



10494 - Imaging the mass structure of distant lens galaxies

Cycle: 14, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Prof. Leon Koopmans (PI) (ESA Member)	Kapteyn Astronomical Institute	koopmans@astro.rug.nl
Prof. Tommaso Treu (CoI) (AdminUSPI) (Contact)	University of California - Santa Barbara	tt@physics.ucsb.edu
Dr. Adam S. Bolton (CoI)	Smithsonian Institution Astrophysical Observatory	bolton@mit.edu
Prof. Scott Burles (CoI)	Massachusetts Institute of Technology	burles@mit.edu
Dr. Leonidas Moustakas (CoI)	Jet Propulsion Laboratory	leonidas@jpl.nasa.gov

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) GAL-0364-52000-084	ACS/WFC NIC2	3	16-Jan-2007 21:01:25.0	yes
02	(2) GAL-0472-51955-429	ACS/WFC NIC2	3	16-Jan-2007 21:01:41.0	yes
03	(3) GAL-0541-51959-145	ACS/WFC NIC2	3	16-Jan-2007 21:01:52.0	yes
04	(4) GAL-0572-52289-495	ACS/WFC NIC2	3	16-Jan-2007 21:02:02.0	yes

Proposal 10494 (STScI Edit Number: 1, Created: Tuesday, January 16, 2007 9:04:11 PM EST) - Overview

<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) GAL-0605-52353-503	ACS/WFC NIC2	3	16-Jan-2007 21:02:14.0	yes
06	(6) GAL-0626-52057-518	ACS/WFC NIC2	3	16-Jan-2007 21:02:24.0	yes
07	(7) GAL-0645-52203-517	ACS/WFC NIC2	3	16-Jan-2007 21:02:33.0	yes
08	(8) GAL-0677-52606-520	ACS/WFC NIC2	3	16-Jan-2007 21:02:43.0	yes
09	(9) GAL-0668-52162-428	ACS/WFC NIC2	3	16-Jan-2007 21:02:55.0	yes
10	(10) GAL-0722-52224-442	ACS/WFC NIC2	3	16-Jan-2007 21:03:05.0	yes
11	(11) GAL-0743-52262-304	ACS/WFC NIC2	3	16-Jan-2007 21:03:14.0	yes
12	(12) GAL-0788-52338-605	ACS/WFC NIC2	3	16-Jan-2007 21:03:26.0	yes
13	(13) GAL-0847-52426-549	ACS/WFC NIC2	3	16-Jan-2007 21:03:35.0	yes
14	(14) GAL-0902-52409-068	ACS/WFC NIC2	3	16-Jan-2007 21:03:44.0	yes
53	(14) GAL-0902-52409-068	NIC2	1	16-Jan-2007 21:03:51.0	yes
15	(15) GAL-0969-52442-134	ACS/WFC NIC2	3	16-Jan-2007 21:03:59.0	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>
52	(2) GAL-0472-51955-429	ACS/WFC NIC2	3	16-Jan-2007 21:04:08.0	yes

49 Total Orbits Used

ABSTRACT

The surface brightness distribution of extended gravitationally lensed arcs and Einstein rings contains super-resolved information about the lensed object, and, more excitingly, about the smooth and clumpy mass distribution of the lens galaxies. The source and lens information can non-parametrically be separated, resulting in a direct "gravitational-mass image" of the inner mass-distribution of cosmologically-distant galaxies (Koopmans 2005).

With this goal in mind, we propose deep HST ACS-F555W/F814W and NICMOS-F160W imaging of 15 gravitational-lens systems with spatially resolved lensed sources, selected from the 17 new lens systems discovered by the Sloan Lens ACS Survey (Bolton et al. 2004). Each system has been selected from the SDSS and confirmed in a time-efficient HST-ACS snapshot program (cycle-13); they show highly-magnified arcs or Einstein rings, lensed by a massive early-type lens galaxy. High-fidelity multi-color HST images are required (not delivered by the 420-sec snapshot images) to isolate these lensed images (properly cleaned, dithered and extinction-corrected) from the lens galaxy surface brightness distribution, and apply our "gravitational-mass imaging" technique.

The sample of galaxy mass distributions - determined through this method from the arcs and Einstein ring HST images - will be studied to: (i) measure the smooth mass distribution of the lens galaxies (Dark and luminous mass are separated using the HST images and the stellar M/L values derived from a joint stellar-dynamical analysis of each system); (ii) quantify statistically and individually the incidence of mass-substructure (with or without obvious luminous counter-parts such as dwarf galaxies). Since dark-matter substructure should be considerably more prevalent at higher redshift, both results provide a direct test of this prediction of the CDM hierarchical structure-formation model.

OBSERVING DESCRIPTION

The goal of our observations is to obtain high signal to noise spatially resolved photometry through filters F555W, F814W and F160W. The multi-color images will be used to derive accurate surface photometry of the lens galaxy -- corrected for dust extinction -- and thus pinpoint the distribution of luminous mass (i.e. measure effective radii to <15 percent, magnitudes to <0.1 mags, PA to better than 10 deg). We will exploit the multicolor information to subtract the light from the lens galaxy (massive ellipticals are in general very uniform in color) and compute extinction corrected images of the Einstein Rings (e.g. Koopmans et al. 2003). Precise removal of the lens galaxy contamination and of reddening correction is key to the success of non parametric mass reconstruction methods.

The following strategy will allow us to meet our goals:

Choice of Instrument: In the optical, ACS is a significant improvement over WFPC2, both in terms of sensitivity and of sampling of the PSF. The WFC is preferred to the HRC because its higher sensitivity to low surface brightness features combined with an efficient dithering strategy (see below) more than compensate for the larger pixel size. In the IR, the NIC2 camera provides the optimal trade-off between sampling of the PSF (further improved by sub-pixel dithering) and sensitivity to low surface brightness features.

Choice of Filters: To correct for dust extinction, we require observations in three filters. This allows for a check on the extinction law, as well as error estimates by bootstrapping on each individual pair of colors. We choose ACS/F555W, ACS/F814W, and NIC2/F160W because they are broad-band filters and thus maximize the S/N in the images, and also they cover a long wavelength baseline. NIC2/F160W is the reddest broad filter with low background, and thus the optimal choice to image faint sources.

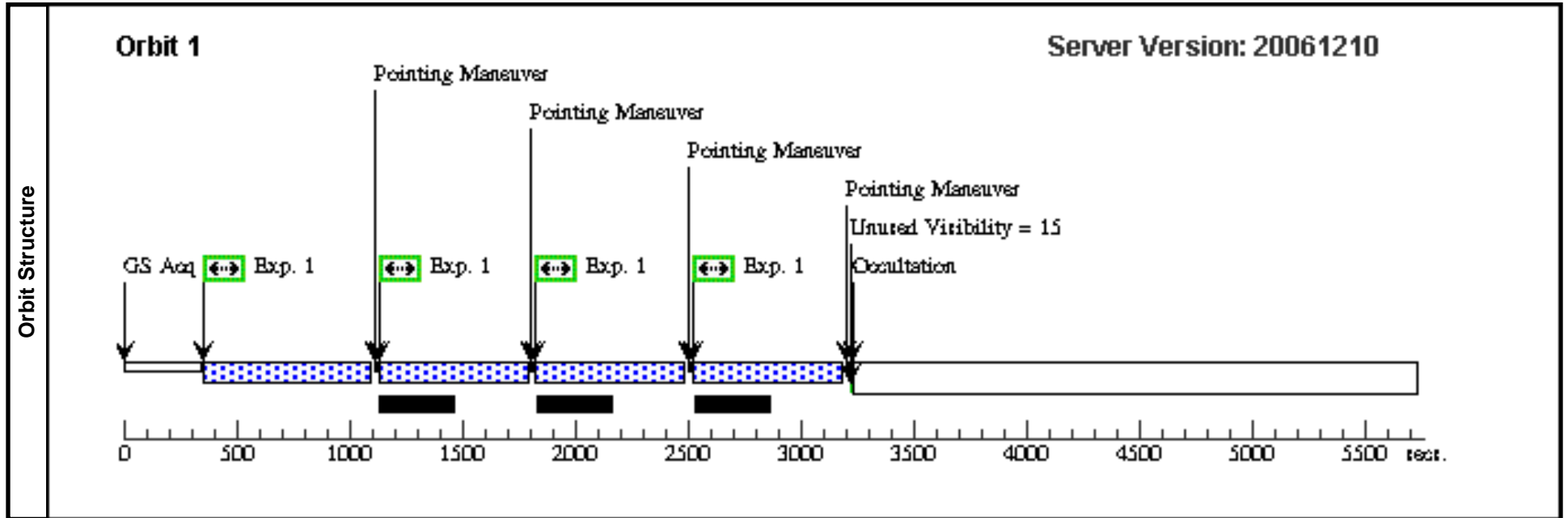
Exposure Times and dithering strategy: Our currently available snapshot ACS-F814W images provide a S/N of only ~ 2 in the faint areas of the Einstein rings, once the light from the lens galaxies has been subtracted. Cosmic ray hits and residual cosmetic defects from single exposures further limit the effective signal-to-noise ratio. This low sensitivity and loss of information (e.g due to CRs) limit a detailed characterization of the ring (Kochanek et al. 2001; Blandford et al. 2001). To obtain deconvolved, extinction-corrected images of the lens system, one needs to obtain a $S/N \geq 5$ per pixel, because the extinction correction introduces additional noise errors. A full orbit exposure will be a substantial improvement, beyond the

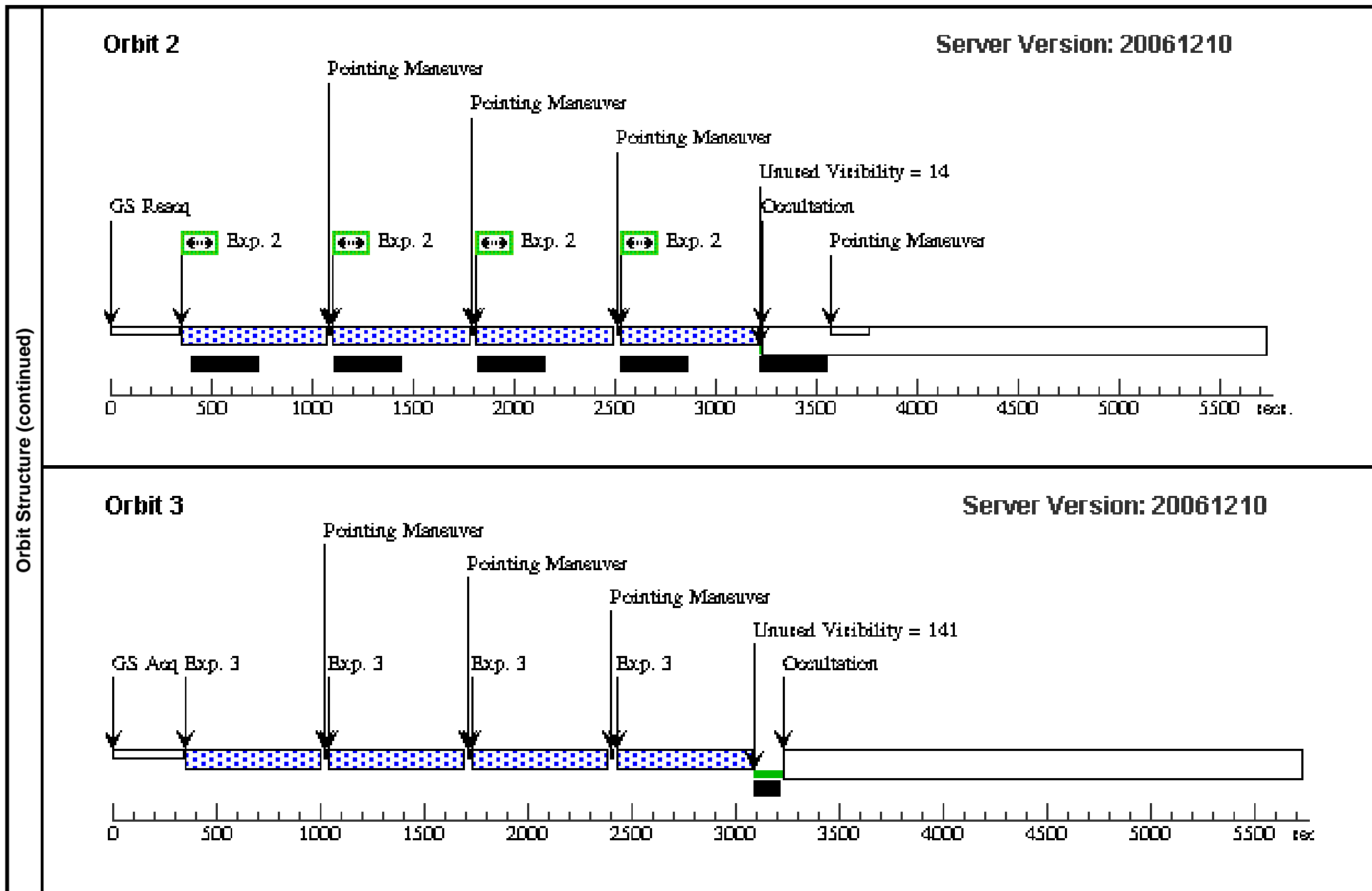
factor of $5^{1/2}$ expected from pure statistical noise considerations [S/N is not affected by gyro mode], allowing us to fully exploit the lensed images. The surface brightness of the extended lensed features in the other two bands is currently unknown. However, based on previous experience with the CASTLeS-collaboration observations, one orbit per filter is enough to accurately model the lens galaxy and de-redden it.

