16001 - STUDYING AGN FEEDING AND FEEDBACK IN THE MOST QUENCHED COOL CORE CLUSTER

Cycle: 27, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Myriam Gitti (PI) (ESA Member) (Contact)	**Universita di Bologna**	**myriam.gitti@unibo.it**
Prof. Michael A. McDonald (CoI) (Contact)	Massachusetts Institute of Technology	mcdonald@space.mit.edu
Fabrizio Brighenti (CoI) (ESA Member)	Universita di Bologna	fabrizio.brighenti@unibo.it
Dr. Gianfranco Brunetti (CoI) (ESA Member)	CNR, Istituto di Radioastronomia	brunetti@ira.cnr.it
Dr. Megan Donahue (CoI)	Michigan State University	donahue@pa.msu.edu
Dr. Luigina Feretti (CoI) (ESA Member)	INAF, Istituto di Fisica Spaziale e Fisica Cosmica-Bologna	lferetti@ira.inaf.it
Dr. William R. Forman (CoI)	Smithsonian Institution Astrophysical Observatory	wforman@cfa.harvard.edu
Massimo Gaspari (CoI)	Princeton University	mgaspari@astro.princeton.edu
Dr. Marcello Giroletti (CoI) (ESA Member)	INAF Istituto di Radioastronomia	giroletti@ira.inaf.it
Dr. Alessandro Ignesti (CoI) (ESA Member)	Universita di Bologna	alessandro.ignesti2@unibo.it
Dr. Christine Jones (CoI)	Smithsonian Institution Astrophysical Observatory	cjones@cfa.harvard.edu
Dr. Brian R. McNamara (CoI) (CSA Member)	University of Waterloo	mcnamara@uwaterloo.ca
Dr. Paul E. J. Nulsen (CoI)	Smithsonian Institution Astrophysical Observatory	pnulsen@cfa.harvard.edu
Dr. Scott Randall (CoI)	Smithsonian Institution Astrophysical Observatory	srandall@head.cfa.harvard.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) CLG-J0947+7623	ACS/WFC	3	20-Sep-2019 15:01:25.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
02	(1) CLG-J0947+7623	ACS/WFC	2	20-Sep-2019 15:01:26.0	yes
03	(1) CLG-J0947+7623	ACS/WFC	2	20-Sep-2019 15:01:27.0	yes

7 Total Orbits Used

ABSTRACT

We propose the parallel study of two systems that are almost identical in ICM and feedback properties, but differ by a factor of ~100 in SFR. With a SFR of ~0.1% of the classical cooling rate, RBS 797 may be the most quenched cool core cluster, making it the best place to study the effectiveness of AGN feedback. The jets in RBS 797 appear to have recently reoriented by 90 degrees over multiple AGN outbursts. We argue that precessing jets can lead to more isotropic heating, leading to maximally suppressed cooling. The requested high quality Chandra and narrow-band HST data of RBS 797 will allow us to examine in detail how AGN feedback in RBS 797 is more successfully coupling to the ICM, and potentially provide critical clues to the ultimate solution of the cooling flow problem.

OBSERVING DESCRIPTION

Our goal is to obtain deep, high-angular resolution maps of [O II]3726,3729 for the central galaxy in RBS797, following in methodology from HST Proposals 15315 and 15661. This is possible using the ramp filters on ACS, which provide narrow-band filters over the range 3700-10700A. At the redshift of our target the filter width is ~120A. The width of this filter means that we will (easily) obtain both lines in the [O II] doublet, while avoiding any other strong lines. Given the inherent challenge in flux calibrating and flat fielding HST ramp filter data, achieving a reliable flux map would be challenging even with perfect knowledge of the intrinsic extinction.

In addition, we require broadband observations in order to subtract continuum emission, which will contribute significantly to the narrow bandpass. These two filters have been chosen for each galaxy to bracket the 4000A break and avoid emission from Balmer lines and [O III] (5007A). These broadband filters are a factor of ~10x wider than the narrow-band filter, providing similar sensitivity to the continuum in a single orbit as we achieve over 8 exposures in the narrow band. Combining the two bands bracketing the [OII] line, we will have a factor of 5x deeper exposure in the continuum, compared to the narrow-band exposure. Without these deep continuum images, we would add significant amounts of noise during the continuum-subtraction procedure, reducing the effective depth of our narrow-band images.

Visit

Proposal 16001, RBS797-OII (01) Fri Sep 20 19:01:27 GMT 2019

Diagnostic Status: Warning

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Diagnostics

(Exposure 2 (RBS797-OII (01))) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp filters as central wavelengths & transmission efficiencies vary within the apertures.

(Exposure 3 (RBS797-OII (01))) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp filters as central wavelengths & transmission efficiencies vary within the apertures.

