



17484 - Beyond PAndAS: Two Extremely Faint Candidate Satellites of M33

Identified in Diffuse Light

Cycle: 31, 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) CANDIDATE-1 ANY	ACS/WFC WFC3/UVIS	1	19-Sep-2023 11:01:13.0	yes
02	(2) CANDIDATE-2 ANY	ACS/WFC WFC3/UVIS	1	19-Sep-2023 11:01:14.0	yes

2 Total Orbits Used

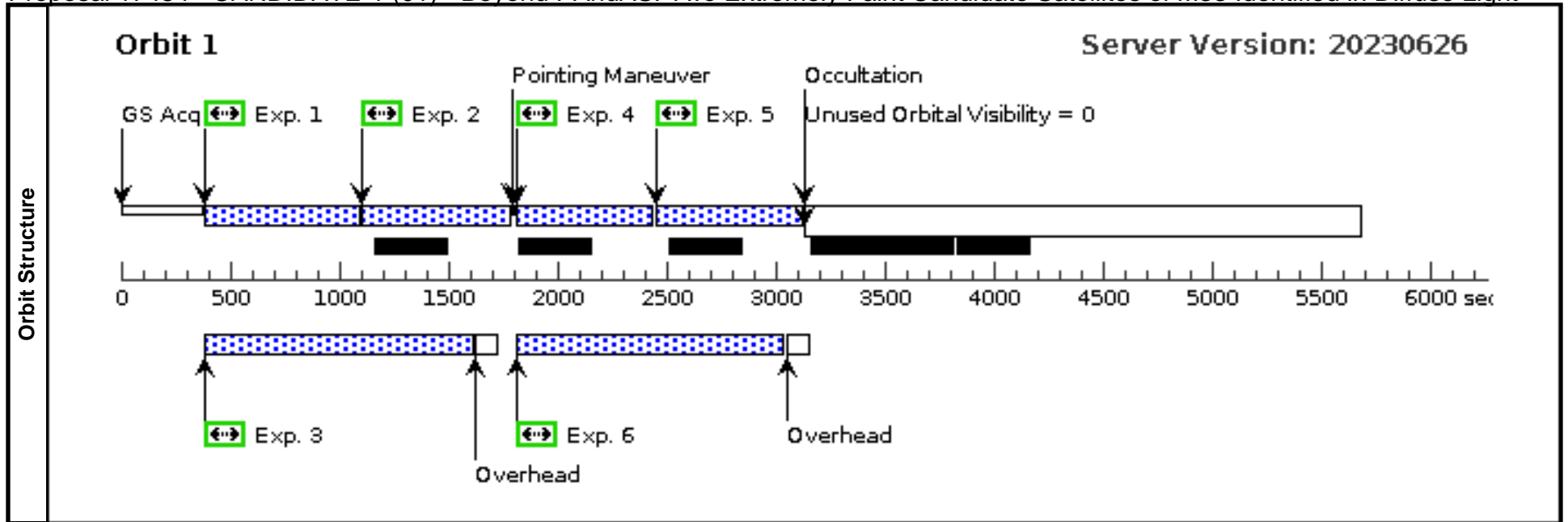
ABSTRACT

M33 is predicted to host more than ten satellite galaxies, but only two potential companions (And XXII, Pisces VII) have been discovered to date. Is this a failure of galaxy formation models, or simply a by-product of how difficult it is to find low surface brightness galaxies in the nearby Universe? In this proposal, we request deep HST observations of two candidate dwarf satellite galaxies identified around M33 using the Dragonfly Telephoto Array. We have undertaken ground-based follow-up which strongly suggests these candidates are dwarf galaxies in the Local Group, but definitive confirmation requires high-resolution space-based imaging.

With high-quality HST data, we will (1) confirm the nature of these candidates as galaxies by detecting an adequate number of red giants associated with these galaxies; (2) measure the precise distance to these dwarf candidates to confirm whether they are indeed M33 satellites; (3) measure their physical properties -- geometry and structural parameters, total luminosities, stellar masses, and preliminary star formation histories. If these candidates are indeed dwarfs around M33, this small HST program would quickly double the known population of M33 satellite galaxies and provide a new avenue for carrying out a rigorous search for all potential M33 satellites. This data set will also enable follow-up studies of the dynamics of the M33-M31 system, including new constraints on the orbit of M33, and a direct test for the hierarchical nature of the LCDM paradigm in the regime of low mass galaxies.

OBSERVING DESCRIPTION

This proposal aims to obtain two-band photometry for two candidate dwarf satellite galaxies identified around M33, identified using ground-based data. This HST/ACS data will be used to construct deep color-magnitude diagrams with ACS and parallel WFC3 pointings. Each target will be observed with a single orbit split between two F606W and two F814W sub-exposures, to effectively eliminate hot pixels and cosmic rays. A single parallel exposure per filter will be obtained with WFC3 and will be used to estimate the background contamination from the MW and M31 stellar halos.



Proposal 17484 - CANDIDATE-2 (02) - Beyond PAndAS: Two Extremely Faint Candidate Satellites of M33 Identified in Diffuse Light

Tue Sep 19 15:01:14 GMT 2023

Visit	Proposal 17484, CANDIDATE-2 (02), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(2)	CANDIDATE-2	RA: 01 41 42.1900 (25.4257917d) Dec: +25 06 54.72 (25.11520d) Equinox: J2000		V=20.0+/-1.0	Reference Frame: ICRS				
	<i>Comments:</i> 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	science	(2) CANDIDATE-2	ACS/WFC, ACCUM, WFC1	F606W		POS TARG 0,0	Prime + Parallel Group 1-3 in CANDIDATE-2 (02)	500 Secs (500 Secs) [==>]	[1]
	2	science	(2) CANDIDATE-2	ACS/WFC, ACCUM, WFC1	F814W			Prime + Parallel Group 1-3 in CANDIDATE-2 (02)	500 Secs (500 Secs) [==>]	[1]
	3	wfc3par	ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W			Prime + Parallel Group 1-3 in CANDIDATE-2 (02)	1200 Secs (1200 Secs) [==>]	[1]
	4	science	(2) CANDIDATE-2	ACS/WFC, ACCUM, WFC1	F814W		POS TARG 0.246,0.267	Prime + Parallel Group 4-6 in CANDIDATE-2 (02)	498 Secs (498 Secs) [==>]	[1]
	5	science	(2) CANDIDATE-2	ACS/WFC, ACCUM, WFC1	F606W		POS TARG 0.246,0.267	Prime + Parallel Group 4-6 in CANDIDATE-2 (02)	498 Secs (498 Secs) [==>]	[1]
	6	wfc3par	ANY	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W			Prime + Parallel Group 4-6 in CANDIDATE-2 (02)	1200 Secs (1200 Secs) [==>]	[1]