Proposal 10494 - Visit 01 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:12 GMT 2007

Visit	Proposal 10494, Visit 01, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	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=20.7 Angle Between Sides=69.1 Center Pattern=true		(1), (2)				
	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true		(3)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	GAL-0364-52000-084	RA: 16 27 46.4453 (246.9435221d) Dec: -00 53 57.56 (-.89932d) Equinox: J2000		V=17.5	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) GAL-0364-5200 0-084	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	540.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(1) GAL-0364-5200 0-084	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	550.0 Secs	
								[==>556.0 Secs (Pattern 1)] [==>556.0 Secs (Pattern 2)] [==>556.0 Secs (Pattern 3)] [==>556.0 Secs (Pattern 4)]	[2]	
3		(1) GAL-0364-5200 0-084	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP6 4; NSAMP=18			Pattern 3-3 (2)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]

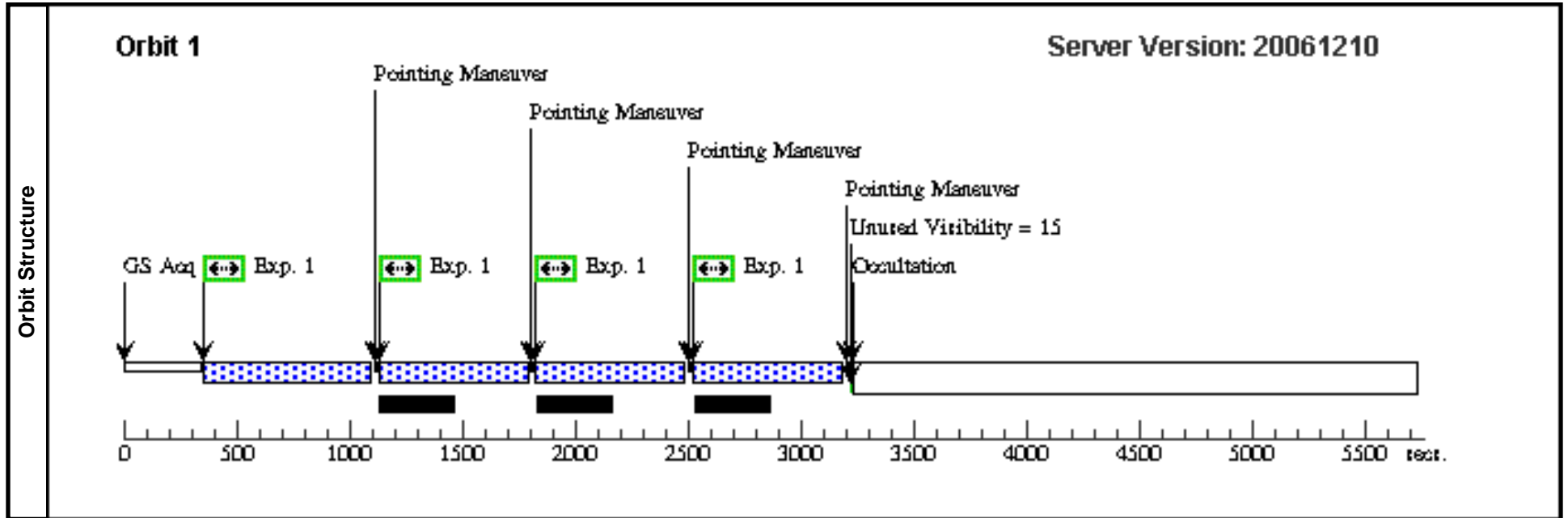


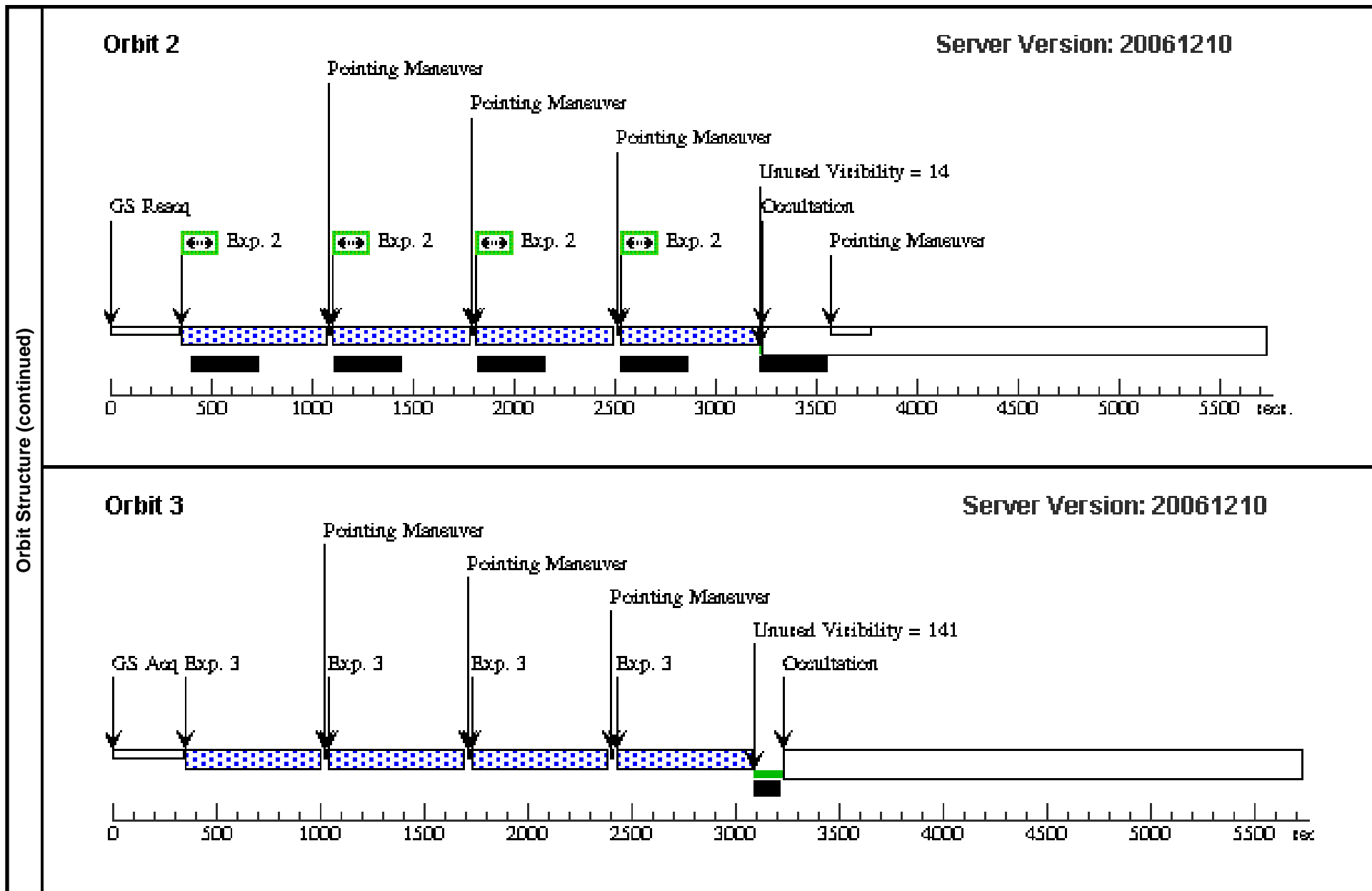


Proposal 10494 - Visit 02 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:14 GMT 2007

Visit	Proposal 10494, Visit 02, failed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern			Exposures			
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	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true				(3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(2)	GAL-0472-51955-429	RA: 09 12 5.3122 (138.0221342d) Dec: +00 29 1.18 (.48366d) Equinox: J2000			V=16.1	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(2) GAL-0472-5195-429	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	540.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(2) GAL-0472-5195-429	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	550.0 Secs	
								[==>556.0 Secs (Pattern 1)] [==>556.0 Secs (Pattern 2)] [==>556.0 Secs (Pattern 3)] [==>556.0 Secs (Pattern 4)]	[2]	
3		(2) GAL-0472-5195-429	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP6 4; NSAMP=18		Pattern 3-3 (2)			
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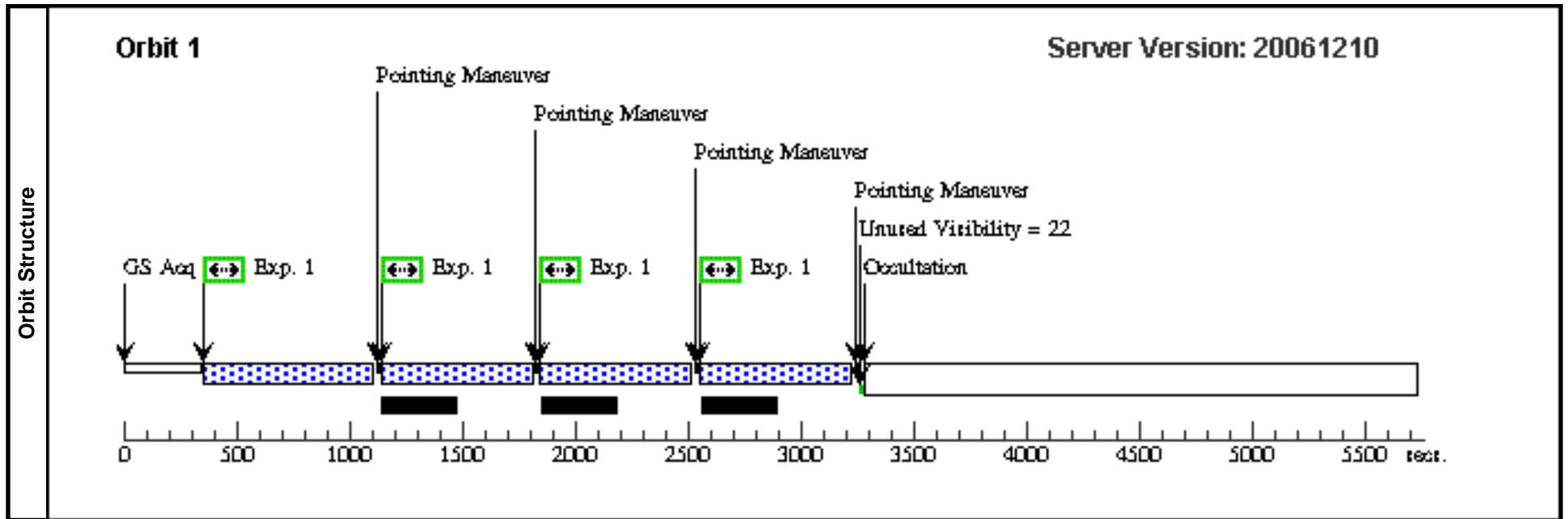


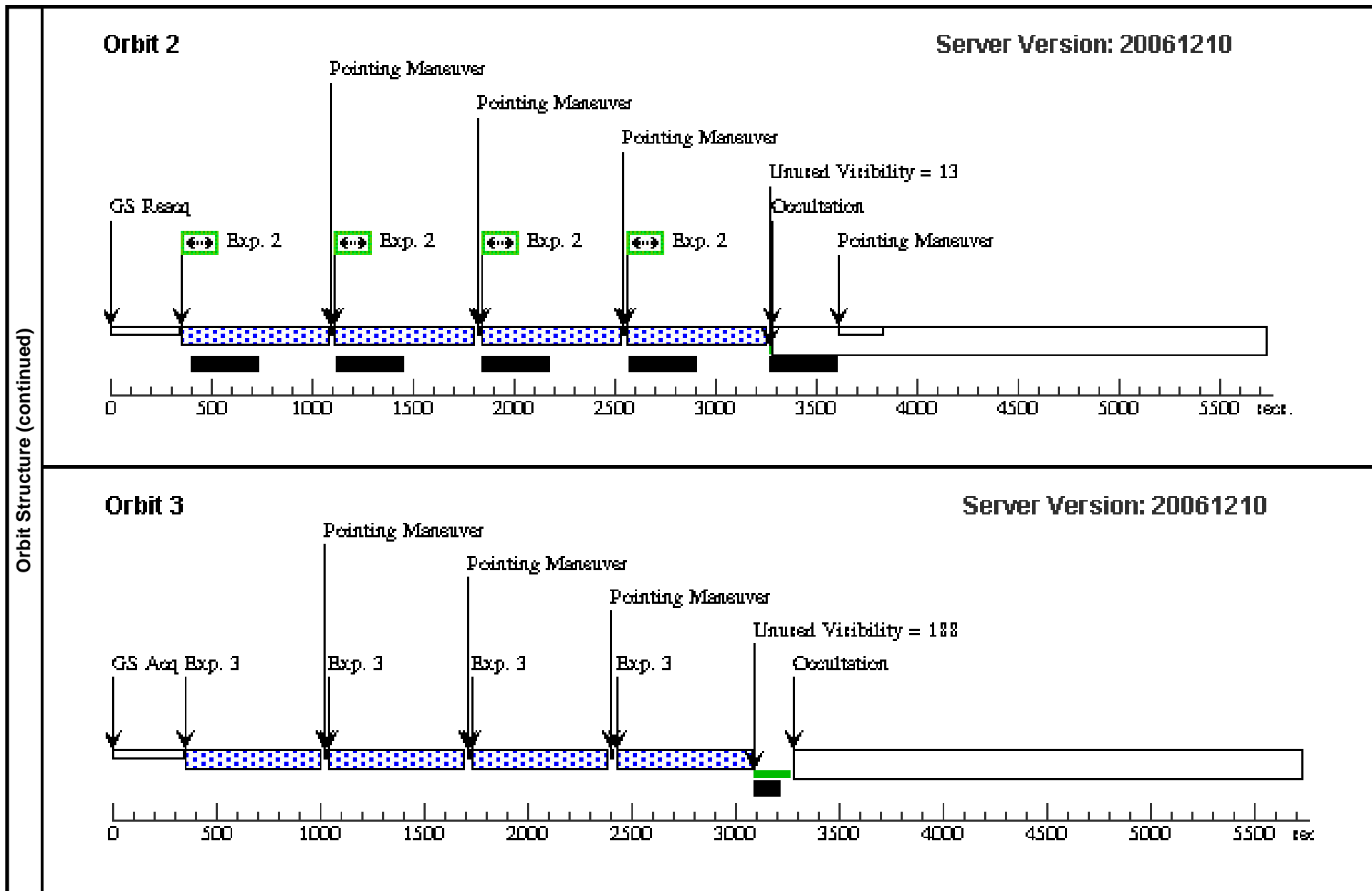


Proposal 10494 - Visit 03 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:15 GMT 2007

Visit		Proposal 10494, Visit 03, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)								
Patterns	#	Primary Pattern	Secondary Pattern				Exposures			
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(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true					(3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	GAL-0541-51959-145	RA: 07 37 28.4431 (114.3685129d) Dec: +32 16 18.66 (32.27185d) Equinox: J2000		V=17.9	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(3) GAL-0541-51959-145	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	550.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(3) GAL-0541-51959-145	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	560.0 Secs	
								[==>568.0 Secs (Pattern 1)] [==>568.0 Secs (Pattern 2)] [==>568.0 Secs (Pattern 3)] [==>568.0 Secs (Pattern 4)]	[2]	
3		(3) GAL-0541-51959-145	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP64; NSAMP=18			Pattern 3-3 (2)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]

