



12918 - Origin of UCDs in the Coma Cluster

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) COMA2-0	ACS/WFC	2	10-Jul-2012 23:08:16.0	yes
02	(2) COMA3-0	ACS/WFC	2	10-Jul-2012 23:08:27.0	yes
03	(3) COMA2-4	ACS/WFC	2	10-Jul-2012 23:08:37.0	yes
04	(4) COMA4-5	ACS/WFC	2	10-Jul-2012 23:08:45.0	yes
05	(5) COMA3-6	ACS/WFC	2	10-Jul-2012 23:08:54.0	yes
06	(6) COMA4-6	ACS/WFC	2	10-Jul-2012 23:09:02.0	yes

12 Total Orbits Used

ABSTRACT

We propose to explore the nature and origin of ultra-compact dwarf galaxies through two passband imaging with the ACS/WFC of 6 fields in the Coma cluster core. This is part of an on-going ACS survey of the Coma cluster which was cut short by the ACS failure. The proposed 6 fields will

provide contiguous coverage of the central core assuring legacy value of this treasury program while concurrently targeting regions expected to harbor large UCD populations where specific tests will help distinguish between different formation scenarios. Through the high spatial resolution of ACS we have successfully identified a population of UCDs in the Coma cluster, strongly concentrated around the central giants and along a narrow band through the core region. Based on the UCD properties, distribution, and similarities to the Coma cluster GC population in our current dataset, we find more evidence for UCDs originating as star clusters than as stripped nuclei from tidally disrupted dwarf ellipticals. However, other formation scenarios are not ruled out. The proposed observations fill in the principal axis of the core, targeting regions around 3 major galaxies, where we expect high concentrations of UCDs based on this previous work. With more complete coverage in the central core, we will establish whether GCs and UCDs maintain similar distributions and similarly higher densities around the 3 targeted galaxies, investigate previously noted color affiliations of UCDs with these host galaxies, and determine whether the number counts of UCDs are consistent with the bright tail of the GC luminosity function or the implied numbers of disrupted dwarfs with intracluster light measurements.

OBSERVING DESCRIPTION

We plan to observe 6 fields with ACS/WFC in both F814W and F475W as done previously for the Coma HST/ACS Treasury survey. These 6 fields extend the survey along the principal core axis and provide contiguous coverage in the core region. Additionally, these fields probe regions which are targeted specifically to help establish the origins of UCDs. This includes the region around the unusual galaxy IC 4051 which hosts a large GC population and which may host a large UCD population, and 4 fields immediately adjacent to NGC 4874 and NGC 4889 in order to investigate the extent of the large UCD populations bound to these central galaxies, their distribution, and especially any color trends.

Two filters are necessary for initial color selection of GC/UCDs and to study the color distribution of the GC/UCDs. We will use F814W and F475W as in the original survey and which proved to be a good discriminant for color selection. We will use the same observing strategy as implemented previously: 2 orbits per field, observing each field with 2 filters, and with a total 4 dithered exposures to be multidrizzle combined. Total exposure times previously were 1400s in F814W and 2677s in F475W, reaching a point source limit of $I_C = 26.6$. The total time per orbit pair for this cycle is 109s shorter. Thus total exposure times will be 1400s in F814W and 2568s in F475W. This provides the required depth and color information necessary for detections of GCs to $M_I \sim -8.5$ (90% completeness) and will allow identification of sources as UCDs down to $M_I \sim -11$ via measurement of effective radius in the ACS F814W images. Since $M_I = -11$ is often used as the cutoff between GC and UCDs, this depth is sufficient.

Orientations are specified to be ± 15 deg for every 90 deg around the original survey orientation. Although it would be ideal to use an identical

Proposal 12918 (STScI Edit Number: 0, Created: Tuesday, July 10, 2012 10:09:09 PM EST) - Overview

orientation as the original survey to assure no gaps in the coverage, we have relaxed this requirement in order to maximize schedulability while still assuring nearly complete survey coverage. The orientation for one target field, Coma2-0, is less restrictive, chosen only to ensure overlap with the unusual galaxy IC 4051. If it proves necessary to increase schedulability for any of these fields, the orientation requirements can be relaxed further. This may also be necessary in order to access good guide stars.

