16027 - Beyond MACS: A Snapshot Survey of the Most Massive Clusters of Galaxies at z>0.5

Cycle: 26, Proposal Category: SNAP

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Harald Ebeling (PI) (Contact)	**University of Hawaii**	**ebeling@ifa.hawaii.edu**
Prof. Jean-Paul Richard Kneib (CoI) (ESA Member)	Ecole Polytechnique Federale de Lausanne	jean-paul.kneib@epfl.ch
Dr. Alastair C. Edge (CoI) (ESA Member)	Durham Univ.	alastair.edge@durham.ac.uk
Dr. Nick Kaiser (CoI) (ESA Member)	Ecole Normale Superieure	nick.kaiser@ens.fr
Dr. Johan Pierre Richard (CoI) (ESA Member)	Centre de Recherche Astrophysique de Lyon	johan.richard@univ-lyon1.fr
Dr. Benjamin Clement (CoI) (ESA Member)	Centre de Recherche Astrophysique de Lyon	benjamin.clement@univ-lyon1.fr
Dr. Sune Toft (CoI) (ESA Member)	University of Copenhagen, Niels Bohr Institute	sune@nbi.ku.dk
Dr. Marceau Limousin (CoI) (ESA Member)	Laboratoire d'Astrophysique de Marseille	marceau.limousin@oamp.fr
Dr. Hakim Atek (CoI) (ESA Member)	CNRS, Institut d'Astrophysique de Paris	hakim.atek@iap.fr
Mr. Conor McPartland (CoI)	University of Hawaii	conormcp@ifa.hawaii.edu
Mr. Andrew Repp (CoI)	University of Hawaii	repp@ifa.hawaii.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
31	(35) EMACSJ1350.7-1055	ACS/WFC	1	08-Oct-2019 12:02:56.0	yes
84	(35) EMACSJ1350.7-1055	ACS/WFC	1	08-Oct-2019 12:02:57.0	yes
1D	(35) EMACSJ1350.7-1055	WFC3/IR	1	08-Oct-2019 12:02:58.0	yes

3 Total Orbits Used

ABSTRACT

Truly massive galaxy clusters play a pivotal role for a wealth of extragalactic and cosmological research topics, and SNAPshot observations of these systems are ideally suited to identify the most promising cluster targets for further, in-depth study. The power of this approach was demonstrated by ACS/WFC3 SNAPshots of X-ray selected MACS and eMACS clusters at z>0.3 obtained by us in previous Cycles (44 of them in all of F606W, F814W, F110W, and F140W). Based on these data, the CLASH MCT program selected 16 out of 25 of their targets to be MACS clusters. Similarly, all but one of the six most powerful cluster lenses selected for in-depth study by the HST Frontier Fields initiative are MACS detections, and so are 16 of the 29 z>0.3 clusters targeted by the RELICS legacy program.

We propose to extend our spectacularly successful SNAPshot survey of the most X-ray luminous distant clusters to a redshift-mass regime that is poorly sampled by any other project. Targeting only extremely massive clusters at z>0.5 from the X-ray selected eMACS sample (median velocity dispersion: 1180 km/s), the proposed program will (a) identify the most powerful gravitational telescopes at yet higher redshift for the next generation of in-depth studies of the distant Universe with HST and JWST, (b) provide constraints on the mass distribution within these extreme systems, (c) help improve our understanding of the physical nature of galaxy-galaxy and galaxy-gas interactions in cluster cores, and (d) unveil Balmer Break Galaxies at z~2 and Lyman-break galaxies at z>6 as F814W dropouts.

Acknowledging the broad community interest in our sample we waive our data rights for these observations.

OBSERVING DESCRIPTION

We propose ACS and WFC3 SNAPshot observations of all eMACS clusters at z>0.5 not yet observed with HST in our program's four filters. Our targets are uniformly distributed over the high-Galactic latitude sky (|b|>20 deg), dec > -30 deg, making ours an ideal SNAPshot sample. Since all of our science goals require or greatly benefit from color information, we aim for three independent visits per cluster target (one each for ACS/F606W and F814W imaging, and a third one for SNAPshots with WFC3/F110W/F140W). Counting each visit as a separate target (as indicated in Section 3.3.3 of the CfP) but discounting visits already performed for some of our targets in previous SNAP programs, we are left with 174 distinct "targets". Some of these will be used as backup (we suspect the respective clusters to be less massive than suggested by the RASS X-ray luminosity). From the remainder, 166 visits will be selected to match the number of orbits awarded.

Visit

Proposal 16027, Visit 31 Tue Oct 08 16:02:58 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-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=true		(1)

