16836 - The Massive Relic Galaxy NGC 5872

Cycle: 29, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Prof. David Buote (PI) (Contact)	**University of California - Irvine**	**buote@uci.edu**
Dr. Aaron J. Barth (CoI)	University of California - Irvine	barth@uci.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) NGC5872	WFC3/IR WFC3/UVIS	1	12-Oct-2021 15:00:16.0	yes

1 Total Orbits Used

ABSTRACT

A potentially powerful approach to study early galaxy formation is through massive relic galaxies (MRGs) which are local analogs of the high-redshift "red nuggets" thought to represent progenitors of today's early-type galaxies. When a luminous hot halo is present, X-ray observations of the diffuse hot gas of MRGs provide the most viable means to measure the gravitating mass profile, and X-rays afford a powerful direct approach to study cooling and AGN feedback. Here we propose a joint Chandra -HST observation of NGC 5872, a very massive MRG, to map its inner mass profile (<~R_e), especially by measuring the stellar mass-to-light ratio, and to examine the magnitude of AGN feedback through image analysis and the radial profile of the ratio of the cooling and free-fall times.

OBSERVING DESCRIPTION

Our HST observations are designed to measure the surface brightness profile of galaxy NGC 5872 accurately. The data will be used together with Chandra observations to model the galaxy's mass distribution including stellar mass, hot gas, and dark matter.

We will use WFC3 with both UVIS and IR cameras. Our IR F160W exposures will include four dithered RAPID mode exposures to obtain high dynamic range imaging of the galaxy's central region, with the IRSUB512 subarray. Then, four dithered full-frame IR exposures will be obtained using the WFC3-IR-DITHER-BOX-UVIS pattern in order to obtain deeper imaging out to large radius. Finally, we will obtain two UVIS F814W images using the UVIS-GAP-LINE pattern to dither across the CCD gap. The F814W data will provide higher angular resolution of the galaxy's nuclear region than the IR data, which will enable measurement of the galaxy's stellar profile at the smallest radii and also enable detection of dust lanes or a dust disk if present. This exposure plan efficiently fills a single orbit with no time lost to buffer dump overheads.

Visit

Proposal 16836, Visit 01 Tue Oct 12 19:00:16 GMT 2021

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(4)	Pattern Type=WFC3-UVIS-GAP-LINE Purpose=MOSAIC Number Of Points=2 Point Spacing=2.414 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.759 Angle Between Sides= Center Pattern=true		(3)
(6)	Pattern Type=WFC3-IR-DITHER-BOX-UVIS Purpose=DITHER Number Of Points=4 Point Spacing=23.02 Line Spacing=35.212	Coordinate Frame=POS-TARG Pattern Orientation=0.713 Angle Between Sides=89.287 Center Pattern=true		(2)
(8)	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)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC5872	RA: 15 10 55.6580 (227.7319083d) Dec: -11 28 48.53 (-11.48015d) Equinox: J2000	Redshift: 0.024556	V=13.31+/-0.74 H=9.521 +/- 0.018 mag, I=11.30 +/- 0.11	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[ELLIPTICAL]
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) NGC5872	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=14; SAMP-SEQ=RAPID		Pattern 8, Exps 1-1 in Visit 01 (8)	11.942378 Secs (47.77 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(1) NGC5872	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=12; SAMP-SEQ=STEP50		Pattern 6, Exps 2-2 in Visit 01 (6)	349.232932 Secs (1396.932 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
3		(1) NGC5872	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO; FLASH=15		Pattern 4, Exps 3-3 in Visit 01 (4)	268 Secs (536 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***

Orbit Structure