Proposal 12918 - Coma2-0 (01) - Origin of UCDs in the Coma Cluster

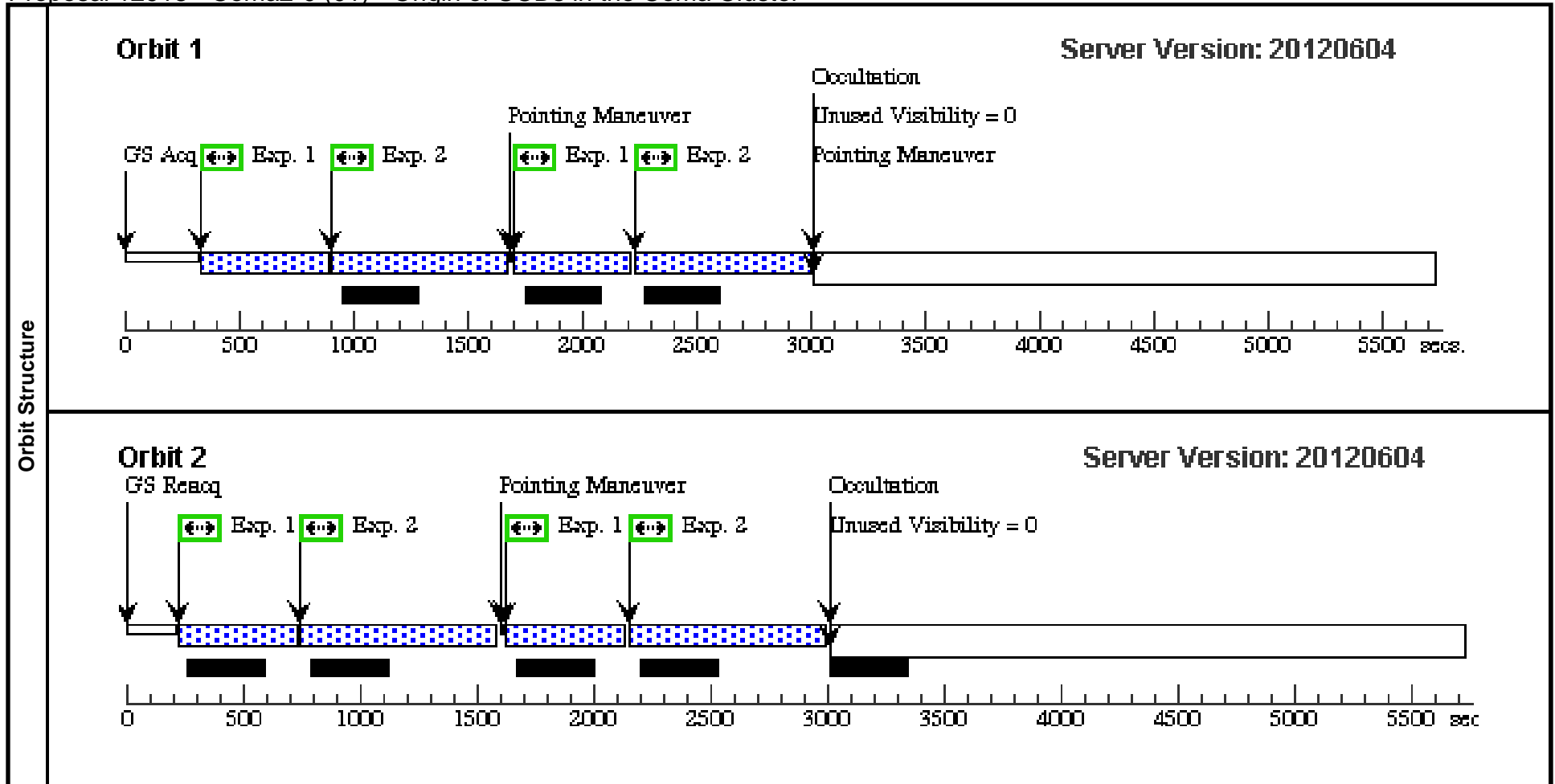
Wed Jul 11 03:09:10 GMT 2012

Visit	Proposal 12918, Coma2-0 (01) Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SCHED 100%; ORIENT 267D TO 297 D; ORIENT 0D TO 117 D; ORIENT 168D TO 185 D		
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Patterns	#	Primary Pattern	Secondary Pattern	Exposures	
	(1)	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	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.2412 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=22.3239 Angle Between Sides= Center Pattern=false