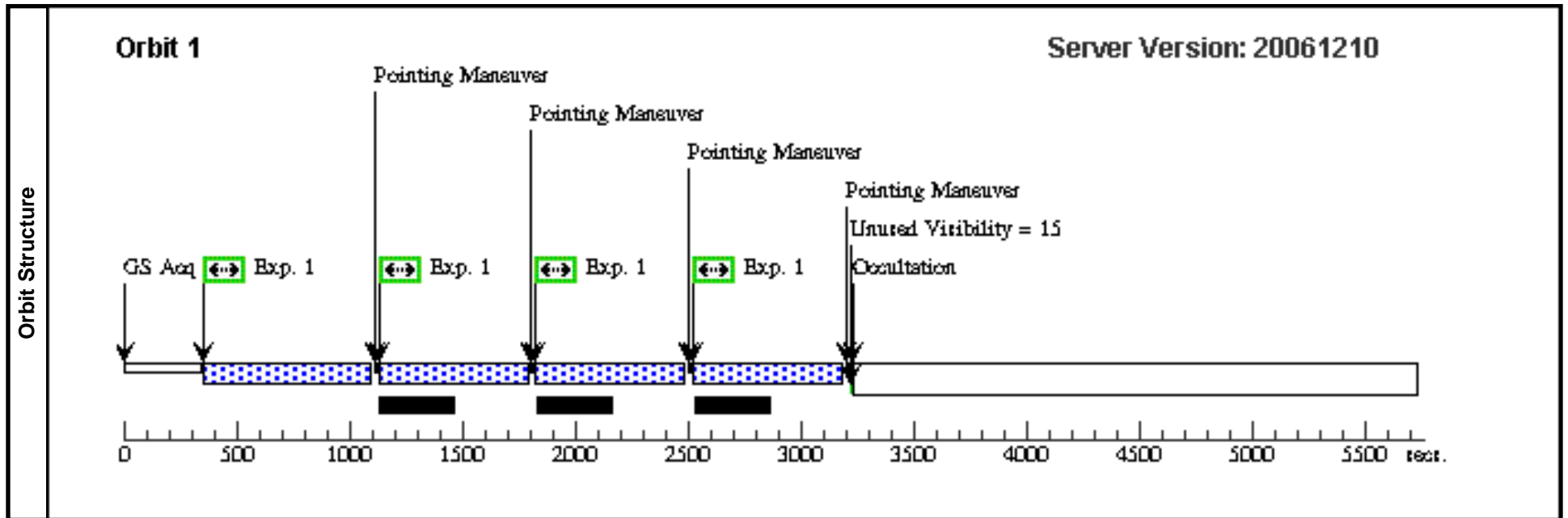


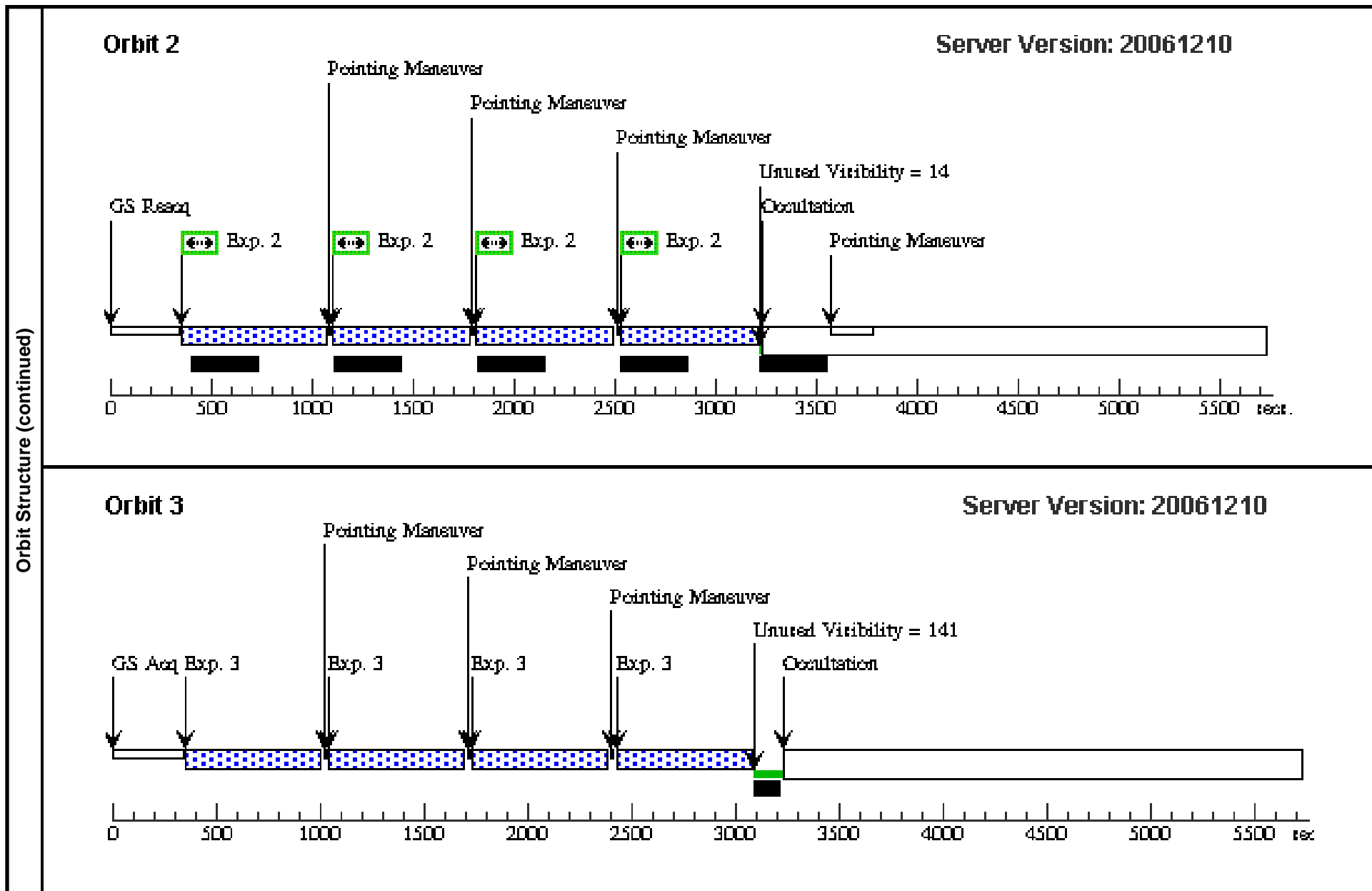


Proposal 10494 - Visit 04 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:16 GMT 2007

Visit	Proposal 10494, Visit 04, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern			Exposures			
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	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true				(3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(4)	GAL-0572-52289-495	RA: 09 59 44.0707 (149.9336279d) Dec: +04 10 17.00 (4.17139d) Equinox: J2000			V=17.6	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(4) GAL-0572-5228 9-495	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	540.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(4) GAL-0572-5228 9-495	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	550.0 Secs	
								[==>556.0 Secs (Pattern 1)] [==>556.0 Secs (Pattern 2)] [==>556.0 Secs (Pattern 3)] [==>556.0 Secs (Pattern 4)]	[2]	
3		(4) GAL-0572-5228 9-495	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP6 4; NSAMP=18			Pattern 3-3 (2)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]

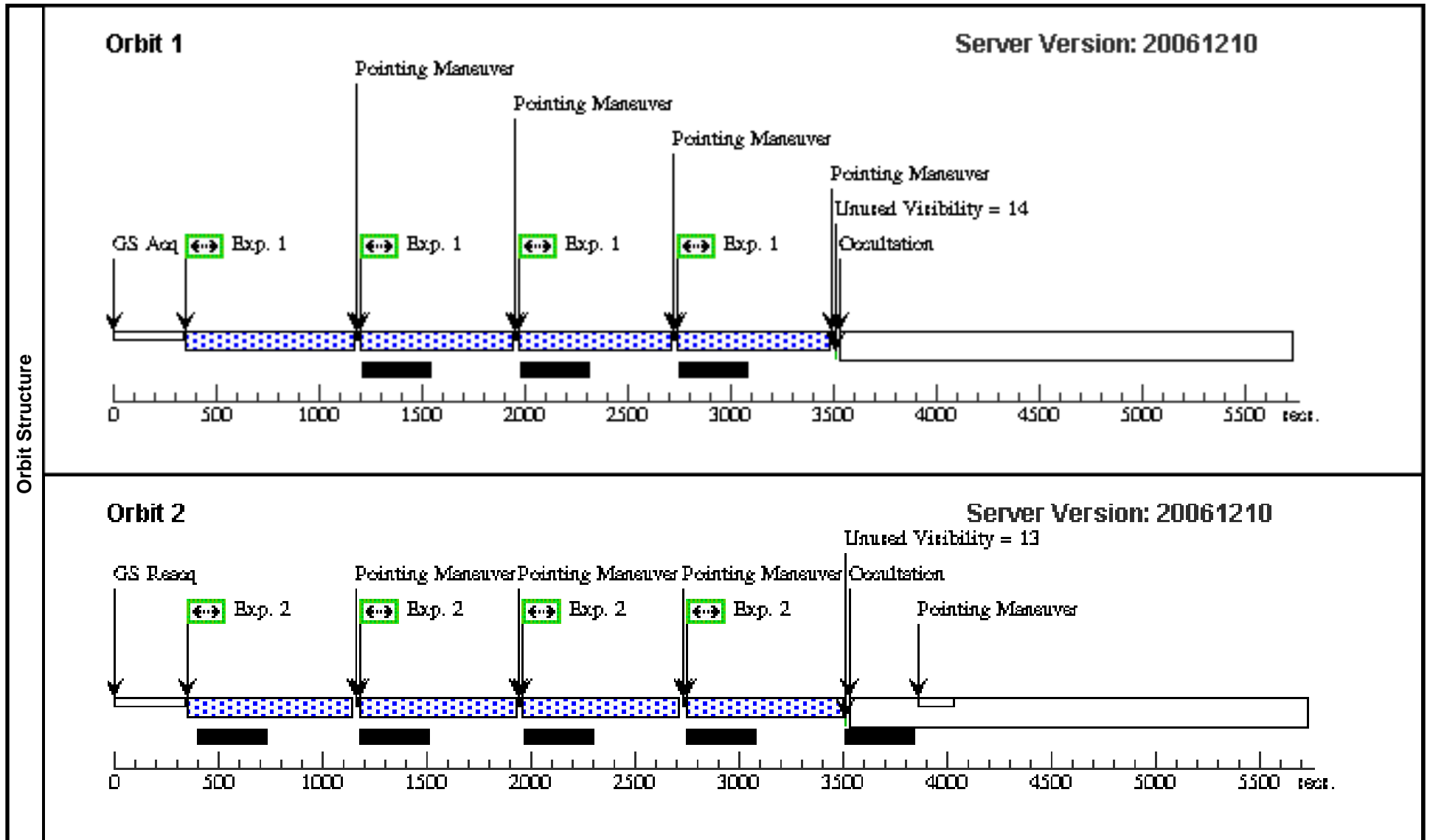


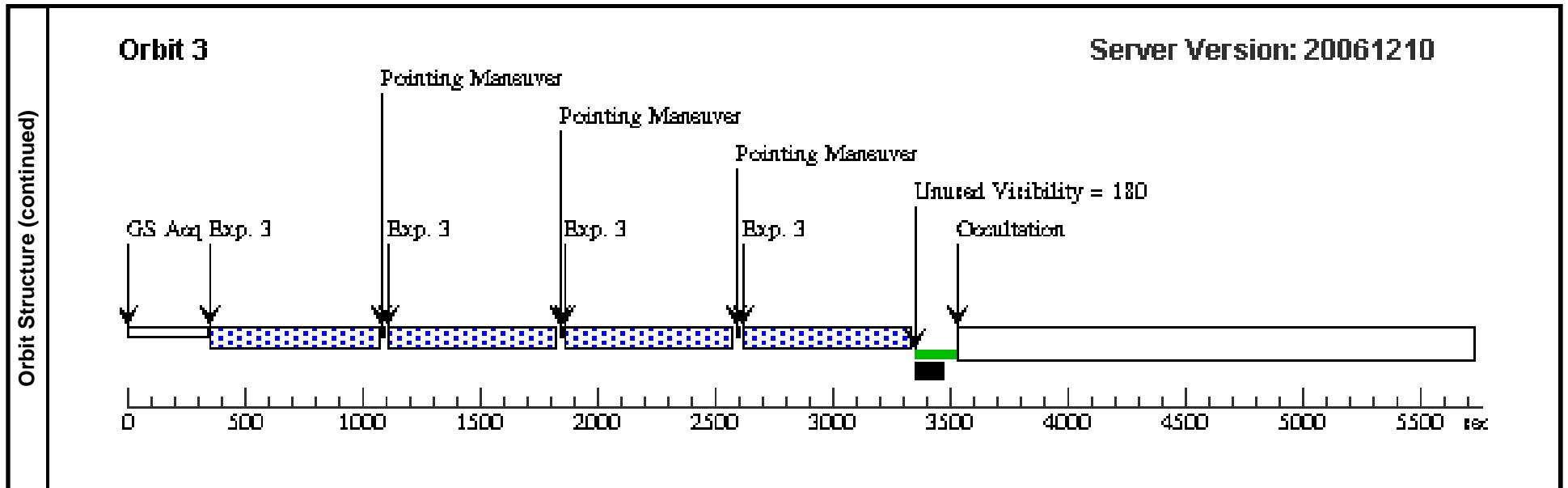


Proposal 10494 - Visit 05 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:17 GMT 2007

Visit	Proposal 10494, Visit 05, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
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	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true				(3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(5)	GAL-0605-52353-503	RA: 14 02 28.2218 (210.6175908d) Dec: +63 21 33.34 (63.35926d) Equinox: J2000			V=16.9	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(5) GAL-0605-52353-503	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	610.0 Secs	
									[==>614.0 Secs (Pattern 1)] [==>614.0 Secs (Pattern 2)] [==>614.0 Secs (Pattern 3)] [==>614.0 Secs (Pattern 4)]	[1]
	2		(5) GAL-0605-52353-503	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	630.0 Secs	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]	
3		(5) GAL-0605-52353-503	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP64; NSAMP=19			Pattern 3-3 (2)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]

