16038 - Imaging a Rare Starburst Central Galaxy in a Merging Cluster

Cycle: 27, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Prof. Michael A. McDonald (PI) (Contact)	**Massachusetts Institute of Technology**	**mcdonald@space.mit.edu**
Mr. Taweewat Somboonpanyakul (CoI)	Massachusetts Institute of Technology	taweewat@mit.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) CHIPS1911+4455	ACS/WFC	1	07-Nov-2019 11:03:19.0	yes
02	(1) CHIPS1911+4455	WFC3/IR	1	07-Nov-2019 11:03:20.0	yes

2 Total Orbits Used

ABSTRACT

We have recently discovered a new galaxy cluster at z=0.48 that harbors a massive central galaxy forming stars at a rate of ~150 Msun/yr. This would make it the second most star-forming central galaxy known and a far cry from the typical red-and-dead giant ellipticals that live in the centers of clusters. While star formation has been seen in the centers of relaxed, cool core clusters -- thought to be a residual cooling flow that represents the imbalance between cooling and feedack -- this system represents the only known system at z<1 where star formation is proceeding in the center of a merging galaxy cluster. It is unclear how such a system could come to be, as the current understanding is that relaxedness is a necessary condition for the development of cooling in the intracluster medium. With the proposed-for HST data, we will be able to map out the ongoing star formation and see if it is morphologically more similar to the distribution of cooling intracluster gas or to nearby member galaxies. This will allow us to distinguish between a merger and cooling origin for the star formation. In either case, this system represents a rare phase of galaxy formation, and may provide important clues to the formation of giant elliptical galaxies and the cooling/feedback balance in cluster cores.

OBSERVING DESCRIPTION

The goal of this program is to obtain broadband images in F550M and F110W to probe the young and old stellar populations, respectively. In each filter we will obtain 3 exposures to allow removal of cosmic rays. Overall it should be a really straightforward program to execute. We are only interested in the ~15" surrounding our pointing position, so orientation is not important.

Visit

Proposal 16038, Blue_cont (01), implementation Thu Nov 07 16:03:21 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=3.034 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.29 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

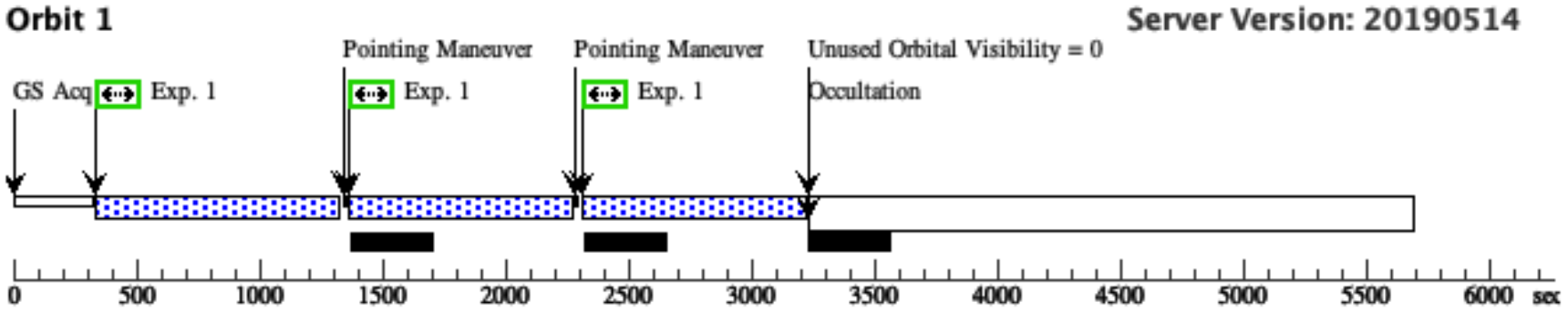
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	CHIPS1911+4455	RA: 19 11 1.9161 (287.7579837d) Dec: +44 55 20.73 (44.92242d) Equinox: J2000		V=19	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST, TIDAL TAIL]
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) CHIPS1911+4455	ACS/WFC, ACCUM, WFC1	F550M			Pattern 1, Exps 1-1 in Blue_cont (01) (1)	100 Secs (2361 Secs) *[==>787.0 Secs (Pattern 1)]* *[==>787.0 Secs (Pattern 2)]* *[==>787.0 Secs (Pattern 3)]*	***[1]***

Orbit Structure



Visit

Proposal 16038, Red_cont (02), implementation Thu Nov 07 16:03:21 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-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=131.859 Angle Between Sides= Center Pattern=true	(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	CHIPS1911+4455	RA: 19 11 1.9161 (287.7579837d) Dec: +44 55 20.73 (44.92242d) Equinox: J2000		V=19	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST, TIDAL TAIL]
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) CHIPS1911+4455	WFC3/IR, MULTIACCUM, IR-FIX	F110W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 2, Exps 1-1 in Red_cont (02) (2)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1,1)]* *[==>(Pattern 1,2)]* *[==>(Pattern 2,1)]* *[==>(Pattern 2,2)]*	***[1]***

Orbit Structure