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	COMA2-0	RA: 13 00 58.9000 (195.2454167d) Dec: +28 01 41.15 (28.02810d) Equinox: J2000		V=22+/-1	Reference Frame: ICRS

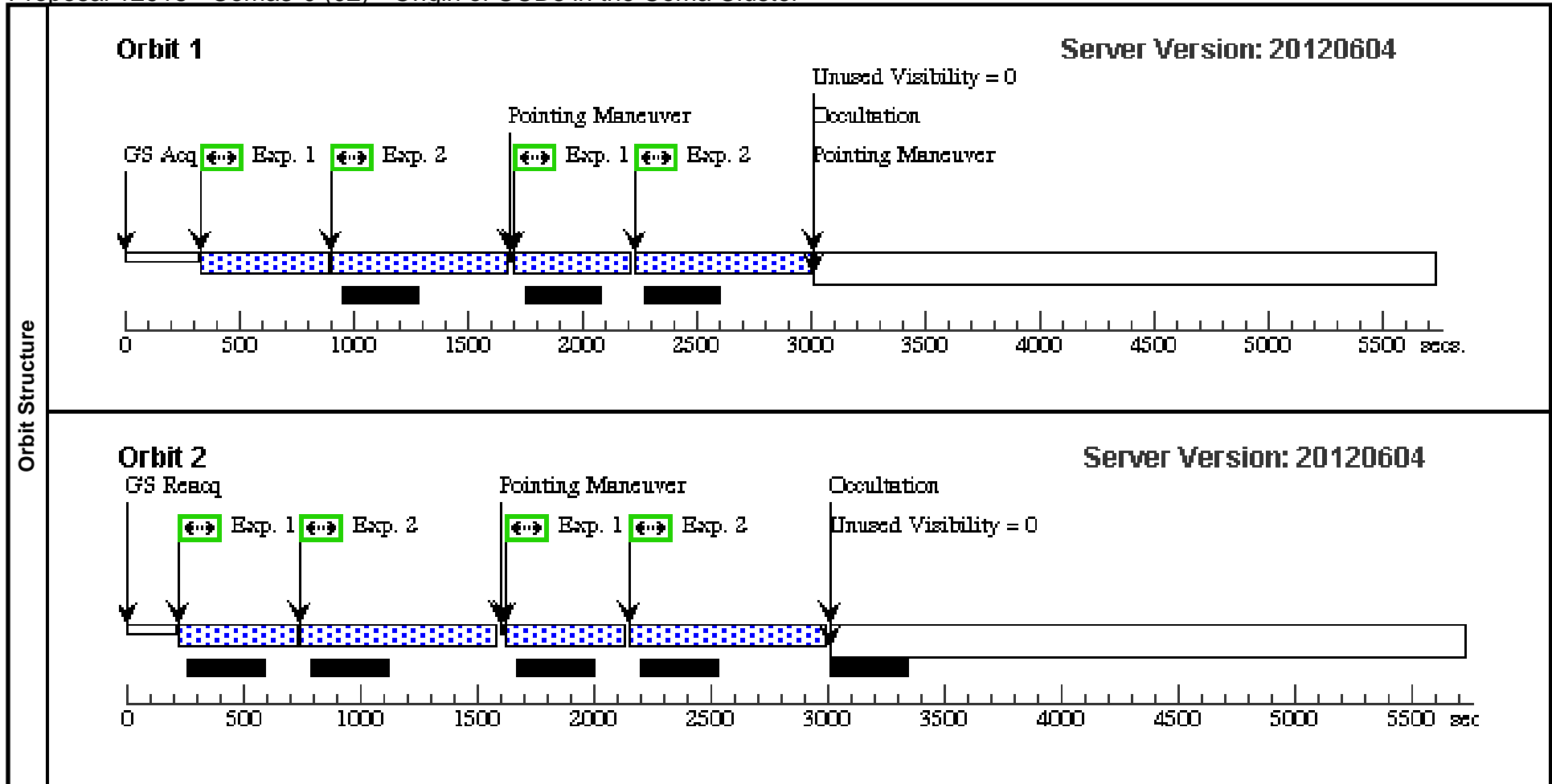
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
		1	F814W	(1) COMA2-0	ACS/WFC, ACCUM, WFCENTER	F814W			Pattern 1, Exps 1-2 in Coma2-0 (01) (1)	350 Secs
[==>(Pattern 1,1)]										[1]
		[==>(Pattern 1,2)]								
		[==>(Pattern 2,1)]	[2]							
	2	F475W	(1) COMA2-0	ACS/WFC, ACCUM, WFCENTER	F475W			Pattern 1, Exps 1-2 in Coma2-0 (01) (1)	640 Secs	
									[==>603.0 Secs (Pattern 1,1)]	[1]
		[==>604.0 Secs (Pattern 1,2)]								
		[==>681.0 Secs (Pattern 2,1)]	[2]							
		[==>680.0 Secs (Pattern 2,2)]								