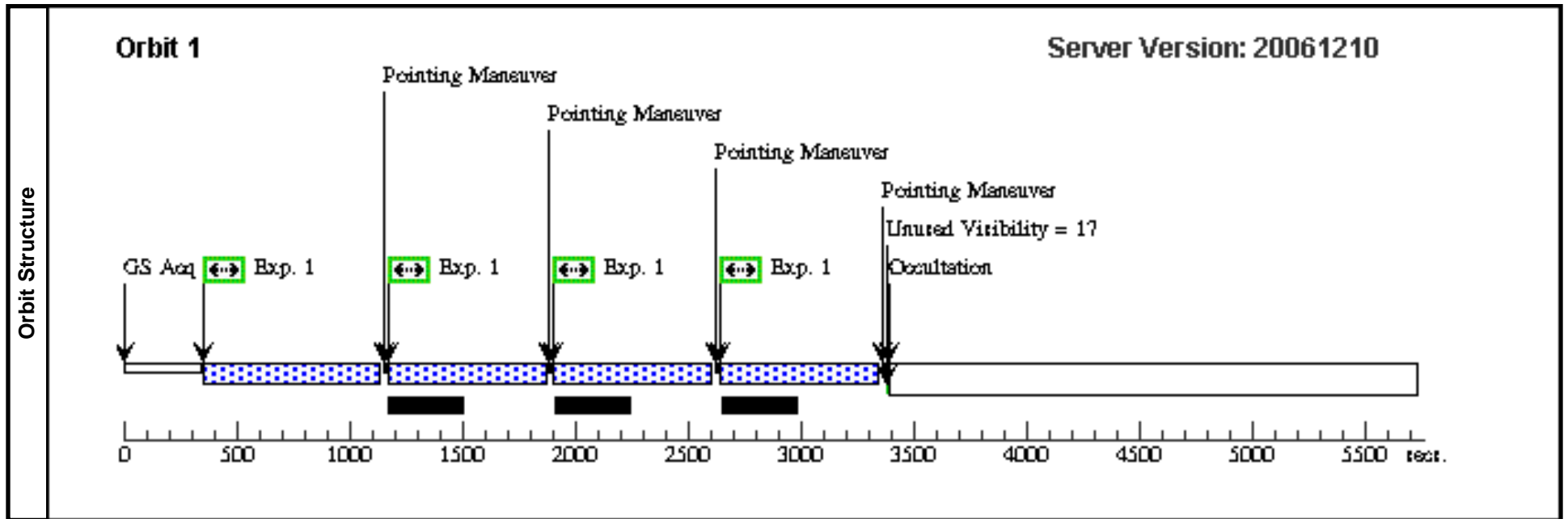


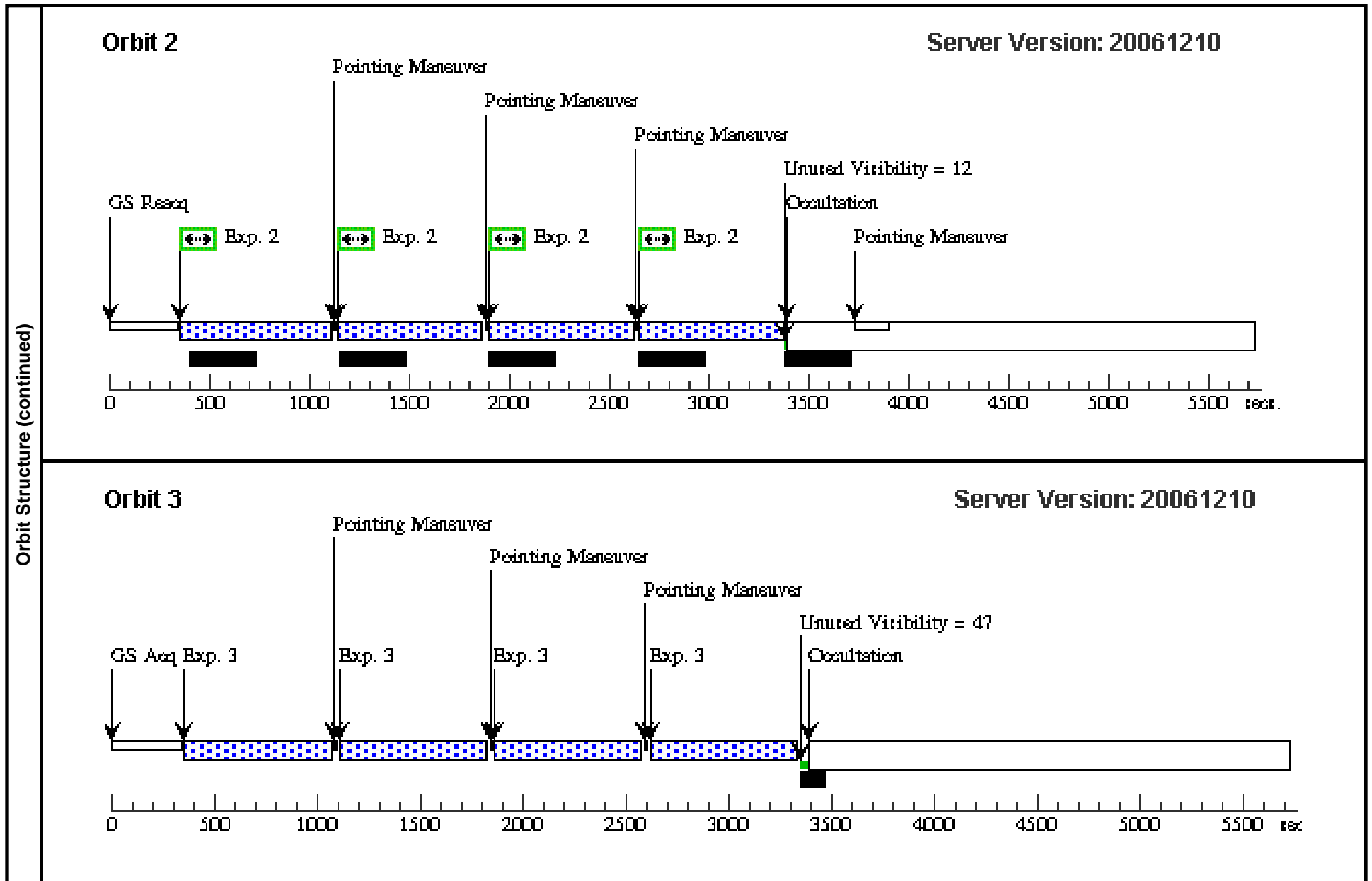


Proposal 10494 - Visit 06 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:18 GMT 2007

Visit	Proposal 10494, Visit 06, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
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	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true				(3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(6)	GAL-0626-52057-518	RA: 16 30 28.1602 (247.6173342d) Dec: +45 20 36.28 (45.34341d) Equinox: J2000			V=17.3	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(6) GAL-0626-52057-518	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	580.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(6) GAL-0626-52057-518	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	590.0 Secs	
								[==>597.0 Secs (Pattern 1)] [==>597.0 Secs (Pattern 2)] [==>597.0 Secs (Pattern 3)] [==>597.0 Secs (Pattern 4)]	[2]	
3		(6) GAL-0626-52057-518	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP64; NSAMP=19		Pattern 3-3 (2)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]	

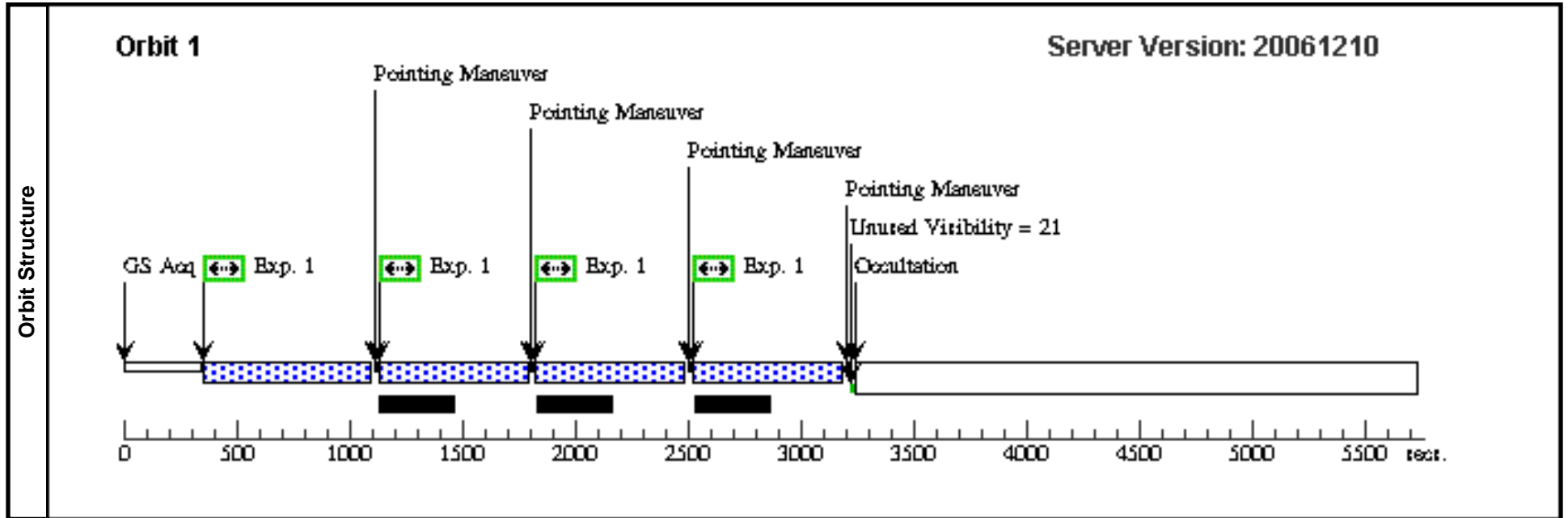


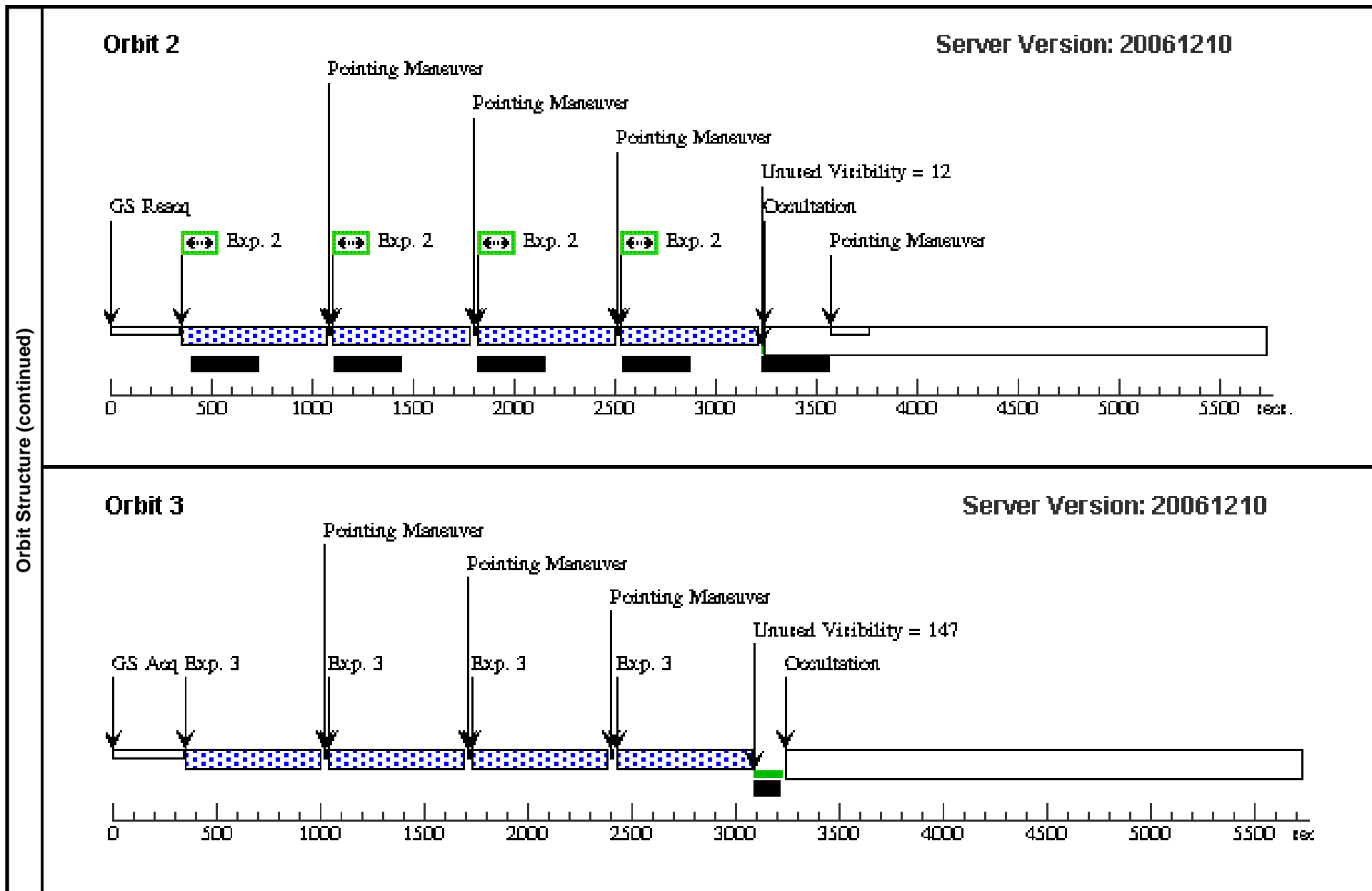


Proposal 10494 - Visit 07 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:19 GMT 2007

Visit	Proposal 10494, Visit 07, scheduling Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
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	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true		(3)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(7)	GAL-0645-52203-517	RA: 23 21 20.9335 (350.3372229d) Dec: -09 39 10.27 (-9.65285d) Equinox: J2000		V=15.9	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(7) GAL-0645-52203-517	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	540.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(7) GAL-0645-52203-517	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	550.0 Secs	
								[==>558.0 Secs (Pattern 1)] [==>558.0 Secs (Pattern 2)] [==>558.0 Secs (Pattern 3)] [==>558.0 Secs (Pattern 4)]	[2]	
3		(7) GAL-0645-52203-517	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP64; NSAMP=18			Pattern 3-3 (2)		
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]	

