15671 - Unveiling the Nature of Fossil Groups with XMM-HST II: Reducing Variance

Cycle: 26, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) RXJ1136+0713	ACS/WFC	3	24-Jul-2019 12:04:53.0	yes
02	(2) RXJ1410+4145	ACS/WFC	3	24-Jul-2019 12:04:55.0	yes
03	(3) RXJ0856+0553	ACS/WFC	3	24-Jul-2019 12:04:56.0	yes

9 Total Orbits Used

ABSTRACT

Fossil groups (FGs) present a puzzle to theories of structure formation. Despite the low number of bright galaxies, their high velocity dispersions and high T X seem to indicate cluster-like potential wells. Their measured c200 are high indicating early formation epochs, in contradiction with the observed lack of expected large cool cores. We have proposed a discriminatory test, using the intracluster light to mass ratio (ICLf/M) in FGs, using XMM and HST. The pilot study was successful and suggests that FGs are not merging and show high ICLf/M ratios in comparison to relaxed

systems. We propose to increase the sample of bonafide FGs complementing XMM and HST archived observations to account for sample variance, allowing us to reliably constrain their formation mechanisms and ages.

OBSERVING DESCRIPTION

We based our estimation of the exposure times on our previous experience with the HST ACS and the CICLE algorithm applied to several clusters including a CLASH clusters and the FG J1007+3800. CICLE only relies on the information contained in the data, studying the 2D distribution of the light and using the change of intensity curvature to determine where the galaxy ends and the ICL starts. For this reason high quality imaging is required, as that of ACS/WFC. We need S/N of ~2.5-3 to obtain results of similar precision (or better) than those we obtained for J1007+3800. To achieve this S/N in the images of these FGs we would repeat the same exposures as with exposures, i.e., 1 orbit with the F435W filter and 2 orbits with the F606W filter.

Based on our previous experience we would like to ask to follow the same setup suggested by Dan Coe, i.e., to split in multiple (3 or 4) exposures to help reject cosmic rays in final stacked images. The dithered exposures should also cover the gap between the two ACS detectors. They will also mitigate against bad detector pixels and improve the resolution of stacked (drizzled) images.

Visit

Proposal 15671, RXJ1136 (01), implementation Wed Jul 24 16:04:57 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=3.058944 Line Spacing=6.039452	Coordinate Frame=POS-TARG Pattern Orientation=85.329042 Angle Between Sides=179.702031 Center Pattern=false		(1-3)

Fixed Targets

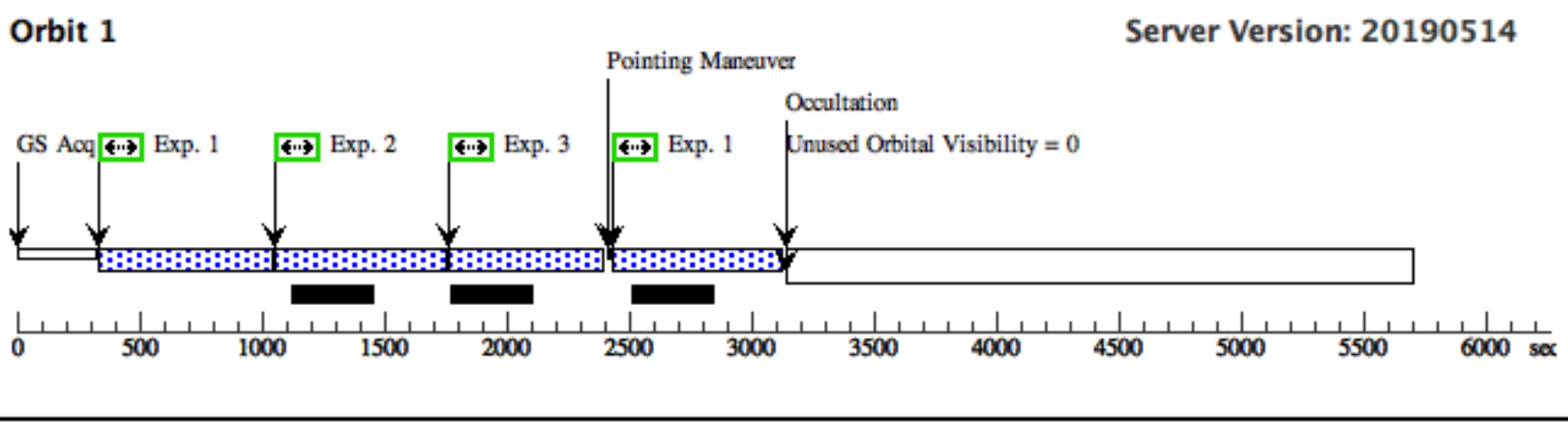
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	RXJ1136+0713	RA: 11 36 23.7200 (174.0988333d) Dec: +07 13 37.52 (7.22709d) Equinox: J2000		V=16.3+/-0.2	Reference Frame: ICRS