Proposal 12918 - Coma3-0 (02) - Origin of UCDs in the Coma Cluster

Wed Jul 11 03:09:13 GMT 2012

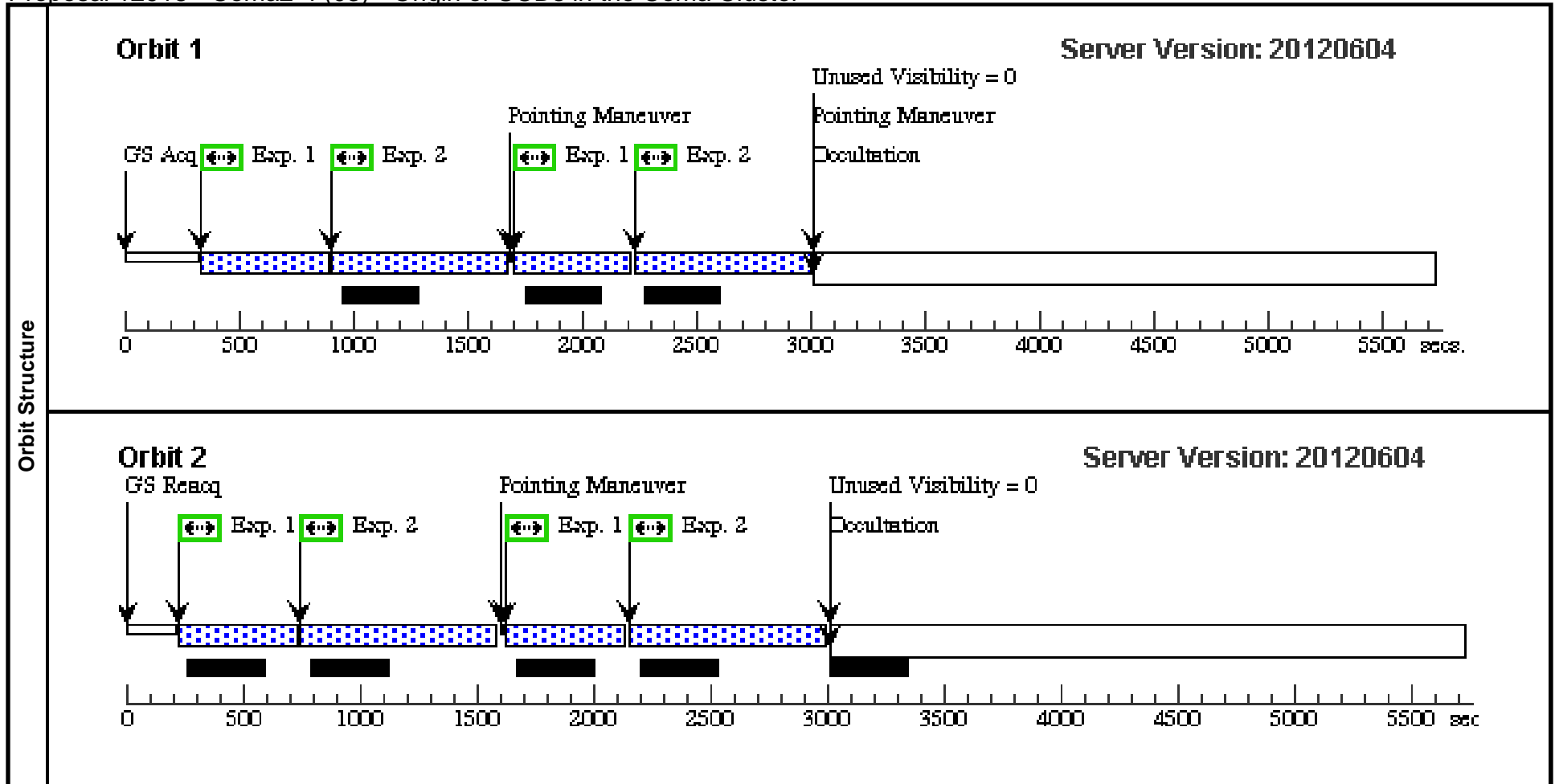
Visit	Proposal 12918, Coma3-0 (02) Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SCHED 100%; ORIENT 267D TO 297 D; ORIENT 87D TO 117 D; ORIENT 357D TO 27 D; ORIENT 177D TO 207 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern 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	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.2412 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=22.3239 Angle Between Sides= Center Pattern=false	(1-2)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	COMA3-0	RA: 13 00 55.3000 (195.2304167d) Dec: +27 58 30.15 (27.97504d) Equinox: J2000		V=22+/-1	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F814W	(2) COMA3-0	ACS/WFC, ACCUM, WFCENTER	F814W			Pattern 1, Exps 1-2 in Coma3-0 (02) (1)	350 Secs	
									[==>(Pattern 1,1)]	[1]
									[==>(Pattern 1,2)]	[2]
2	F475W	(2) COMA3-0	ACS/WFC, ACCUM, WFCENTER	F475W			Pattern 1, Exps 1-2 in Coma3-0 (02) (1)	640 Secs		
								[==>603 Secs (Pattern 1,1)]	[1]	
								[==>604 Secs (Pattern 1,2)]	[2]	
								[==>681 Secs (Pattern 2,1)]	[1]	
								[==>680 Secs (Pattern 2,2)]	[2]	