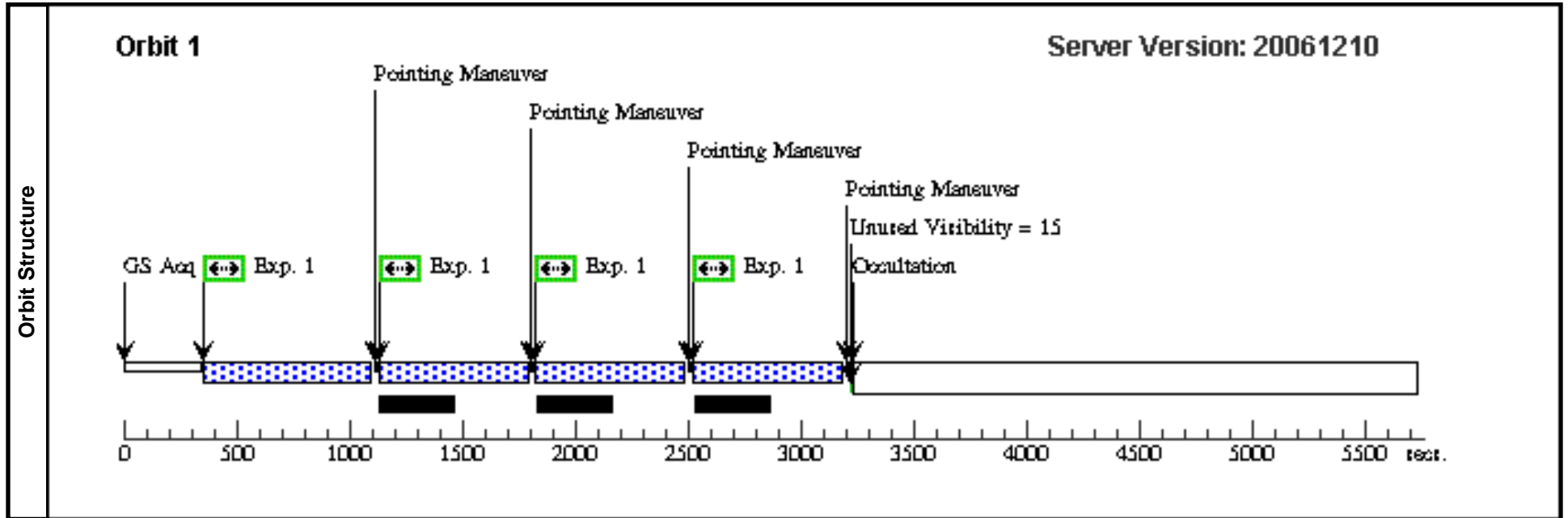


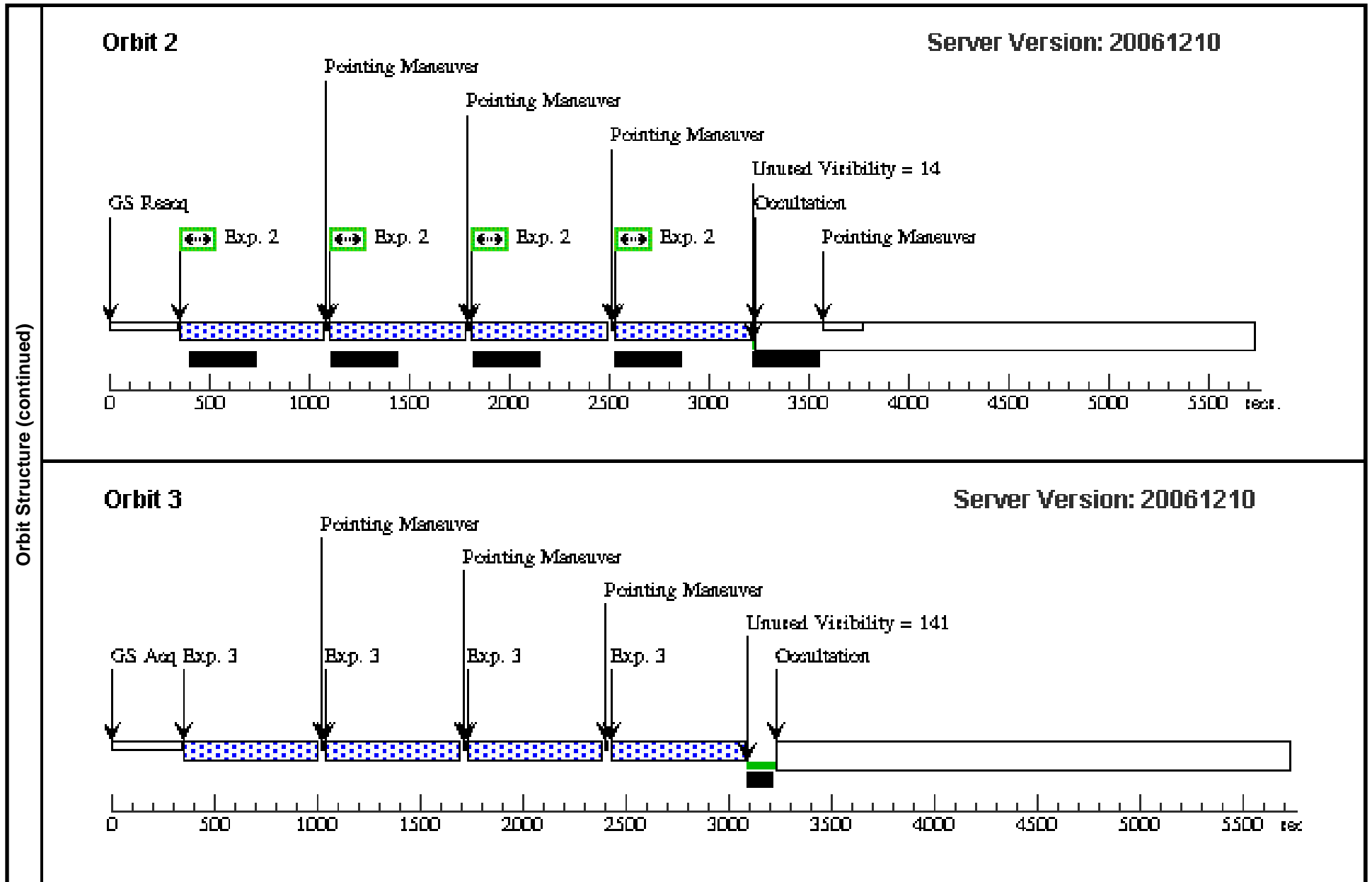


Proposal 10494 - Visit 08 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:20 GMT 2007

Visit	Proposal 10494, Visit 08, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern			Exposures			
		(1)	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=20.7 Angle Between Sides=69.1 Center Pattern=true				(1), (2)		
	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true				(3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(8)	GAL-0677-52606-520	RA: 23 00 53.1396 (345.2214150d) Dec: +00 22 37.95 (.37721d) Equinox: J2000			V=17.6	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(8) GAL-0677-52606-520	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	540.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(8) GAL-0677-52606-520	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	550.0 Secs	
								[==>556.0 Secs (Pattern 1)] [==>556.0 Secs (Pattern 2)] [==>556.0 Secs (Pattern 3)] [==>556.0 Secs (Pattern 4)]	[2]	
3		(8) GAL-0677-52606-520	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP64; NSAMP=18		Pattern 3-3 (2)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]	

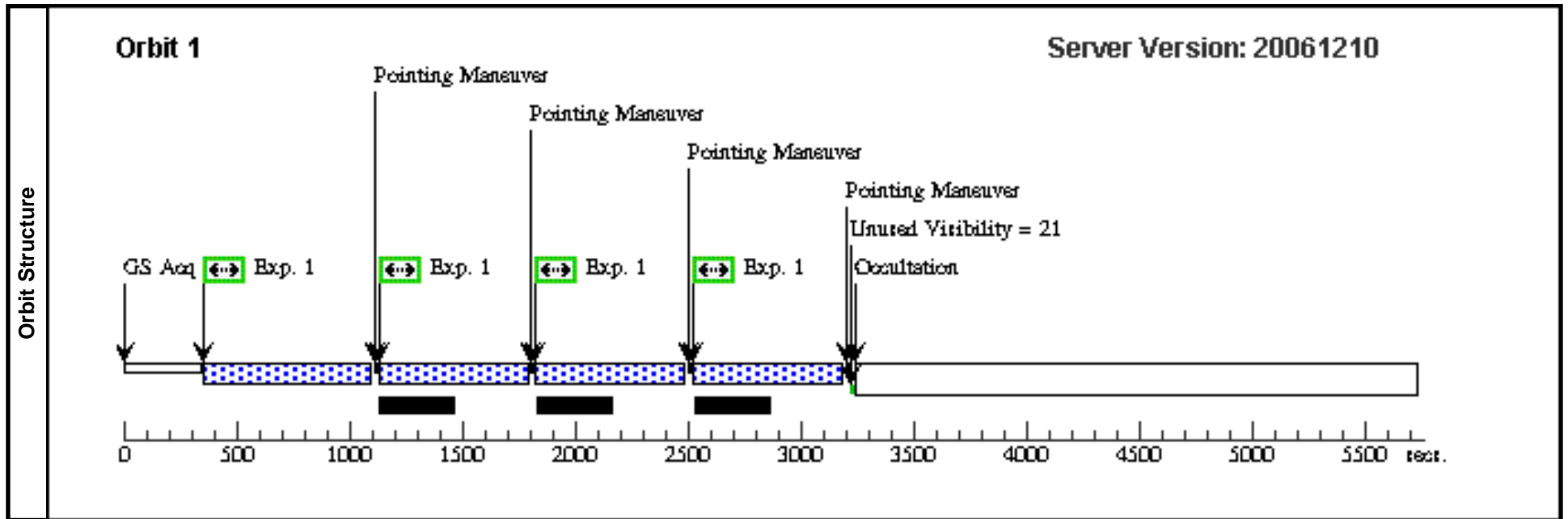


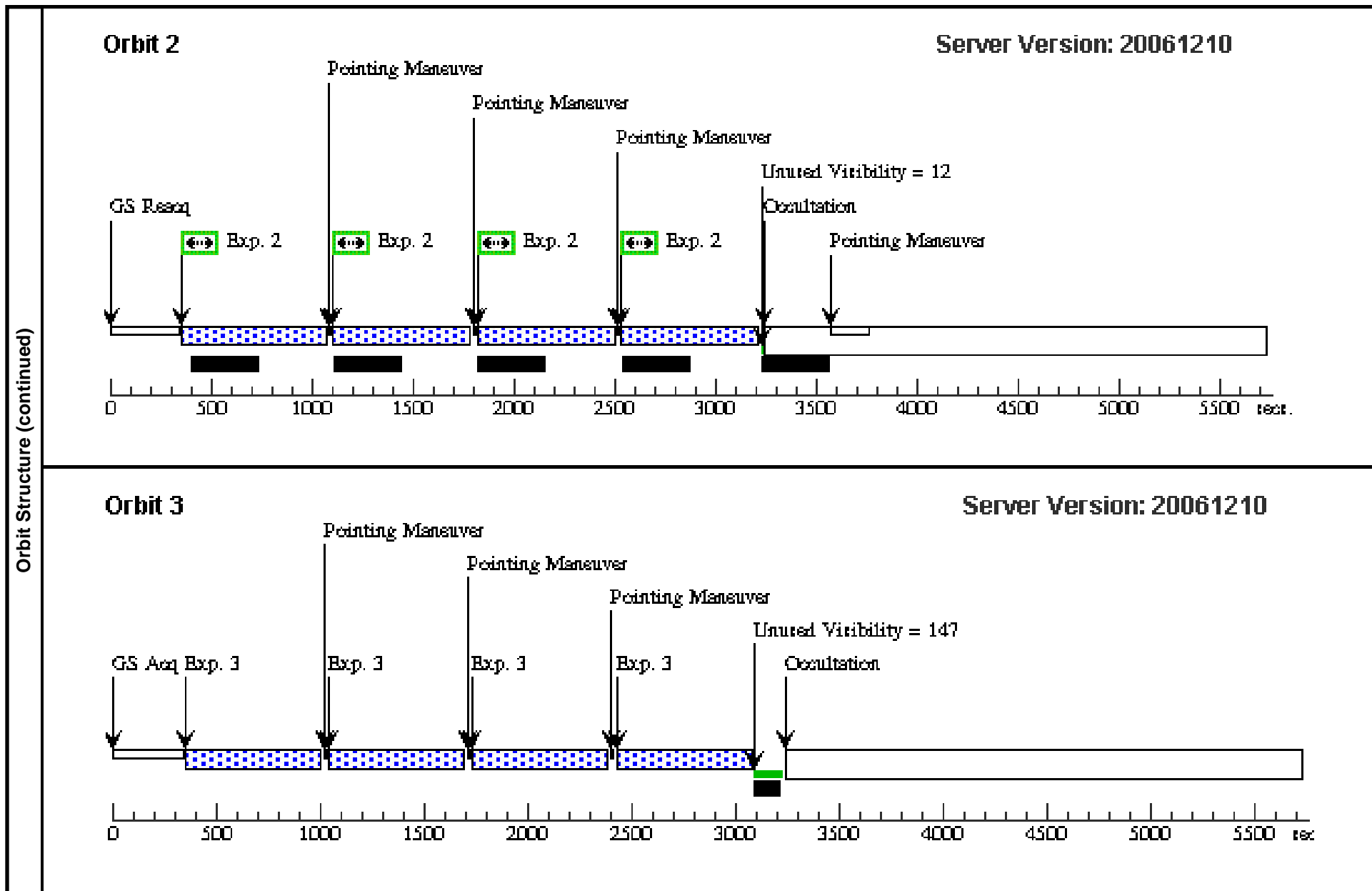


Proposal 10494 - Visit 09 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:21 GMT 2007

Visit		Proposal 10494, Visit 09, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)								
Patterns	#	Primary Pattern	Secondary Pattern		Exposures					
	(1)	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=20.7 Angle Between Sides=69.1 Center Pattern=true		(1), (2)					
(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true		(3)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(9)	GAL-0668-52162-428	RA: 02 16 52.5346 (34.2188942d) Dec: -08 13 45.44 (-8.22929d) Equinox: J2000		V=17.3	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(9) GAL-0668-52162-428	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	540.0 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(9) GAL-0668-52162-428	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	550.0 Secs [==>558.0 Secs (Pattern 1)] [==>558.0 Secs (Pattern 2)] [==>558.0 Secs (Pattern 3)] [==>558.0 Secs (Pattern 4)]	[2]
3		(9) GAL-0668-52162-428	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP64; NSAMP=18			Pattern 3-3 (2)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]

