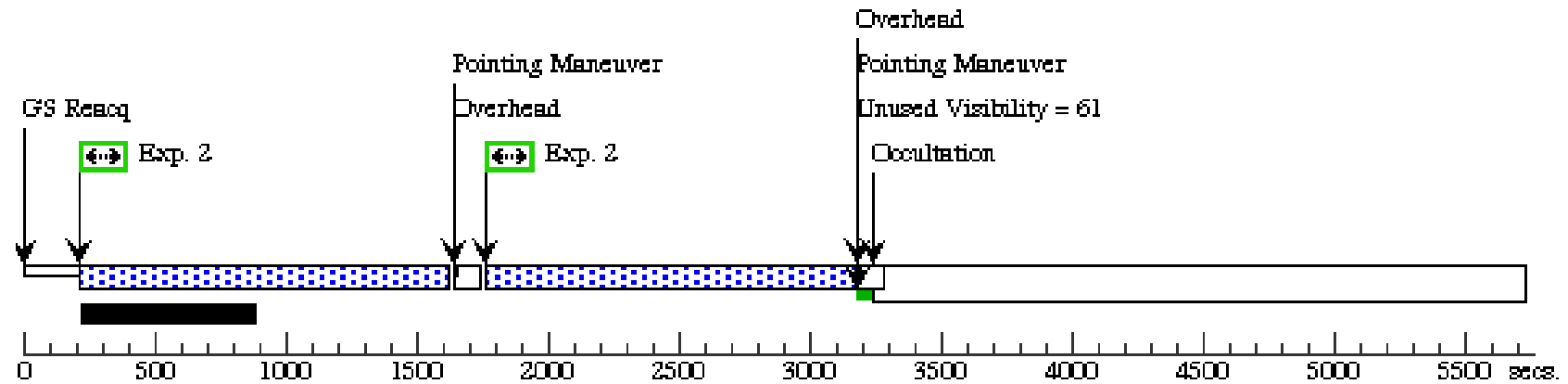
Orbit 2

Server Version: 20110509



Orbit 3

Server Version: 20110509



Orbit 4

Server Version: 20110509