Proposal 12918 - Coma2-4 (03) - Origin of UCDs in the Coma Cluster

Wed Jul 11 03:09:16 GMT 2012

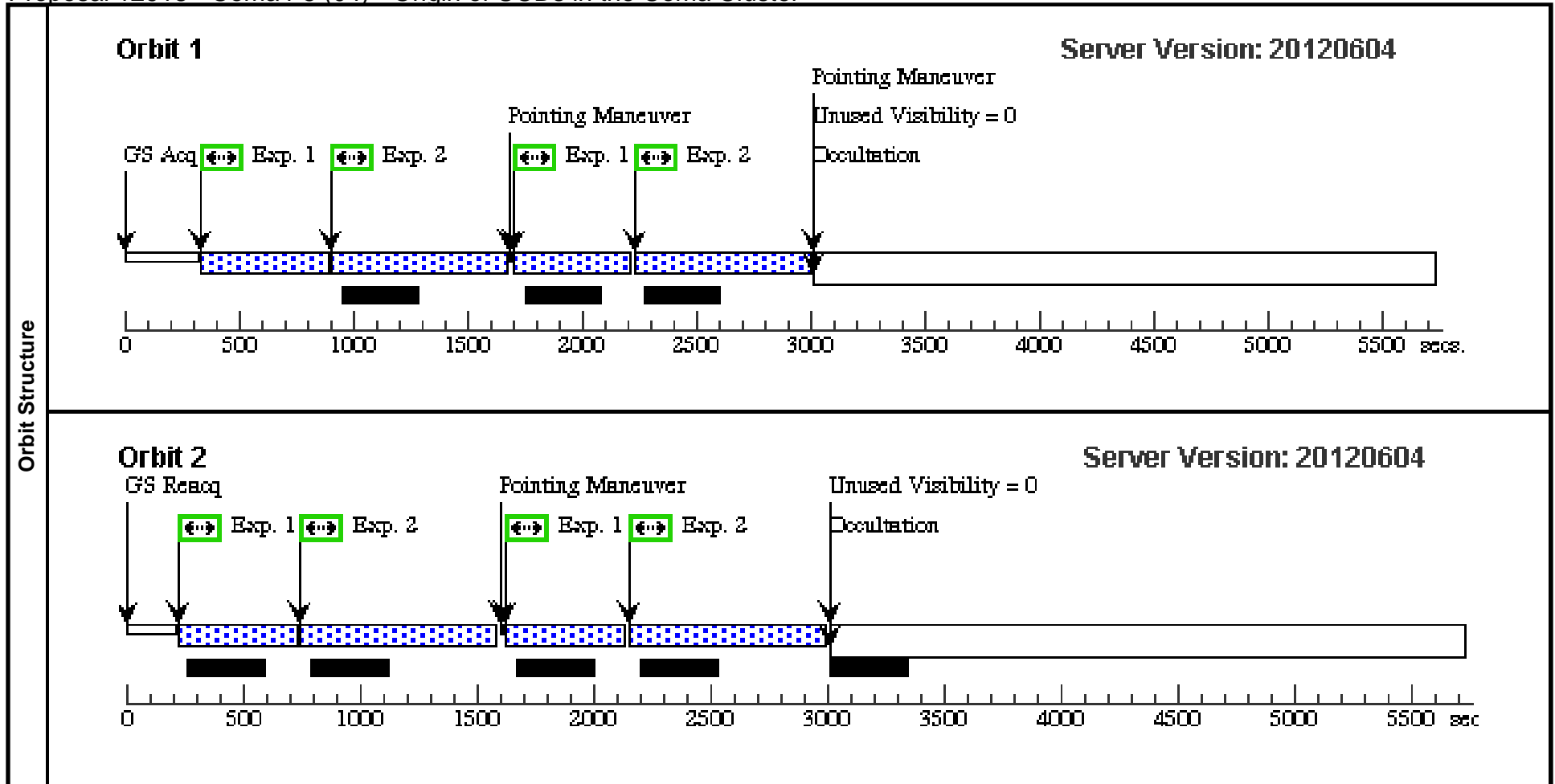
Visit	Proposal 12918, Coma2-4 (03) Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SCHED 100%; ORIENT 267D TO 297 D; ORIENT 87D TO 117 D; ORIENT 357D TO 27 D; ORIENT 177D TO 207 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern 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	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.2412 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=22.3239 Angle Between Sides= Center Pattern=false	(1-2)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	COMA2-4	RA: 12 59 56.5000 (194.9854167d) Dec: +28 01 41.15 (28.02810d) Equinox: J2000		V=22+/-1	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F814W	(3) COMA2-4	ACS/WFC, ACCUM, WFCENTER	F814W			Pattern 1, Exps 1-2 in Coma2-4 (03) (1)	350 Secs	
									[==>(Pattern 1,1)]	[1]
									[==>(Pattern 1,2)]	
									[==>(Pattern 2,1)]	[2]
									[==>(Pattern 2,2)]	
2	F475W	(3) COMA2-4	ACS/WFC, ACCUM, WFCENTER	F475W				Pattern 1, Exps 1-2 in Coma2-4 (03) (1)	640 Secs	
								[==>603 Secs (Pattern 1,1)]	[1]	
								[==>604 Secs (Pattern 1,2)]		
								[==>681 Secs (Pattern 2,1)]	[2]	
								[==>680 Secs (Pattern 2,2)]		