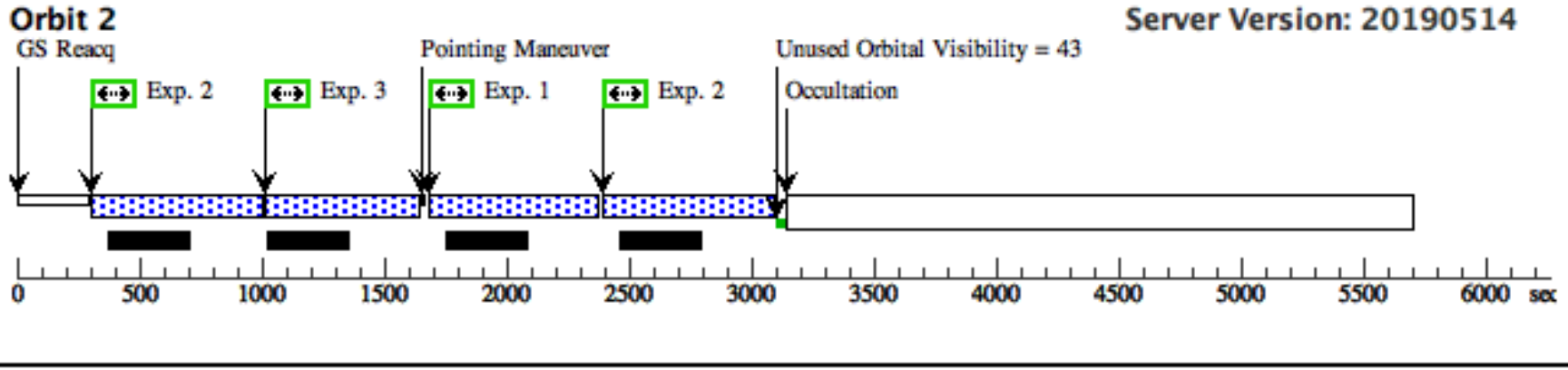
Comments:
Category=CLUSTER OF GALAXIES
Description=[GROUP, POOR CLUSTER]
Extended=YES

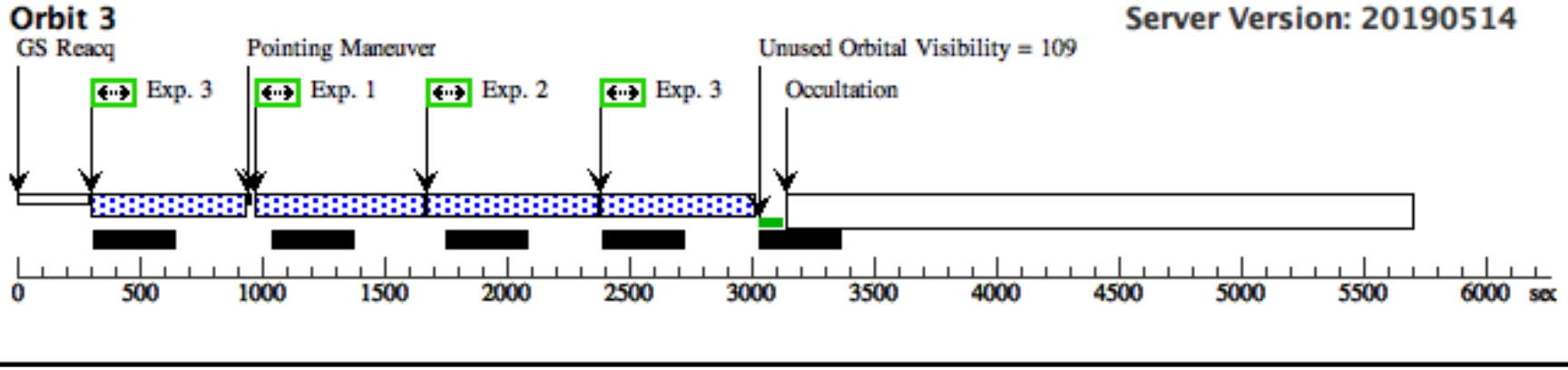
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F435W	(1) RXJ1136+0713	ACS/WFC, ACCUM, WFC	F435W			Pattern 1, Exps 1-3 in RXJ1136 (01) (1)	505 Secs (2020 Secs)	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)]	***[2]***
								[==>(Pattern 4)]	***[3]***
2	F606W	(1) RXJ1136+0713	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 1-3 in RXJ1136 (01) (1)	509 Secs (2036 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)] *[==>(Pattern 3)]*	***[2]***
								[==>(Pattern 4)]	***[3]***
3	F606W	(1) RXJ1136+0713	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 1-3 in RXJ1136 (01) (1)	509 Secs (2036 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[3]***