Fixed Targets

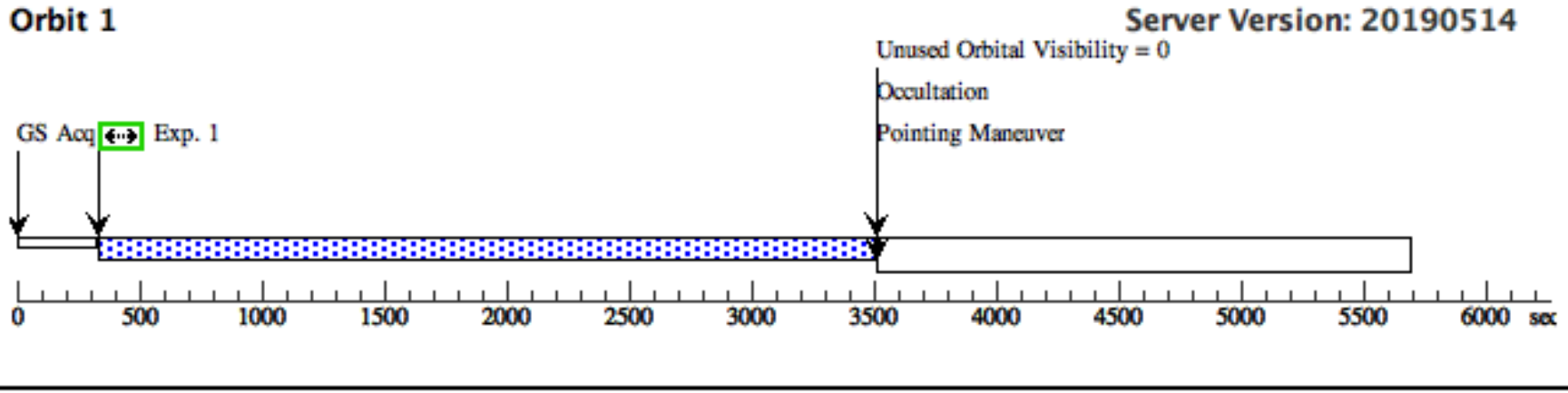
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	CLG-J0947+7623	RA: 09 47 12.9000 (146.8037500d) Dec: +76 23 13.71 (76.38714d) Equinox: J2000	Epoch of Position: 2015.5	V=19.2	Reference Frame: SIMBAD

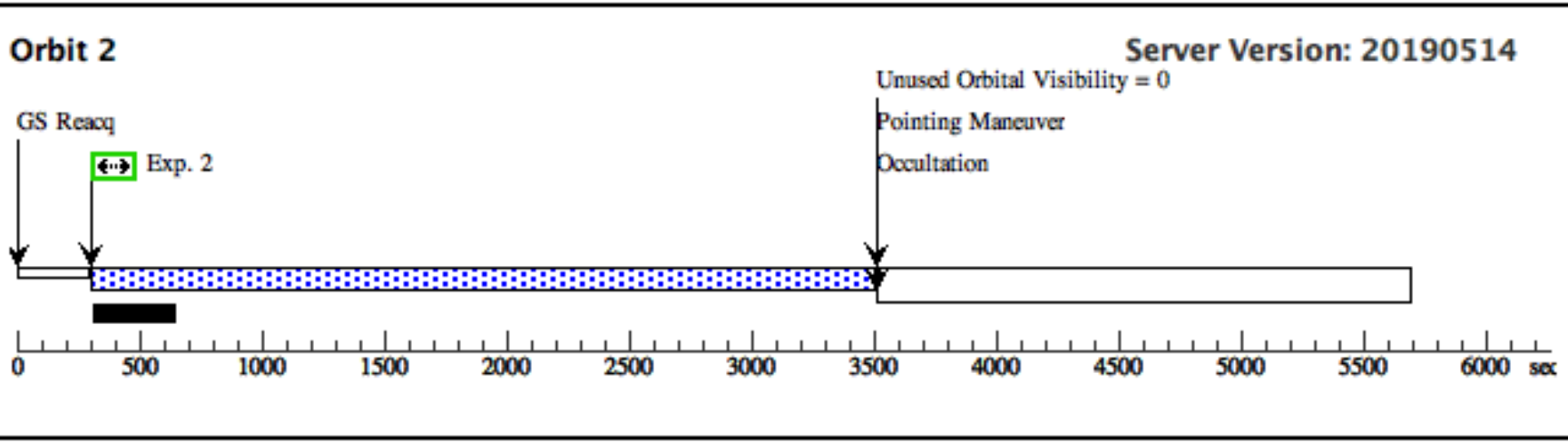
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=CLUSTER OF GALAXIES
Description=[COOLING FLOW, EMISSION LINE NEBULA, RICH CLUSTER]