Proposal 12918 - Coma4-5 (04) - Origin of UCDs in the Coma Cluster

Wed Jul 11 03:09:18 GMT 2012

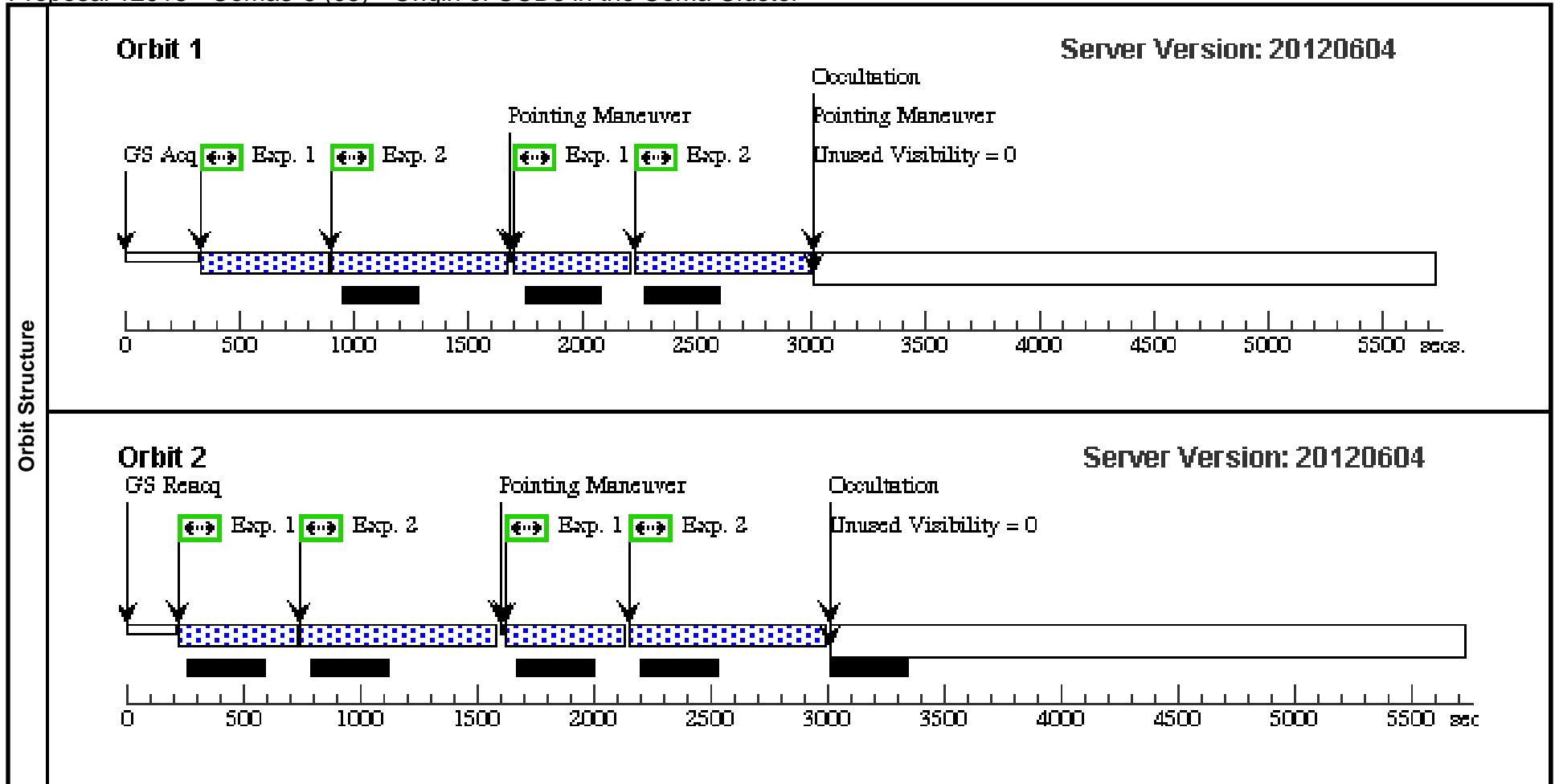
Visit	Proposal 12918, Coma4-5 (04) Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SCHED 100%; ORIENT 267D TO 297 D; ORIENT 87D TO 117 D; ORIENT 357D TO 27 D; ORIENT 177D TO 207 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern 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	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.2412 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=22.3239 Angle Between Sides= Center Pattern=false	(1-2)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(4)	COMA4-5	RA: 12 59 33.7000 (194.8904167d) Dec: +27 55 19.15 (27.92199d) Equinox: J2000		V=22+/-1	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F814W	(4) COMA4-5	ACS/WFC, ACCUM, WFCENTER	F814W			Pattern 1, Exps 1-2 i n Coma4-5 (04) (1)	350 Secs	
									[==>(Pattern 1,1)]	[1]
									[==>(Pattern 1,2)]	
									[==>(Pattern 2,1)]	[2]
									[==>(Pattern 2,2)]	
2	F475W	(4) COMA4-5	ACS/WFC, ACCUM, WFCENTER	F475W				Pattern 1, Exps 1-2 i n Coma4-5 (04) (1)	640 Secs	
								[==>603 Secs (Pattern 1,1)]	[1]	
								[==>604 Secs (Pattern 1,2)]		
								[==>681 Secs (Pattern 2,1)]	[2]	
								[==>680 Secs (Pattern 2,2)]		