Orbit Structure







Visit

Proposal 15671, RXJ1410 (02), implementation Wed Jul 24 16:04:57 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=3.058944 Line Spacing=6.039452	Coordinate Frame=POS-TARG Pattern Orientation=85.329042 Angle Between Sides=179.702031 Center Pattern=false		(1-3)

Fixed Targets

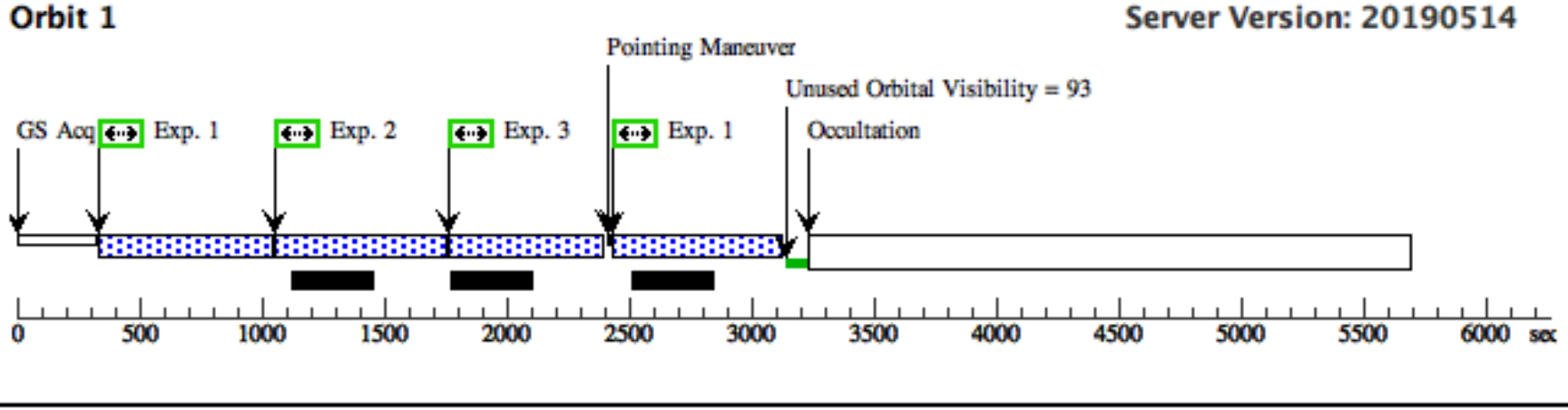
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	RXJ1410+4145	RA: 14 10 4.1900 (212.5174583d) Dec: +41 45 20.88 (41.75580d) Equinox: J2000		V=15.8+/-0.2	Reference Frame: ICRS

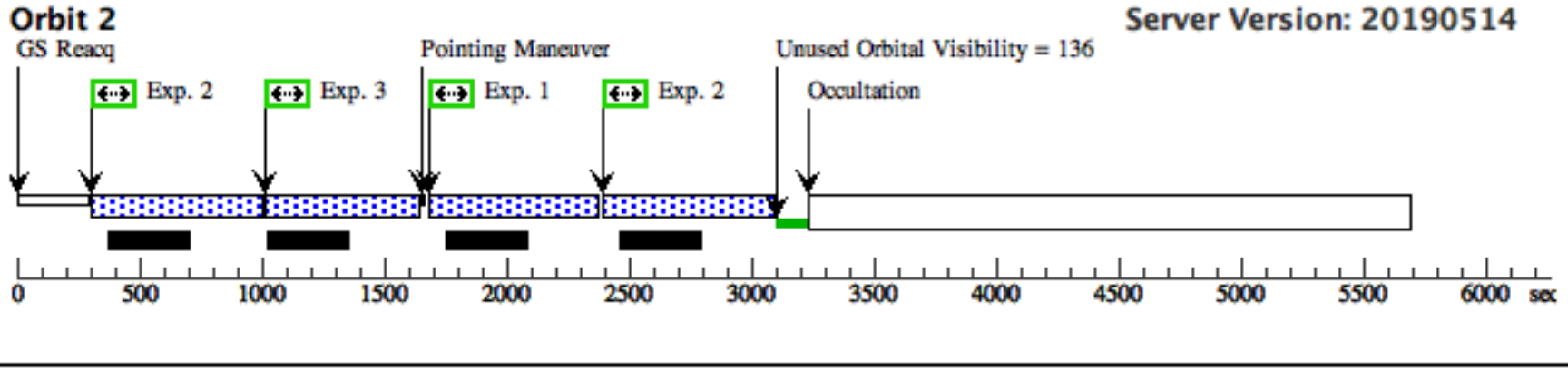
Comments:
Category=CLUSTER OF GALAXIES
Description=[GROUP, POOR CLUSTER]
Extended=YES

