



## 14750 - Exploring environmental effects on galaxy formation with WFC3 in the most distant cluster at $z=2.506$

Cycle: 24, 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) COSCLUSTER	WFC3/IR	4	29-Jul-2016 15:12:08.0	yes

4 Total Orbits Used

### ABSTRACT

We have recently discovered a remarkable concentration of massive galaxies at  $z=2.506$  in the COSMOS field, containing 11 very red galaxies within a 10" radius, defining a 11.6sigma overdensity. The total stellar mass  $M^* \sim 10^{12}$  Msun found within 80 kpc is consistent with a core of a dark matter halo with total mass  $M_{200c} \sim 10^{14}$  Msun, as further confirmed with extended X-ray emission and velocity dispersion (16

spectroscopic members), identifying it as the most distant galaxy cluster known to date. However, unlike other clusters discovered so far the red galaxies in this structure are virtually all star forming with a total star formation rates (SFR)  $\sim 3400 M_{\text{sun}} \text{ yr}^{-1}$  in its 80 kpc-wide core, suggesting that it was caught in a rapid formation phase of a dense cluster core. Hence this structure provides a rare chance to witness the build-up of the cluster central galaxies, and explore environmental effects on massive galaxy evolution in the densest environment. Here we propose WFC3 F125W and F160W imaging (rest-frame U and B band, respectively) of this structure to push the study of mass-size relation and SFR-morphology relation for cluster galaxies to the highest redshift. These observations of this unique structure will provide crucial insights on the interplay between morphological transformation and star formation quenching in cluster cores.