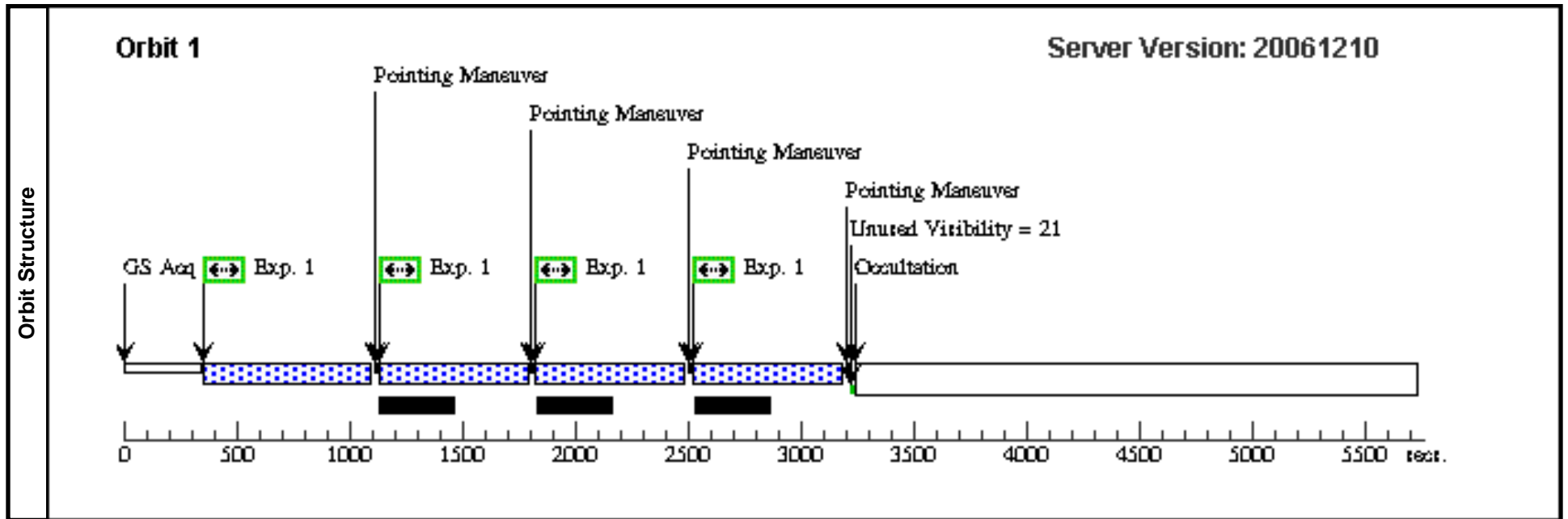


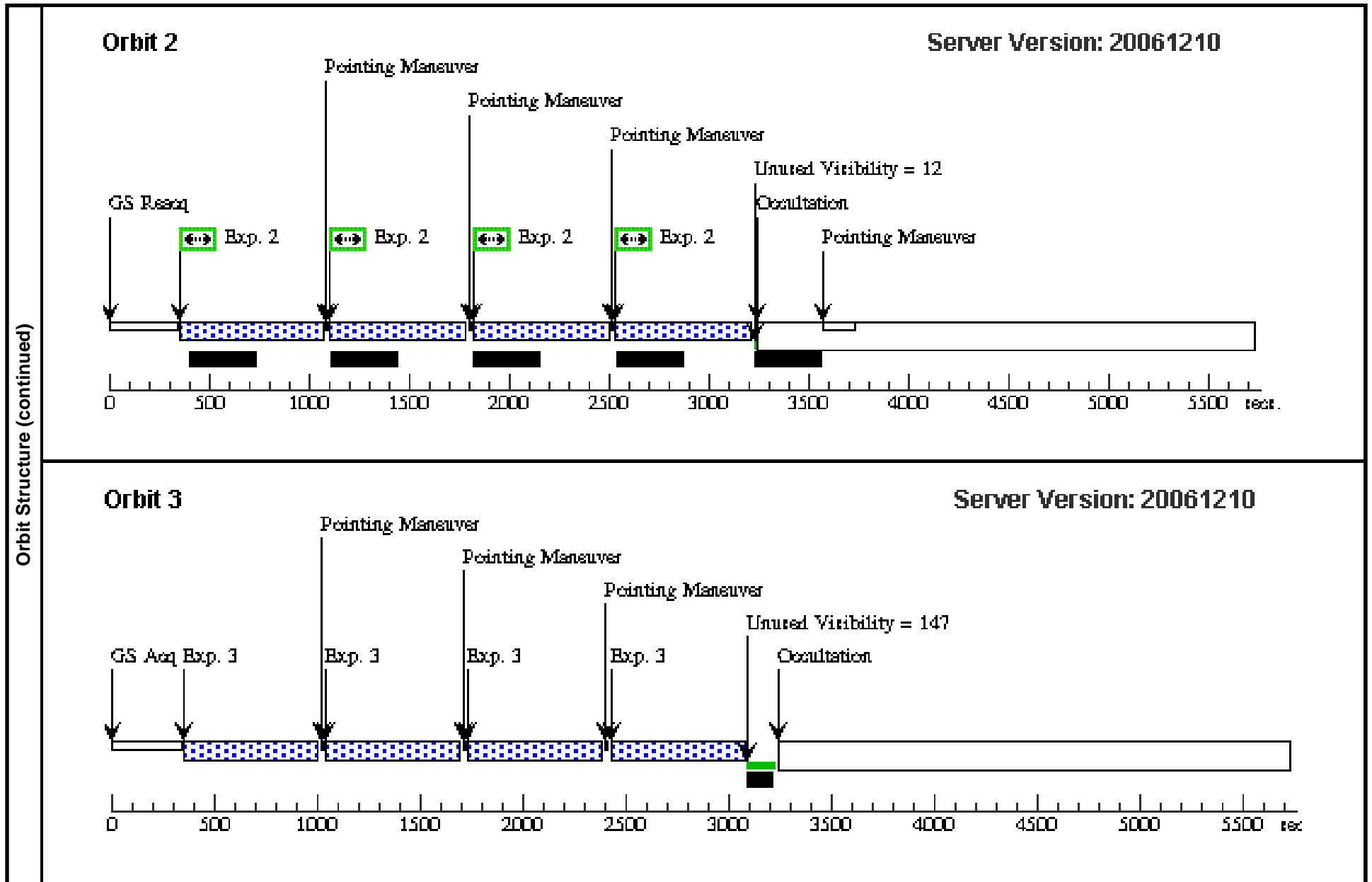


Proposal 10494 - Visit 10 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:22 GMT 2007

Visit	Proposal 10494, Visit 10, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	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=20.7 Angle Between Sides=69.1 Center Pattern=true		(1), (2)				
	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true		(3)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(10)	GAL-0722-52224-442	RA: 22 38 40.1993 (339.6674971d) Dec: -07 54 56.05 (-7.91557d) Equinox: J2000		V=16.9	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(10) GAL-0722-5224-442	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	540.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(10) GAL-0722-5224-442	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	550.0 Secs	
								[==>558.0 Secs (Pattern 1)] [==>558.0 Secs (Pattern 2)] [==>558.0 Secs (Pattern 3)] [==>558.0 Secs (Pattern 4)]	[2]	
3		(10) GAL-0722-5224-442	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP64; NSAMP=18			Pattern 3-3 (2)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]

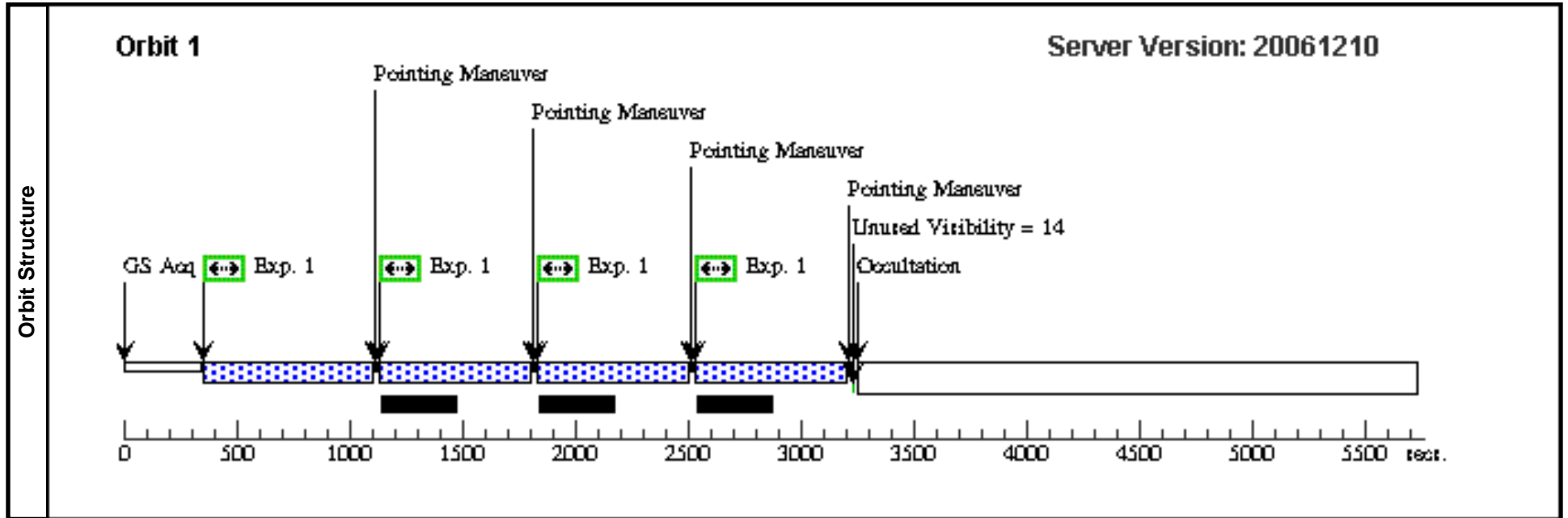


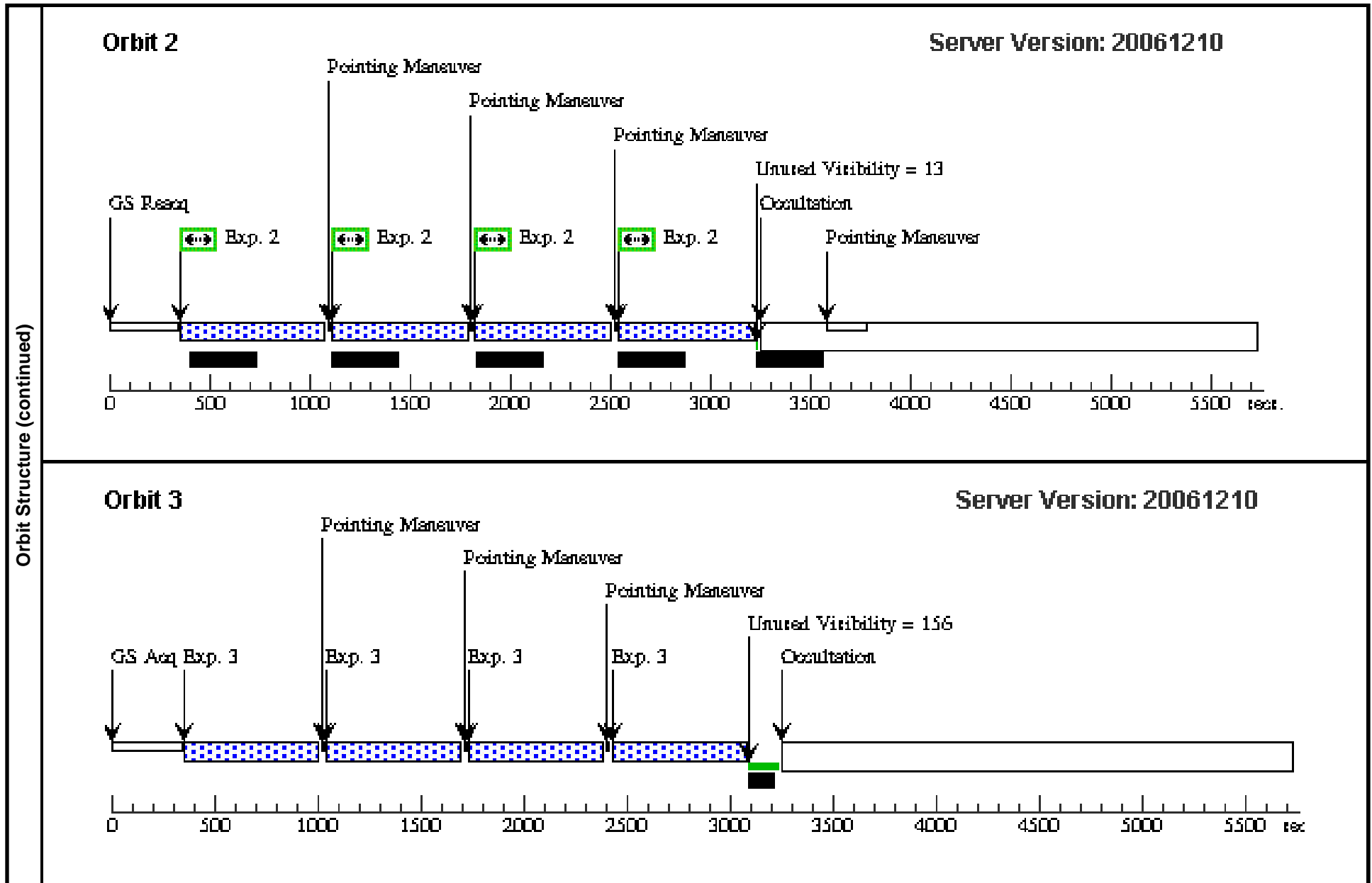


Proposal 10494 - Visit 11 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:23 GMT 2007

Visit	Proposal 10494, Visit 11, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern			Exposures			
		(1)	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=20.7 Angle Between Sides=69.1 Center Pattern=true				(1), (2)		
	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true				(3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(11)	GAL-0743-52262-304	RA: 23 03 21.7231 (345.8405129d) Dec: +14 22 17.91 (14.37164d) Equinox: J2000			V=16.7	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(11) GAL-0743-52262-304	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	540.0 Secs	
									[==>544.0 Secs (Pattern 1)] [==>544.0 Secs (Pattern 2)] [==>544.0 Secs (Pattern 3)] [==>544.0 Secs (Pattern 4)]	[1]
	2		(11) GAL-0743-52262-304	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	560.0 Secs	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]	
3		(11) GAL-0743-52262-304	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP64; NSAMP=18			Pattern 3-3 (2)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]