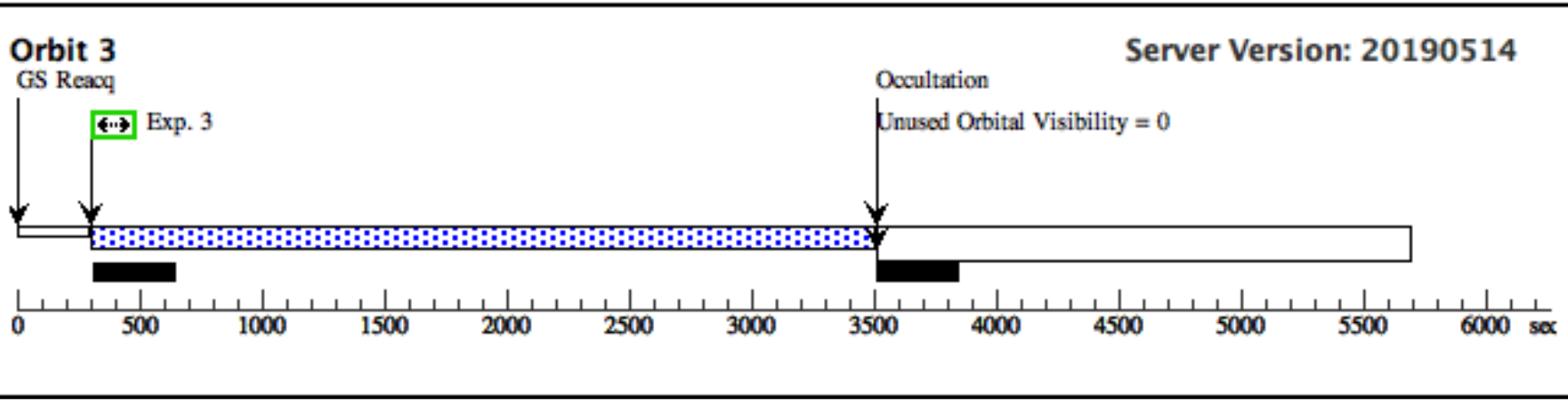
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) CLG-J0947+7623	ACS/WFC, ACCUM, WFC1-MRAMP	FR505N 5046.36 A				2000 Secs (2966 Secs) *[==>2966.0 Secs]*	 ***[1]***
2		(1) CLG-J0947+7623	ACS/WFC, ACCUM, WFC1-MRAMP	FR505N 5046.36 A		POS TARG 0.247,0.094		2000 Secs (3079 Secs) *[==>3079.0 Secs]*	 ***[2]***
3		(1) CLG-J0947+7623	ACS/WFC, ACCUM, WFC1-MRAMP	FR505N 5046.36 A		POS TARG 0.124,0.232		2000 Secs (3079 Secs) *[==>3079.0 Secs]*	 ***[3]***

Orbit Structure







Visit

Proposal 16001, RBS797-OII (02) Fri Sep 20 19:01:27 GMT 2019

Diagnostic Status: Warning

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Diagnostics

(Exposure 1 (RBS797-OII (02))) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp filters as central wavelengths & transmission efficiencies vary within the apertures.

(Exposure 2 (RBS797-OII (02))) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp filters as central wavelengths & transmission efficiencies vary within the apertures.

Fixed Targets

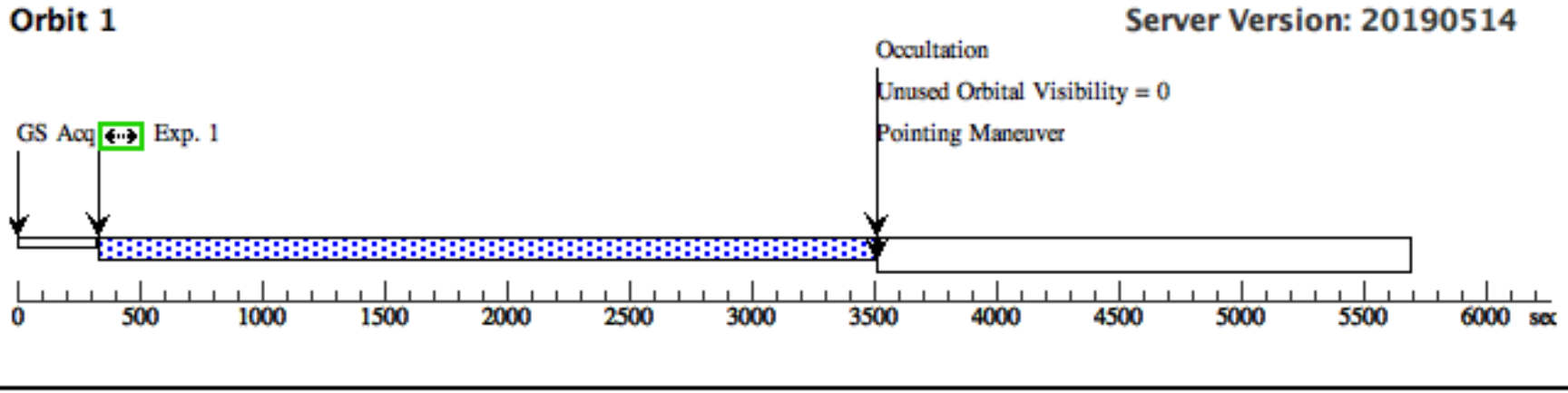
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	CLG-J0947+7623	RA: 09 47 12.9000 (146.8037500d) Dec: +76 23 13.71 (76.38714d) Equinox: J2000	Epoch of Position: 2015.5	V=19.2	Reference Frame: SIMBAD