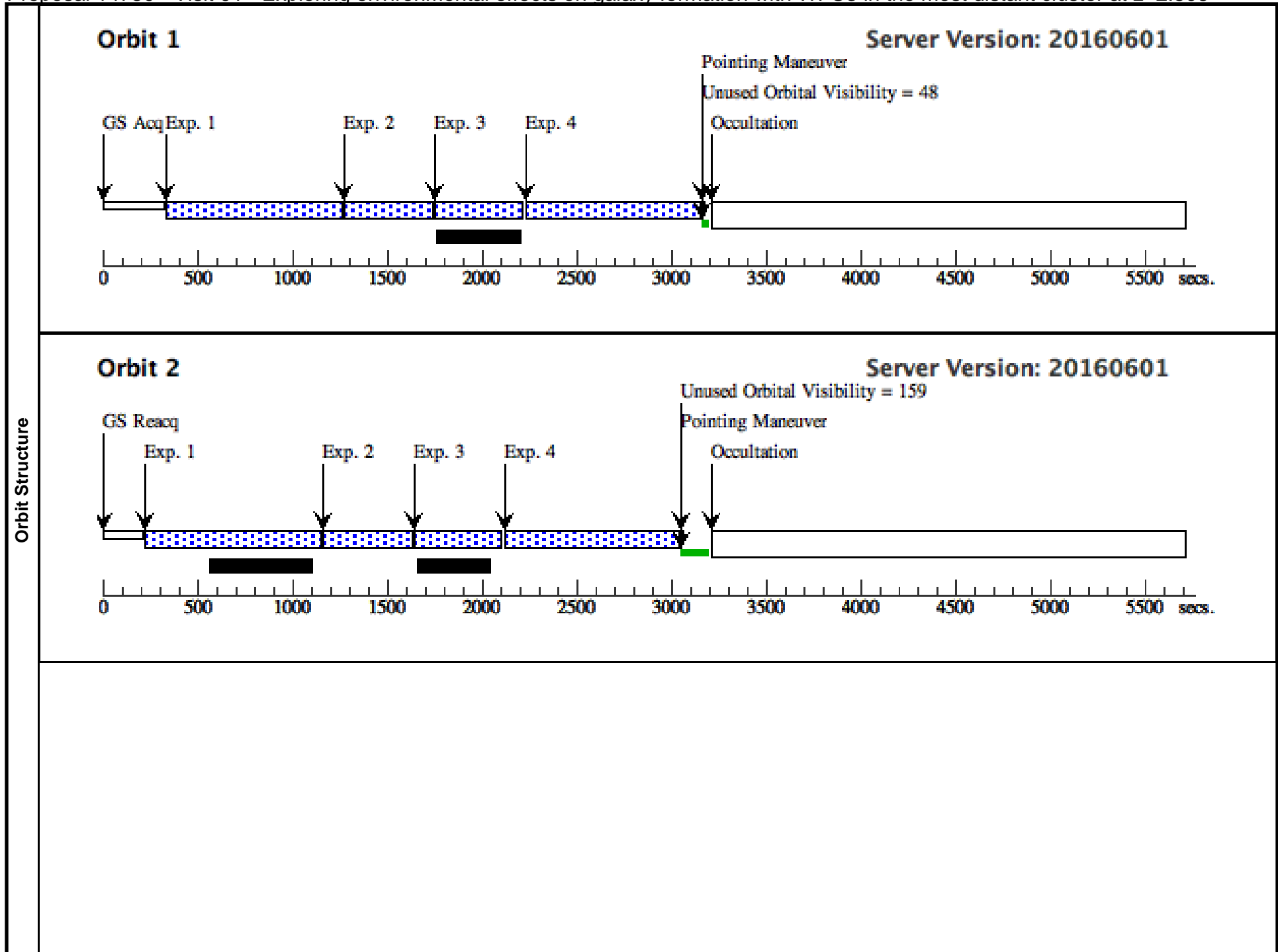
### **OBSERVING DESCRIPTION**

WFC3 F125W and F160W imaging of a distant galaxy cluster at  $z=2.5$

Proposal 14750 - Visit 01 - Exploring environmental effects on galaxy formation with WFC3 in the most distant cluster at z=2.506

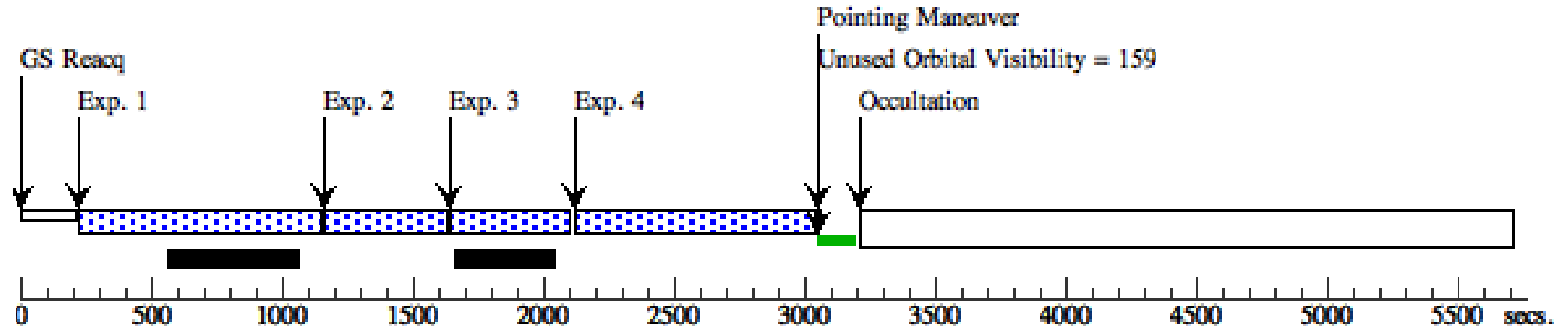
Fri Jul 29 19:12:09 GMT 2016

Visit	<b>Proposal 14750, Visit 01</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1-4)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	COSCLUSTER	RA: 10 00 57.1320 (150.2380500d) Dec: +02 20 11.83 (2.33662d) Equinox: J2000	Redshift: 2.5	V=25.5+/-1.5	Reference Frame: ICRS				
	<i>Comments: Extended=NO</i>									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) COSCLUSTER	F160W	WFC3/IR, MULTIACCUM, IR-FIX	SAMP-SEQ=SPARS 100; NSAMP=10			Pattern 2, Exps 1-4 in Visit 01 (2)	902.935198 Secs (3611.741 Secs)	
									[==>(Pattern 1)]	[1]
									[==>(Pattern 2)]	[2]
									[==>(Pattern 3)]	[3]
									[==>(Pattern 4)]	[4]
	2	(1) COSCLUSTER	F125W	WFC3/IR, MULTIACCUM, IR-FIX	SAMP-SEQ=SPARS 50; NSAMP=10			Pattern 2, Exps 1-4 in Visit 01 (2)	452.93635 Secs (1811.745 Secs)	
									[==>(Pattern 1)]	[1]
									[==>(Pattern 2)]	[2]
									[==>(Pattern 3)]	[3]
									[==>(Pattern 4)]	[4]
	3	(1) COSCLUSTER	F125W	WFC3/IR, MULTIACCUM, IR-FIX	SAMP-SEQ=SPARS 50; NSAMP=10			Pattern 2, Exps 1-4 in Visit 01 (2)	452.93635 Secs (1811.745 Secs)	
									[==>(Pattern 1)]	[1]
									[==>(Pattern 2)]	[2]
									[==>(Pattern 3)]	[3]
									[==>(Pattern 4)]	[4]
4	(1) COSCLUSTER	F160W	WFC3/IR, MULTIACCUM, IR-FIX	SAMP-SEQ=SPARS 100; NSAMP=10			Pattern 2, Exps 1-4 in Visit 01 (2)	902.935198 Secs (3611.741 Secs)		
								[==>(Pattern 1)]	[1]	
								[==>(Pattern 2)]	[2]	
								[==>(Pattern 3)]	[3]	
								[==>(Pattern 4)]	[4]	



### Orbit 3

Server Version: 20160601



### Orbit 4

Server Version: 20160601