Fixed Targets

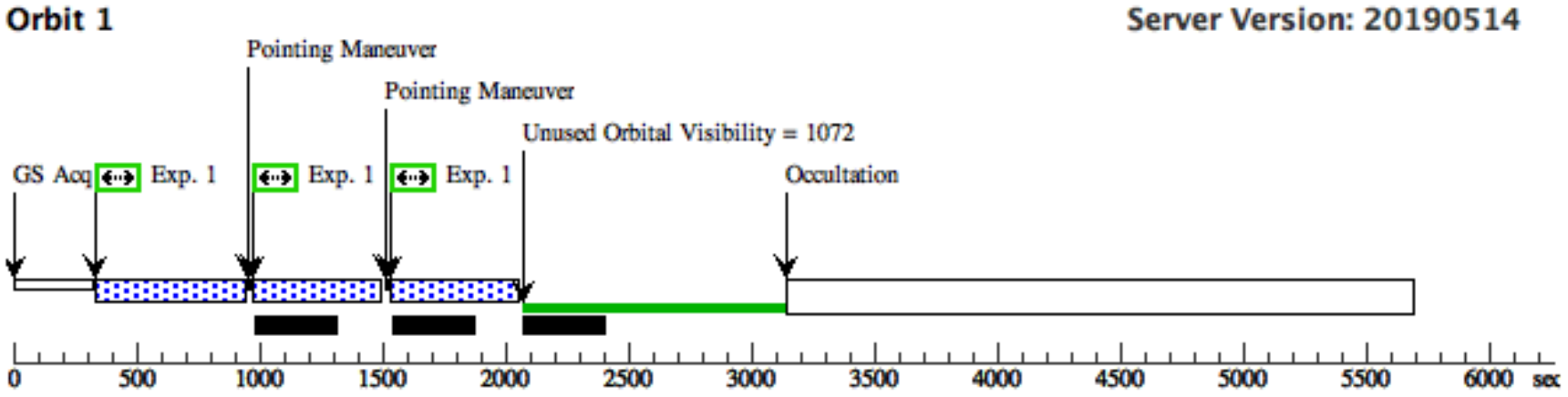
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(35)	EMACSJ1350.7-1055	RA: 13 50 46.4350 (207.6934792d) Dec: -10 55 32.24 (-10.92562d) Equinox: J2000		V=20.0	Reference Frame: ICRS

Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	1350-10_606	(35) EMACSJ1350.7-1055	ACS/WFC, ACCUM, WFC	F606W	CR-SPLIT=NO		Pattern 1, Exps 1-1 in Visit 31 (1)	400 Secs (1200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	*[1]*

Orbit Structure



Visit

Proposal 16027, Visit 84

Tue Oct 08 16:02:58 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-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.011 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=true		(1)

Fixed Targets

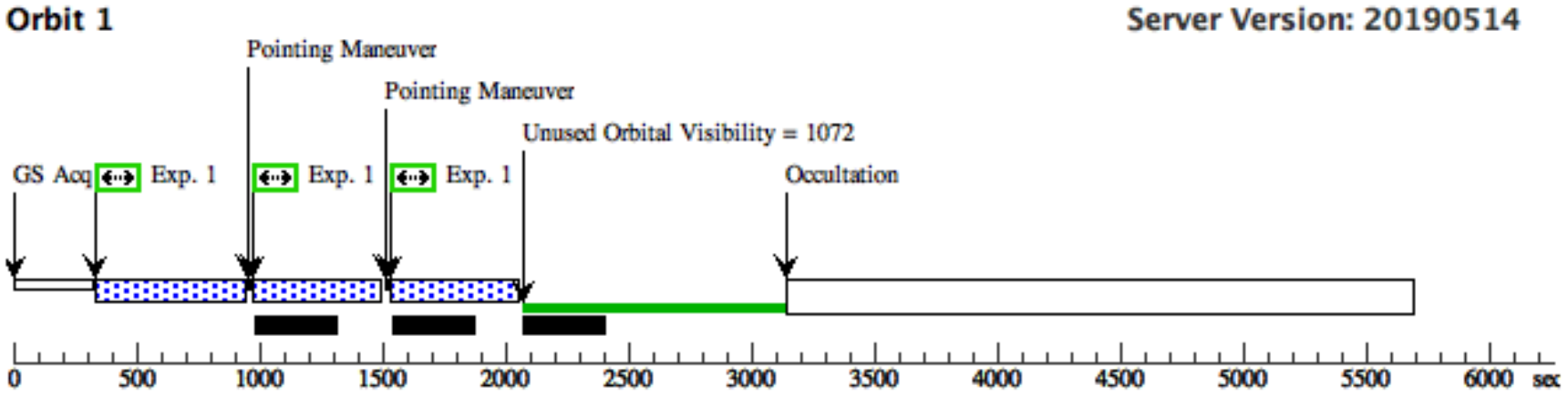
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(35)	EMACSJ1350.7-1055	RA: 13 50 46.4350 (207.6934792d) Dec: -10 55 32.24 (-10.92562d) Equinox: J2000		V=20.0	Reference Frame: ICRS

Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	1350-10_814	(35) EMACSJ1350.7-1055	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO		Pattern 1, Exps 1-1 in Visit 84 (1)	400 Secs (1200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	*[1]*

Orbit Structure



Visit

Proposal 16027, Visit 1D Tue Oct 08 16:02:59 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(35)	EMACSJ1350.7-1055	RA: 13 50 46.4350 (207.6934792d) Dec: -10 55 32.24 (-10.92562d) Equinox: J2000		V=20.0	Reference Frame: ICRS

Comments:
Category=CLUSTER OF GALAXIES
Description=[HIGH REDSHIFT CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	1350-10_110	(35) EMACSJ1350.7-1055	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS25; NSAMP=15		Pattern 2, Exps 1-1 in Visit 1D (2)	352.939501 Secs (705.879 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*
2	1350-10_140	(35) EMACSJ1350.7-1055	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=SPARS25; NSAMP=15		Pattern 2, Exps 2-2 in Visit 1D (2)	352.939501 Secs (705.879 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*

Orbit Structure