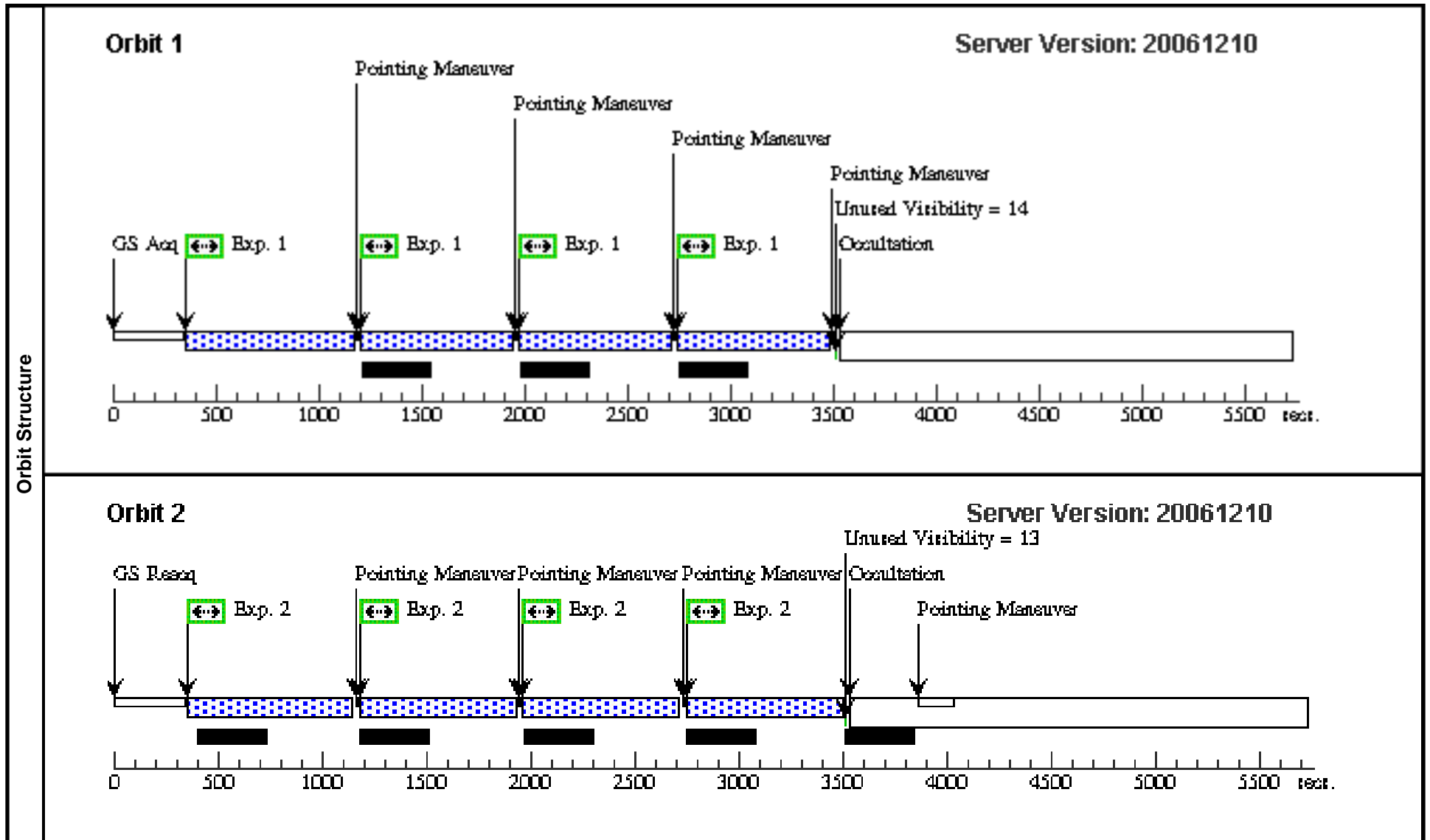


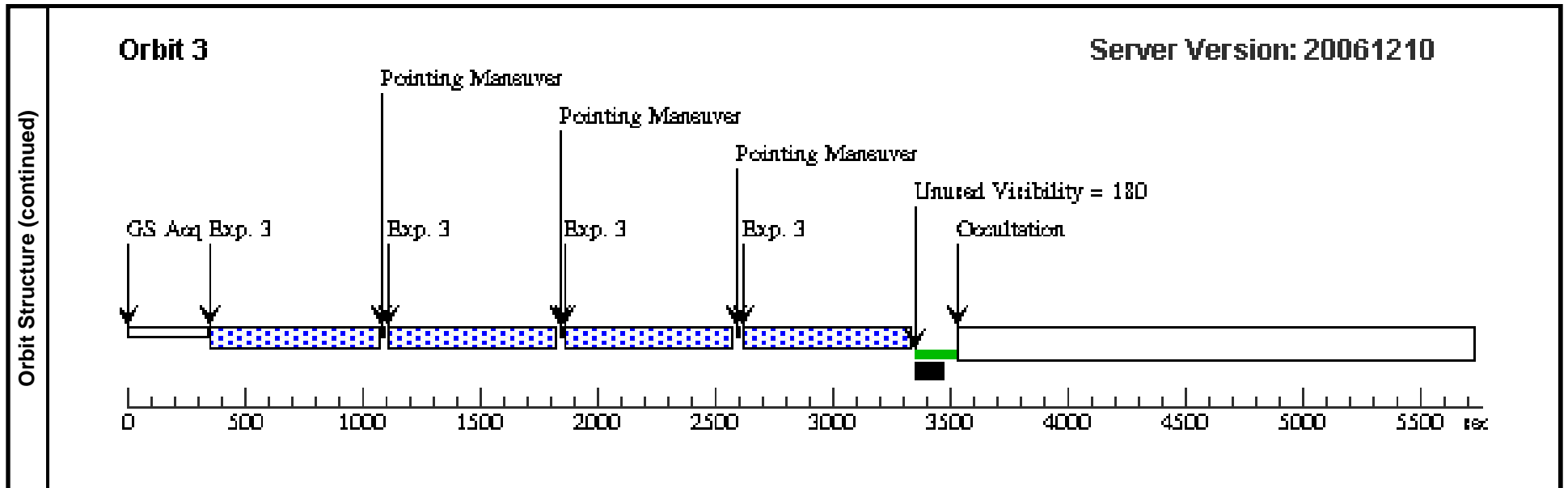


Proposal 10494 - Visit 12 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:24 GMT 2007

Visit	Proposal 10494, Visit 12, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern				Exposures		
		(1)	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=20.7 Angle Between Sides=69.1 Center Pattern=true					(1), (2)	
	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true					(3)		
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(12)	GAL-0788-52338-605	RA: 14 20 15.8501 (215.0660421d) Dec: +60 19 14.80 (60.32078d) Equinox: J2000			V=15.6	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(12) GAL-0788-52338-605	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	610.0 Secs	
									[==>614.0 Secs (Pattern 1)] [==>614.0 Secs (Pattern 2)] [==>614.0 Secs (Pattern 3)] [==>614.0 Secs (Pattern 4)]	[1]
	2		(12) GAL-0788-52338-605	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	630.0 Secs	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]	
3		(12) GAL-0788-52338-605	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP64; NSAMP=19			Pattern 3-3 (2)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]

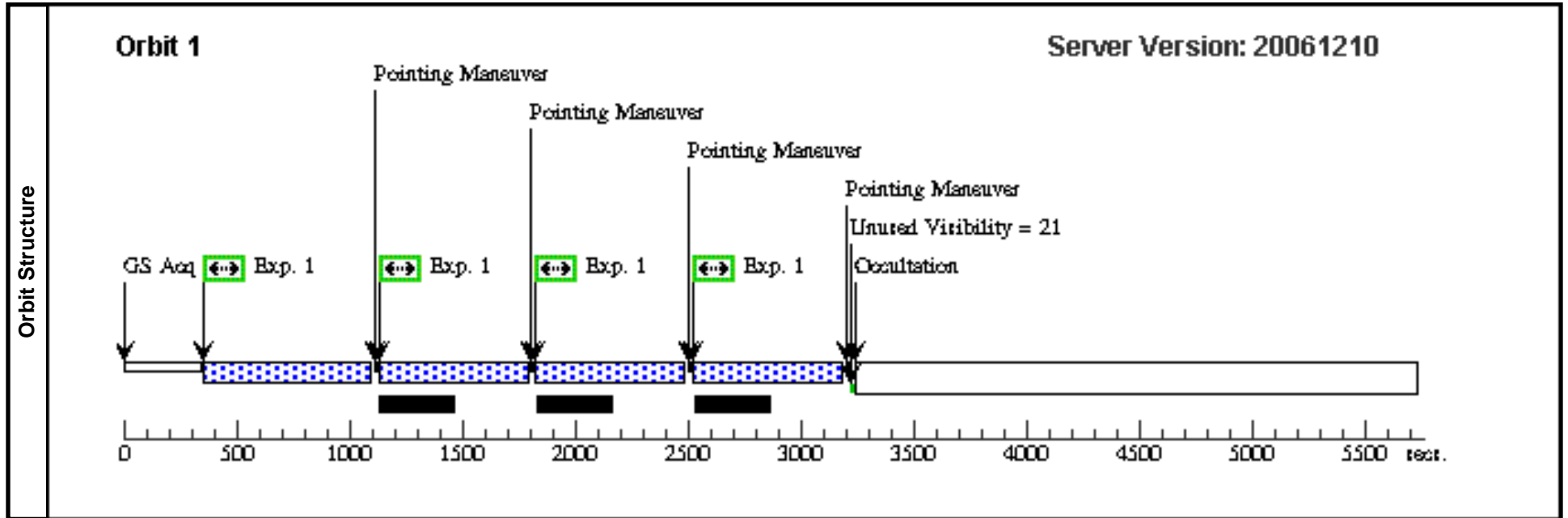


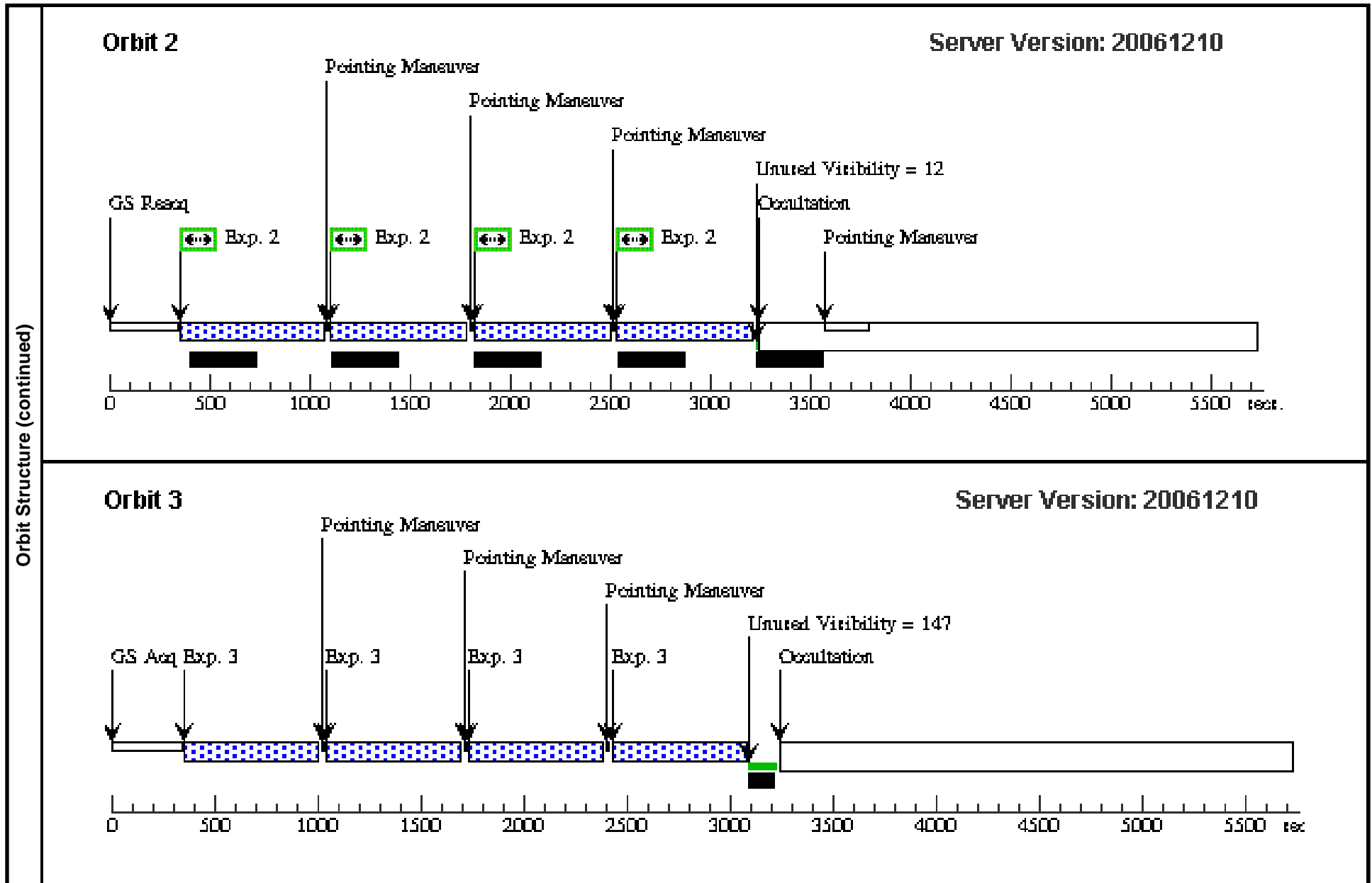


Proposal 10494 - Visit 13 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:25 GMT 2007

Visit	Proposal 10494, Visit 13, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern			Exposures			
		(1)	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=20.7 Angle Between Sides=69.1 Center Pattern=true				(1), (2)		
	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true				(3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(13)	GAL-0847-52426-549	RA: 12 50 28.2593 (192.6177471d) Dec: +05 23 49.07 (5.39696d) Equinox: J2000			V=17.34	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(13) GAL-0847-52426-549	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	540.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(13) GAL-0847-52426-549	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	550.0 Secs	
								[==>558.0 Secs (Pattern 1)] [==>558.0 Secs (Pattern 2)] [==>558.0 Secs (Pattern 3)] [==>558.0 Secs (Pattern 4)]	[2]	
3		(13) GAL-0847-52426-549	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP64; NSAMP=18		Pattern 3-3 (2)			
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]	

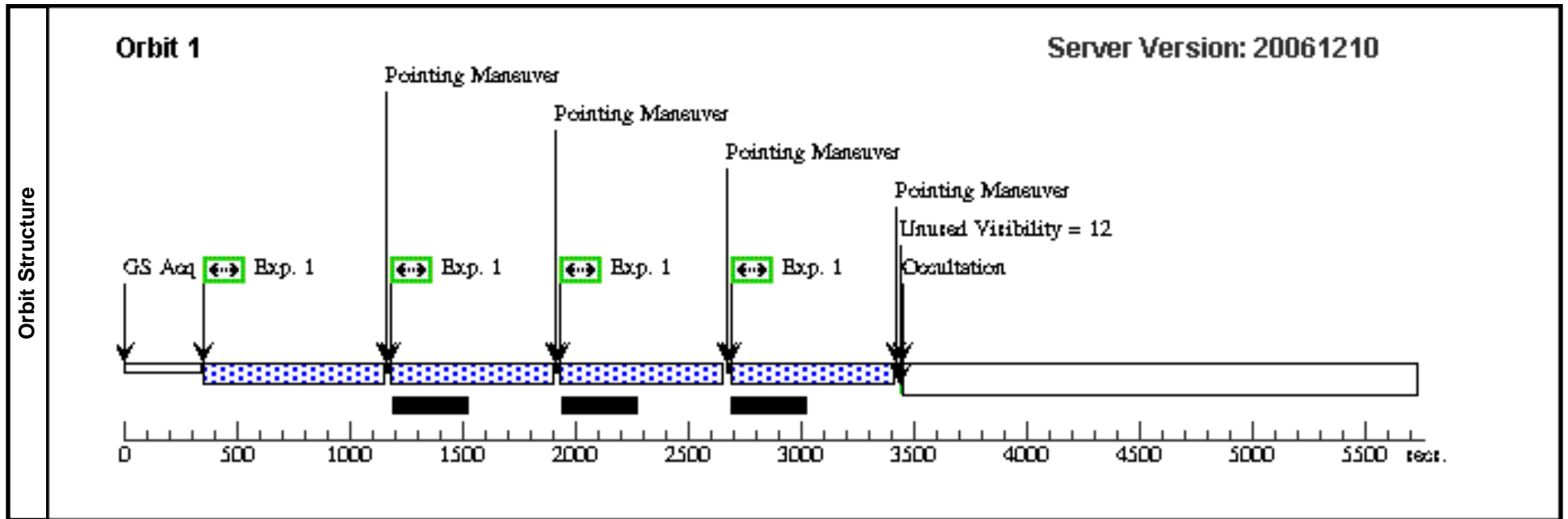


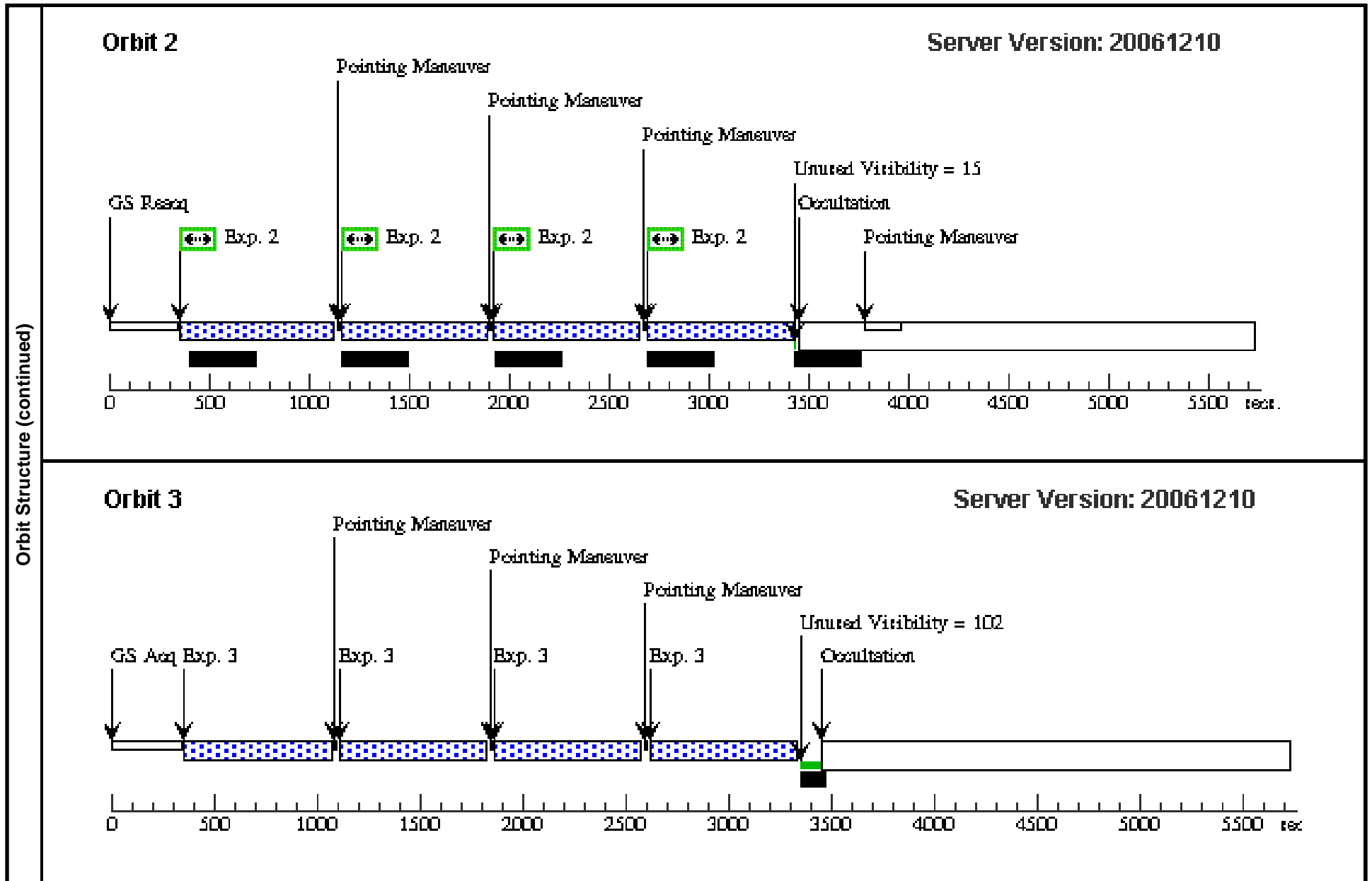


Proposal 10494 - Visit 14 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:26 GMT 2007