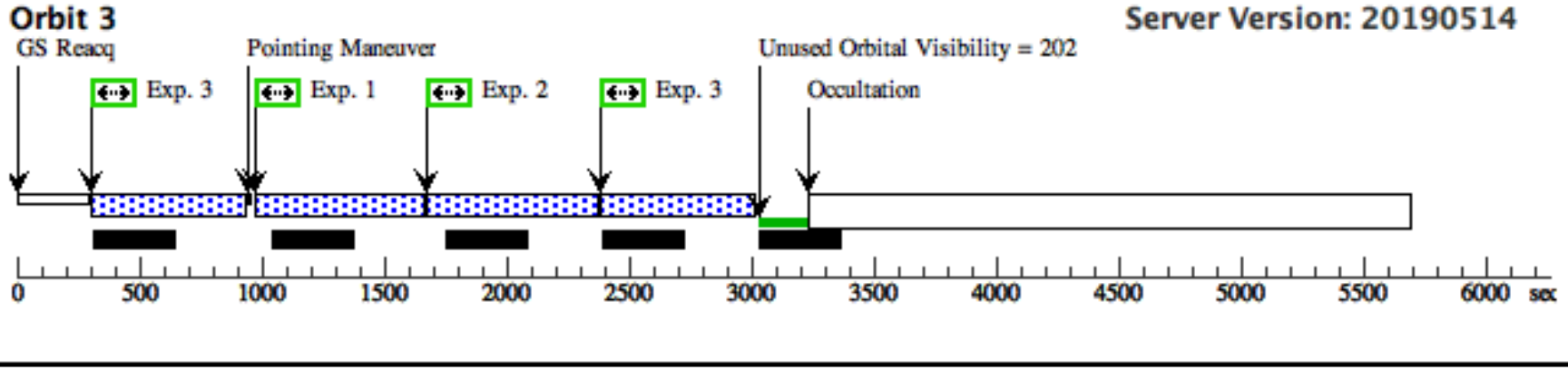
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F435W	(2) RXJ1410+4145	ACS/WFC, ACCUM, WFC	F435W			Pattern 1, Exps 1-3 in RXJ1410 (02) (1)	505 Secs (2020 Secs)	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)]	***[2]***
								[==>(Pattern 4)]	***[3]***
2	F606W	(2) RXJ1410+4145	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 1-3 in RXJ1410 (02) (1)	509 Secs (2036 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)] *[==>(Pattern 3)]*	***[2]***
								[==>(Pattern 4)]	***[3]***
3	F606W	(2) RXJ1410+4145	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 1-3 in RXJ1410 (02) (1)	509 Secs (2036 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[3]***

Orbit Structure







Visit

Proposal 15671, RXJ0856 (03), implementation Wed Jul 24 16:04:57 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=3.058944 Line Spacing=6.039452	Coordinate Frame=POS-TARG Pattern Orientation=85.329042 Angle Between Sides=179.702031 Center Pattern=false		(1-3)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	RXJ0856+0553	RA: 08 56 40.7200 (134.1696667d) Dec: +05 53 47.36 (5.89649d) Equinox: J2000		V=16.3+/-0.2	Reference Frame: ICRS

Comments:
Category=CLUSTER OF GALAXIES
Description=[GROUP, INTERACTING GALAXY, POOR CLUSTER]
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F435W	(3) RXJ0856+0553	ACS/WFC, ACCUM, WFC	F435W			Pattern 1, Exps 1-3 in RXJ0856 (03) (1)	505 Secs (2020 Secs)	
								[==>(Pattern 1)] *[==>(Pattern 2)]*	***[1]***
								[==>(Pattern 3)]	***[2]***
								[==>(Pattern 4)]	***[3]***
2	F606W	(3) RXJ0856+0553	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 1-3 in RXJ0856 (03) (1)	509 Secs (2036 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)] *[==>(Pattern 3)]*	***[2]***
								[==>(Pattern 4)]	***[3]***
3	F606W	(3) RXJ0856+0553	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 1-3 in RXJ0856 (03) (1)	509 Secs (2036 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
								[==>(Pattern 3)] *[==>(Pattern 4)]*	***[3]***

Orbit Structure