Proposal 12918 - Coma3-6 (05) - Origin of UCDs in the Coma Cluster

Wed Jul 11 03:09:20 GMT 2012

Visit	Proposal 12918, Coma3-6 (05) Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SCHED 100%; ORIENT 267D TO 297 D; ORIENT 87D TO 117 D; ORIENT 357D TO 27 D; ORIENT 177D TO 207 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	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	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.2412 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=22.3239 Angle Between Sides= Center Pattern=false	(1-2)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(5)	COMA3-6	RA: 12 59 21.7000 (194.8404167d) Dec: +27 58 30.15 (27.97504d) Equinox: J2000		V=22+/-1	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F814W	(5) COMA3-6	ACS/WFC, ACCUM, WFCENTER	F814W			Pattern 1, Exps 1-2 in Coma3-6 (05) (1)	350 Secs	
									[==>(Pattern 1,1)]	[1]
									[==>(Pattern 1,2)]	
									[==>(Pattern 2,1)]	[2]
									[==>(Pattern 2,2)]	
2	F475W	(5) COMA3-6	ACS/WFC, ACCUM, WFCENTER	F475W			Pattern 1, Exps 1-2 in Coma3-6 (05) (1)	640 Secs		
								[==>603 Secs (Pattern 1,1)]	[1]	
								[==>604 Secs (Pattern 1,2)]		
								[==>681 Secs (Pattern 2,1)]	[2]	
								[==>680 Secs (Pattern 2,2)]		



Proposal 12918 - Coma4-6 (06) - Origin of UCDs in the Coma Cluster

Wed Jul 11 03:09:22 GMT 2012

Visit	Proposal 12918, Coma4-6 (06) Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SCHED 100%; ORIENT 267D TO 297 D; ORIENT 87D TO 117 D; ORIENT 357D TO 27 D; ORIENT 177D TO 207 D									
	Patterns	#	Primary Pattern				Secondary Pattern			
(1)		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	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.2412 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=22.3239 Angle Between Sides= Center Pattern=false	(1-2)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections			Fluxes	Miscellaneous		
	(6)	COMA4-6	RA: 12 59 18.1000 (194.8254167d) Dec: +27 55 19.15 (27.92199d) Equinox: J2000				V=22+/-1	Reference Frame: ICRS		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F814W	(6) COMA4-6	ACS/WFC, ACCUM, WFCENTER	F814W			Pattern 1, Exps 1-2 in Coma4-6 (06) (1)	350 Secs	
									[==>(Pattern 1,1)]	[1]
									[==>(Pattern 1,2)]	
									[==>(Pattern 2,1)]	[2]
									[==>(Pattern 2,2)]	
2	F475W	(6) COMA4-6	ACS/WFC, ACCUM, WFCENTER	F475W				Pattern 1, Exps 1-2 in Coma4-6 (06) (1)	640 Secs	
								[==>603 Secs (Pattern 1,1)]	[1]	
								[==>604 Secs (Pattern 1,2)]		
								[==>681 Secs (Pattern 2,1)]	[2]	
								[==>680 Secs (Pattern 2,2)]		