Visit	Proposal 10494, Visit 14, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern			Exposures			
Patterns		(1)	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=20.7 Angle Between Sides=69.1 Center Pattern=true				(1), (2)		
	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true				(3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(14)	GAL-0902-52409-068	RA: 09 56 29.7816 (149.1240900d) Dec: +51 00 6.39 (51.00178d) Equinox: J2000			V=16.8	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(14) GAL-0902-52409-068	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	590.0 Secs	
									[==>595.0 Secs (Pattern 1)] [==>595.0 Secs (Pattern 2)] [==>595.0 Secs (Pattern 3)] [==>595.0 Secs (Pattern 4)]	[1]
	2		(14) GAL-0902-52409-068	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	610.0 Secs	
								[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]	
3		(14) GAL-0902-52409-068	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP64; NSAMP=19			Pattern 3-3 (2)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]

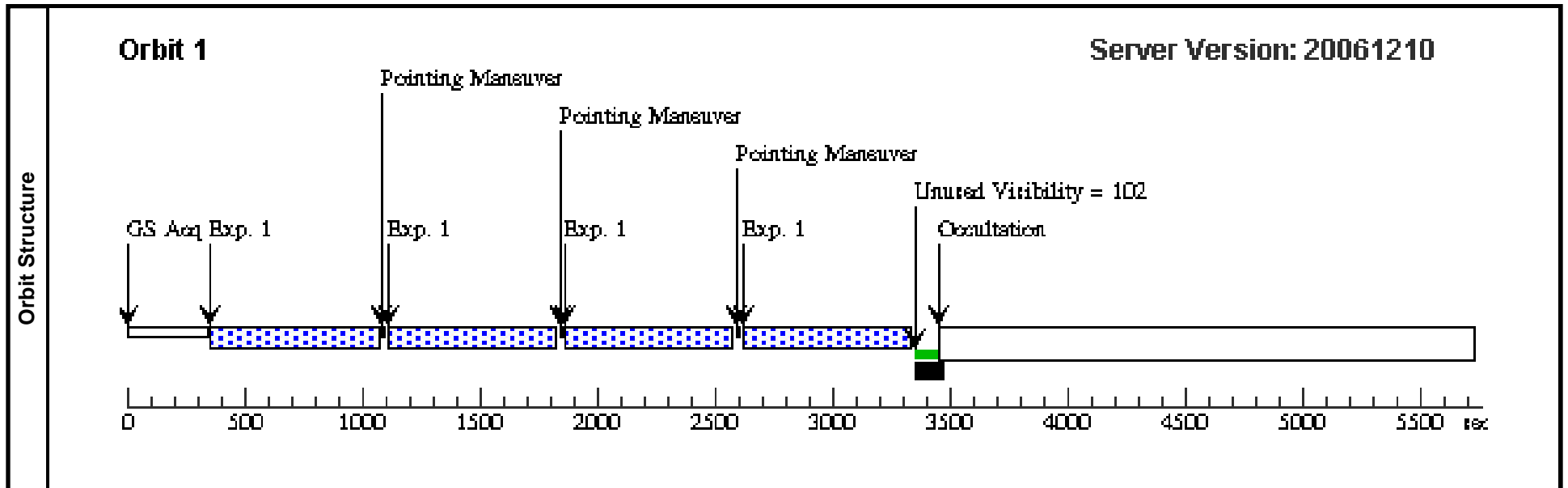




Proposal 10494 - Visit 53 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:27 GMT 2007

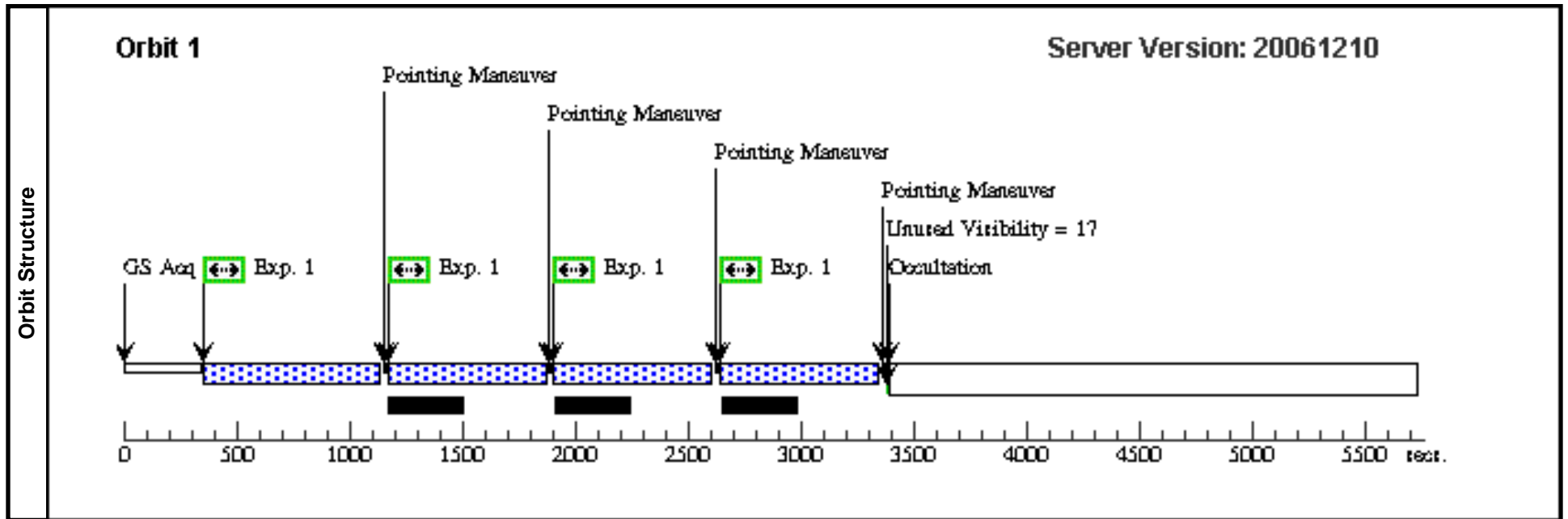
Visit	Proposal 10494, Visit 53 Diagnostic Status: No Diagnostics Scientific Instruments: NIC2 Special Requirements: (none)										
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
(2)		Pattern Type=NIC-SPIRAL-DITH	Coordinate Frame=POS-TARG						(1)		
		Purpose=DITHER	Pattern Orientation=0								
		Number Of Points=4	Angle Between Sides=								
		Point Spacing=4.463	Center Pattern=true								
		Line Spacing=									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(14)	GAL-0902-52409-068	RA: 09 56 29.7816 (149.1240900d)	Dec: +51 00 6.39 (51.00178d)	Equinox: J2000		V=16.8	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1		(14) GAL-0902-524 09-068	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP6 4; NSAMP=19		Pattern 1-1 (2)	[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]	

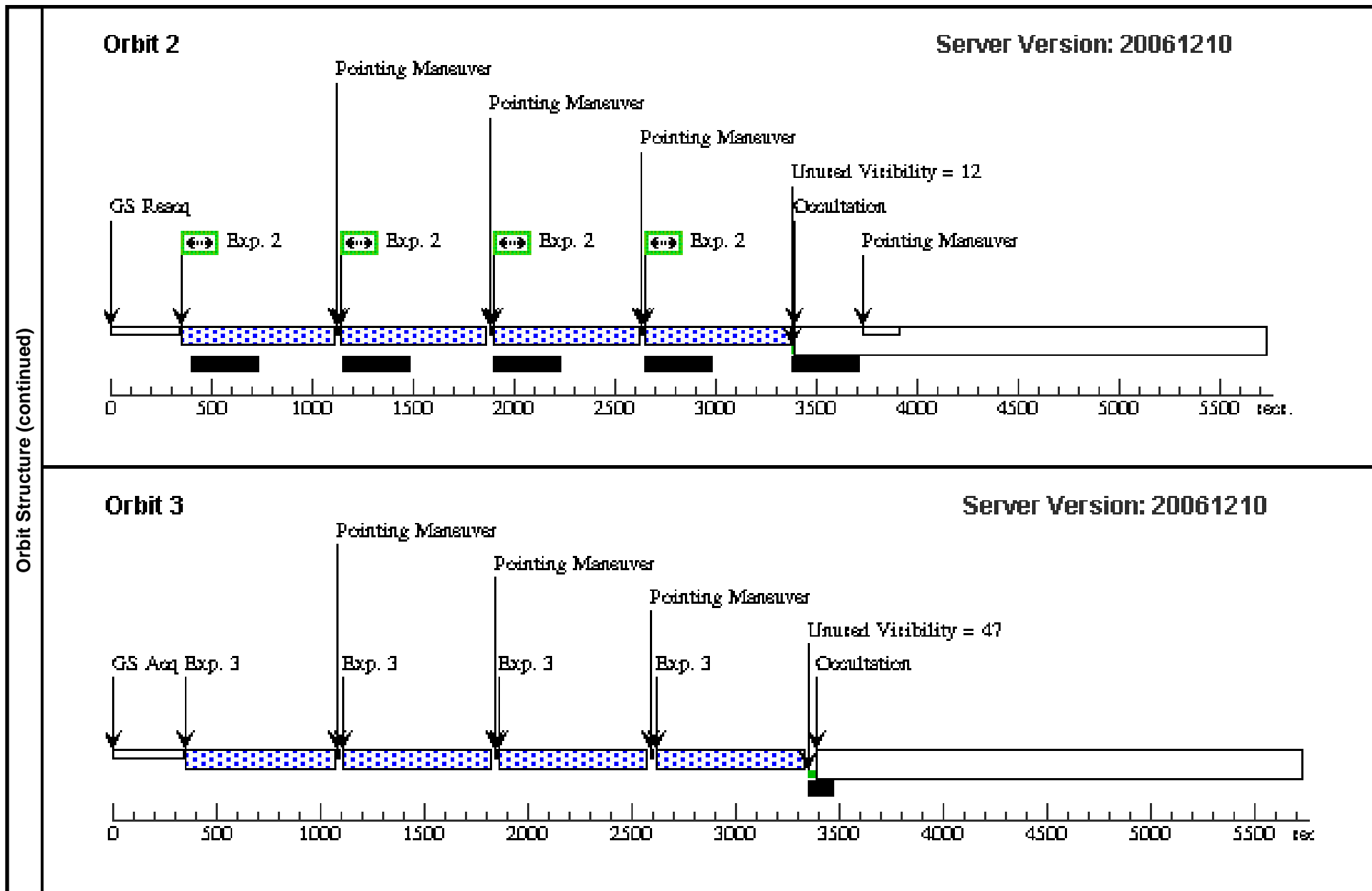


Proposal 10494 - Visit 15 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:27 GMT 2007

Visit	Proposal 10494, Visit 15, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	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=20.7 Angle Between Sides=69.1 Center Pattern=true		(1), (2)				
	(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true		(3)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(15)	GAL-0969-52442-134	RA: 12 05 40.4359 (181.4184829d) Dec: +49 10 29.38 (49.17483d) Equinox: J2000		V=17.28	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(15) GAL-0969-524-42-134	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	580.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(15) GAL-0969-524-42-134	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	590.0 Secs	
								[==>597.0 Secs (Pattern 1)] [==>597.0 Secs (Pattern 2)] [==>597.0 Secs (Pattern 3)] [==>597.0 Secs (Pattern 4)]	[2]	
3		(15) GAL-0969-524-42-134	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP6 4; NSAMP=19			Pattern 3-3 (2)		
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]





Proposal 10494 - Visit 52 - Imaging the mass structure of distant lens galaxies

Wed Jan 17 02:04:29 GMT 2007

Visit		Proposal 10494, Visit 52, completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC, NIC2 Special Requirements: (none)								
Patterns	#	Primary Pattern	Secondary Pattern			Exposures				
	(1)	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=20.7 Angle Between Sides=69.1 Center Pattern=true				(1), (2)			
(2)	Pattern Type=NIC-SPIRAL-DITH Purpose=DITHER Number Of Points=4 Point Spacing=4.463 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=true				(3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	GAL-0472-51955-429	RA: 09 12 5.3122 (138.0221342d) Dec: +00 29 1.18 (.48366d) Equinox: J2000		V=16.1	Coordinate Source: HIPPARCOS/TYCHO_CATALOGUE				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(2) GAL-0472-5195-429	ACS/WFC, ACCUM, WFC1	F555W	CR-SPLIT=NO		Pattern 1-1 (1)	540.0 Secs	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(2) GAL-0472-5195-429	ACS/WFC, ACCUM, WFC1	F814W	CR-SPLIT=NO		Pattern 2-2 (1)	550.0 Secs	
								[==>556.0 Secs (Pattern 1)] [==>556.0 Secs (Pattern 2)] [==>556.0 Secs (Pattern 3)] [==>556.0 Secs (Pattern 4)]	[2]	
3		(2) GAL-0472-5195-429	NIC2, MULTIACCUM, NIC2	F160W	SAMP-SEQ=STEP6 4; NSAMP=18			Pattern 3-3 (2)		
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]