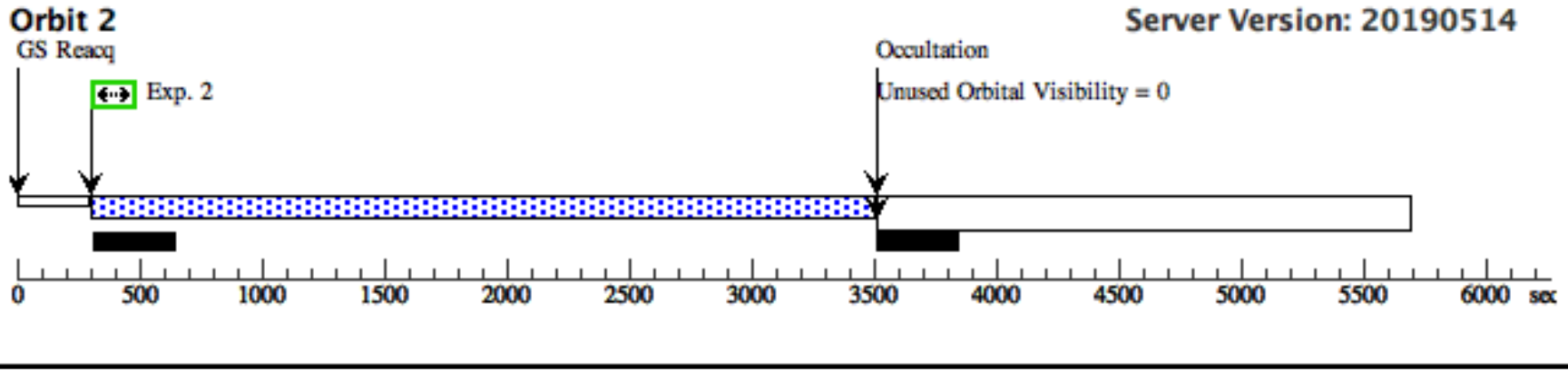
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=CLUSTER OF GALAXIES
Description=[COOLING FLOW, EMISSION LINE NEBULA, RICH CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) CLG-J0947+7623	ACS/WFC, ACCUM, WFC1-MRAMP	FR505N 5046.36 A		POS TARG -0.124,0.138		2000 Secs (2966 Secs) *[==>2966.0 Secs]*	 ***[1]***
2		(1) CLG-J0947+7623	ACS/WFC, ACCUM, WFC1-MRAMP	FR505N 5046.36 A		POS TARG -0.124,0.232		2000 Secs (3079 Secs) *[==>3079.0 Secs]*	 ***[2]***

Orbit Structure





Visit

Proposal 16001, RBS797-blue (03) Fri Sep 20 19:01:27 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=ACS-WFC-DITHER-BOX	Coordinate Frame=POS-TARG		(1)
	Purpose=DITHER	Pattern Orientation=18.39		
	Number Of Points=4	Angle Between Sides=68.14		
	Point Spacing=0.262	Center Pattern=false		
	Line Spacing=0.192			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	CLG-J0947+7623	RA: 09 47 12.9000 (146.8037500d) Dec: +76 23 13.71 (76.38714d) Equinox: J2000	Epoch of Position: 2015.5	V=19.2	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=CLUSTER OF GALAXIES
Description=[COOLING FLOW, EMISSION LINE NEBULA, RICH CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) CLG-J0947+7623	ACS/WFC, ACCUM, WFC2	F435W			Pattern 2, Exps 1-1 in RBS797-blue (03) (2)	1000 Secs (5728 Secs)	
								[==>1404.0 Secs (Pattern 1)] *[==>1404.0 Secs (Pattern 2)]*	***[1]***
								[==>1460.0 Secs (Pattern 3)] *[==>1460.0 Secs (Pattern 4)]*	***[2]***

Orbit Structure