15417 - Globular clusters and dark matter in the Virgo ultra-diffuse galaxy VLSB-B

Cycle: 25, 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) VLSB-B	ACS/WFC WFC3/UVIS	1	08-Dec-2017 14:14:56.0	yes

1 Total Orbits Used

ABSTRACT

Ultra-diffuse galaxies (UDGs) are low surface brightness galaxies with low stellar masses, but sizes more like L* galaxies. UDGs could be "failed galaxies" that have been extremely inefficient at forming stars, and thus extremely dark matter dominated. We have identified the galaxy VLSB-B in the nearby Virgo cluster as one of the lowest surface brightness UDGs, and have very recently obtained velocities of candidate satellite globular clusters (GCs) in an effort to measure its dynamical mass. A preliminary measurement of the velocity dispersion of VLSB-B's GCs indicates that it

could have one of the highest dark matter fractions for a galaxy of its mass. VLSB-B's systemic velocity is close to zero, however, making confusion between its GCs and Milky Way foreground stars a problem. GCs at Virgo distance are mostly point sources from the ground, but are easily distinguished from stars by HST. We propose to use HST/WFC3 for one orbit to image VLSB-B and definitively separate GCs from foreground stars by spatially resolving the GCs. Coupled with our ground-based spectroscopy, we will then have a clean measurement of VLSB-B's dynamical mass. The imaging will also be used to study the GC system of this unique galaxy.

OBSERVING DESCRIPTION

The primary goal of our program is to obtain a clean, deep sample of globular clusters (GCs) in VLSB-B by spatially resolving them. We use WFC/UVIS with the F606W filter in a 3-point line dither pattern that fills the CCD gap. We also use ACS/WFC with F606W in parallel to observe a neighboring field in the Virgo cluster core that includes VCC 1077.

Visit

Proposal 15417, VLSB-B (01) Fri Dec 08 19:14:57 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: ORIENT 125D TO 136 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=2.4 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-2)

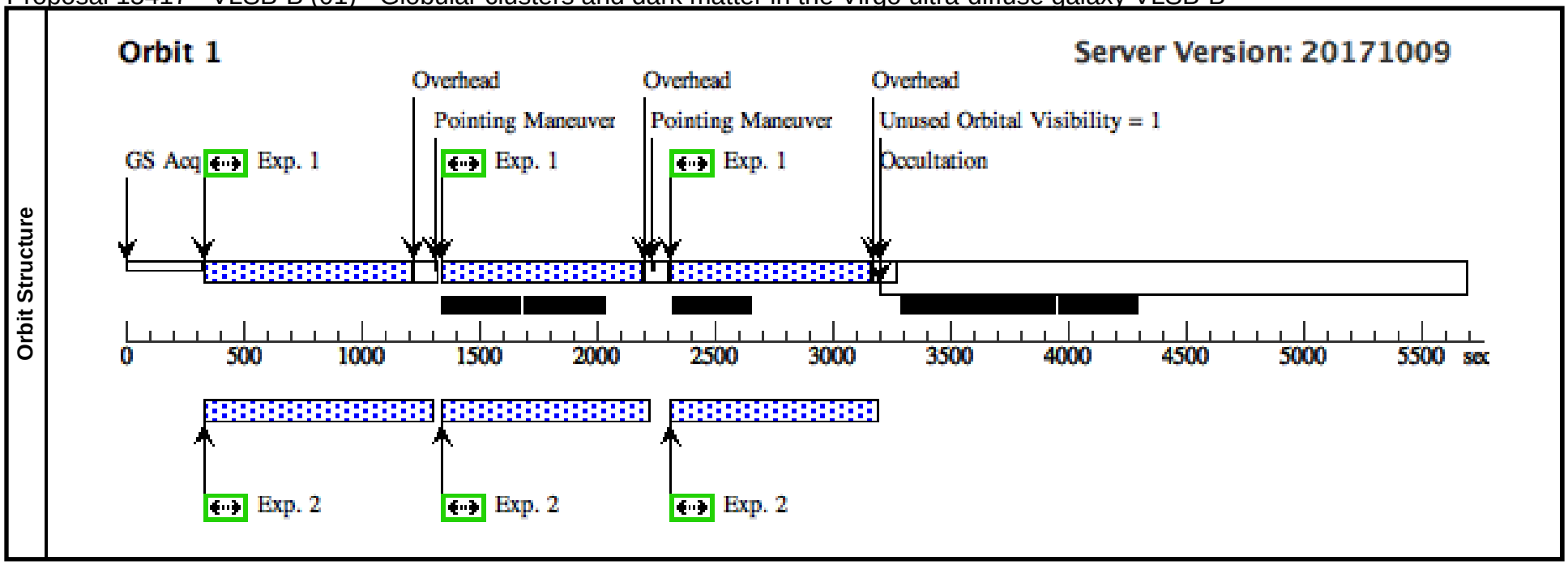
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	VLSB-B	RA: 12 28 11.6540 (187.0485583d) Dec: +12 43 7.19 (12.71866d) Equinox: J2000		V=26.0	Reference Frame: ICRS

Comments: Targeting faint, marginally resolved globular clusters in a low surface brightness galaxy.
Category=GALAXY
Description=[DWARF SPHEROIDAL, LSB]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	VLSB-B	(1) VLSB-B	WFC3/UVIS, ACCUM, UVIS2-FIX	F606W			Pattern 1, Exps 1-2 in VLSB-B (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in VLSB-B (01)	848 Secs (2544 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2	VLSB-B-PARALLEL	(1) VLSB-B	ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 1-2 in VLSB-B (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in VLSB-B (01)	753 Secs (2269 Secs) *[==>763.0 Secs (Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20171009
Overhead
Pointing Maneuver
Overhead
Pointing Maneuver
Overhead
Unused Orbital Visibility = 1
GS Acq
Exp. 1
Exp. 1
Exp. 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 2
Exp. 2
Exp. 2