



15426 - Characterizing the first Ultra-Compact Dwarf with a resolved extended halo

Cycle: 25, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) CENA-MM-UCD1 ANY	ACS/WFC WFC3/UVIS	2	12-Dec-2017 16:01:16.0	yes

2 Total Orbits Used

ABSTRACT

We request HST/WFC3 imaging to obtain a deep color-magnitude diagram of CenA-MM-UCD1: this peculiar ultra-compact dwarf (UCD) is the first reported UCD with a partially resolved extended halo, and it was serendipitously discovered within our Magellan/Megacam survey of the closest elliptical CenA. The origin of UCD is still uncertain, and mounting observational evidence suggests that these objects could be tidally stripped nuclei of more massive galaxies. CenA-MM-UCD1 represents the missing link in the evolutionary sequence between a nuclear star cluster (pre-stripping phase) and a "normal" UCD (post-stripping phase): characterizing the nature of CenA-MM-UCD1 thus represents a milestone for the understanding of the origin of UCDs. The exquisite resolution of the proposed follow-up HST imaging is essential to derive an accurate stellar mass profile for

CenA-MM-UCD1, investigate age/metallicity spreads in its populations with a significantly improved accuracy with respect to the ground-based discovery data, and search for possible faint signs of ongoing tidal disruption.

OBSERVING DESCRIPTION

The observations are going to be performed with WFC3/UVIS (primary) and ACS/WFC (parallel). We request imaging in the F606W and F814W filters (broad V and I) for both instruments to observe our peculiar UCD target: these observations will enable an accurate characterization of its stellar content (central surface brightness profile, TRGB distance, photometric metallicities, star formation history, structural parameters) and will resolve a significantly larger number of stars with respect to the ground-based discovery data, while optimizing the exposure times. The parallel pointing will allow us to observe a field region next to our target: we will thus be able to estimate more precisely the number of background/foreground contaminants (both Milky Way populations and Centaurus A halo stars) present in our WFC3 field.

Our goal is to obtain a SNR of ~ 10 at ~ 1.5 mag below the TRGB, i.e., at F814W ~ 25.5 and F606W ~ 26.5 , in order to derive a precise distance measurement, star formation history, color variations, structural properties and investigate possible spatial asymmetries for our target. With the requested SNR, we will obtain a photometric uncertainty as low as ~ 0.1 mag at the TRGB magnitude. Our goal requires ~ 2400 sec in the F606W filter and ~ 2300 sec in the F814W filter, which nicely fit into one orbit per filter, after taking into account overheads and subdividing the exposures with a standard three-dither line pattern to remove detector defects and improve the PSF sampling; we additionally insert a 50 sec exposure in each filter to avoid saturation at the center of our target. We combine the two orbits into one visit in order to maintain the same orientation and thus target the same stars in both filters; our loose ORIENT constraints are necessary to avoid ghosts/spikes at the target's position caused by bright stars within our WFC3 field-of-view.

Proposal 15426 - CENA-MM-UCD1 (01) - Characterizing the first Ultra-Compact Dwarf with a resolved extended halo

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Visit	Proposal 15426, CENA-MM-UCD1 (01) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 60D TO 85 D; ORIENT 172D TO 197 D; ORIENT 240D TO 297 D; ORIENT 352D TO 17 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=WFC3-UVIS-DITHER- LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(2-3), (5-6)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	CENA-MM-UCD1	RA: 13 18 10.8830 (199.5453458d) Dec: -44 09 26.03 (-44.15723d) Equinox: J2000 <i>Comments: Total apparent magnitude</i> <i>Category=UNIDENTIFIED</i> <i>Description=[NUCLEUS, UNDESIGNATED]</i> <i>Extended=NO</i>		V=17	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	F814W WF C3	(1) CENA-MM-UC D1	WFC3/UVIS, ACCUM, UVIS1	F814W	FLASH=11			50 Secs (50 Secs) [=>50.0 Secs]	[1]
	2	F814W WF C3	(1) CENA-MM-UC D1	WFC3/UVIS, ACCUM, UVIS1	F814W			Pattern 1, Exps 2-3 in CENA-MM-UCD1 (01) (1) Prime + Parallel Group 2-3 in Pattern 1, Exps 2-3 in CENA-MM-UCD1 (01)	800 Secs (2514 Secs) [=>828.0 Secs (Pattern 1)] [=>858.0 Secs (Pattern 2)] [=>828.0 Secs (Pattern 3)]	[1]
	3	F814W ACS ANY		ACS/WFC, ACCUM, WFC	F814W			Pattern 1, Exps 2-3 in CENA-MM-UCD1 (01) (1) Prime + Parallel Group 2-3 in Pattern 1, Exps 2-3 in CENA-MM-UCD1 (01)	700 Secs (2228 Secs) [=>710.0 Secs (Pattern 1)] [=>820.0 Secs (Pattern 2)] [=>698.0 Secs (Pattern 3)]	[1]
	4	F606W WF C3	(1) CENA-MM-UC D1	WFC3/UVIS, ACCUM, UVIS1	F606W	FLASH=11			50 Secs (50 Secs) [=>50.0 Secs]	[2]
	5	F606W WF C3	(1) CENA-MM-UC D1	WFC3/UVIS, ACCUM, UVIS1	F606W			Pattern 1, Exps 5-6 in CENA-MM-UCD1 (01) (1) Prime + Parallel Group 5-6 in Pattern 1, Exps 5-6 in CENA-MM-UCD1 (01)	800 Secs (2625 Secs) [=>855.0 Secs (Pattern 1)] [=>915.0 Secs (Pattern 2)] [=>855.0 Secs (Pattern 3)]	[2]
	6	F606W ACS ANY		ACS/WFC, ACCUM, WFC	F606W			Pattern 1, Exps 5-6 in CENA-MM-UCD1 (01) (1) Prime + Parallel Group 5-6 in Pattern 1, Exps 5-6 in CENA-MM-UCD1 (01)	700 Secs (2379 Secs) [=>770.0 Secs (Pattern 1)] [=>880.0 Secs (Pattern 2)] [=>729.0 Secs (Pattern 3)]	[2]



