



15874 - Ultra-Diffuse Galaxy Formation through Interactions

Cycle: 27, 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) NGC2708DW1 ANY	ACS/WFC WFC3/UVIS	2	24-Sep-2019 11:03:11.0	yes
02	(2) NGC5631DW1 ANY	ACS/WFC WFC3/UVIS	2	24-Sep-2019 11:03:13.0	yes

4 Total Orbits Used

ABSTRACT

We request D-configuration HI observations as well as HST data to image two ultra-diffuse galaxies (UDGs) which are associated with tidal material connected to a larger galaxy halo. These dwarfs provide evidence that UDGs can form via galaxy interactions, although it is not clear whether they are normal dwarf galaxies that have been 'puffed up' during the interaction or if they are tidal dwarf galaxies, the dark matter-free stellar aggregations

Proposal 15874 (STScI Edit Number: 1, Created: Tuesday, September 24, 2019 at 10:03:14 AM Eastern Standard Time) - Overview that can result from gas-rich major galaxy encounters. Alternatively, these galaxies may have formed as UDGs through some other mechanism, and are now being stripped by a larger galaxy halo. The deep VLA observations are essential for spatially correlating HI emission with each dwarf and its stream, which would bolster the tidal dwarf galaxy hypothesis. The HST observations will allow for a detailed morphological analysis of each interacting dwarf and its stellar stream, and will also measure their globular cluster content -- a powerful discriminant between these formation scenarios. The proposed observations will point to one of the formation mechanisms of the mysterious class of UDGs.

OBSERVING DESCRIPTION

The observations are going to be performed with the ACS/WFC (primary) and WFC3/UVIS (parallel). We request imaging in F555W and F814W filters for both instruments in order to both measure the detailed morphology of each ultra-diffuse dwarf (along with its stellar stream) and their globular cluster (GC) content. The parallel WFC3 pointings will allow us to observe a field region next to our ultra-diffuse galaxy targets and will be invaluable to characterize the 'background' of point sources with consistent magnitudes and colors as the GCs we wish to identify.

Each target/visit is two orbits, with the first orbit devoted to F555W and the second to F814W. We use a standard four-point dither box for each orbit, with sub-pixel dithers in order to get closer to the native resolution of ACS. This is vital, as one method we will use to identify globular clusters is to measure slight deviations from a true point source. Most globular clusters at the distance to our targets will be very slightly resolved, and we will use a standard 'concentration index' to identify them (basically, the difference in magnitude between two apertures).

We have implemented some loose ORIENTs in order to include some portion of the stream associated with each dwarf, and its connection to the main parent galaxy.

This program is relatively resilient to two-gyro mode, we believe. Our visits are 2-orbits, and we have loose ORIENT constraints. Nor does this program have time constraints (other than the baseline excitement of the science!). We can also achieve our science goals with a longer acquisition time, if necessary.

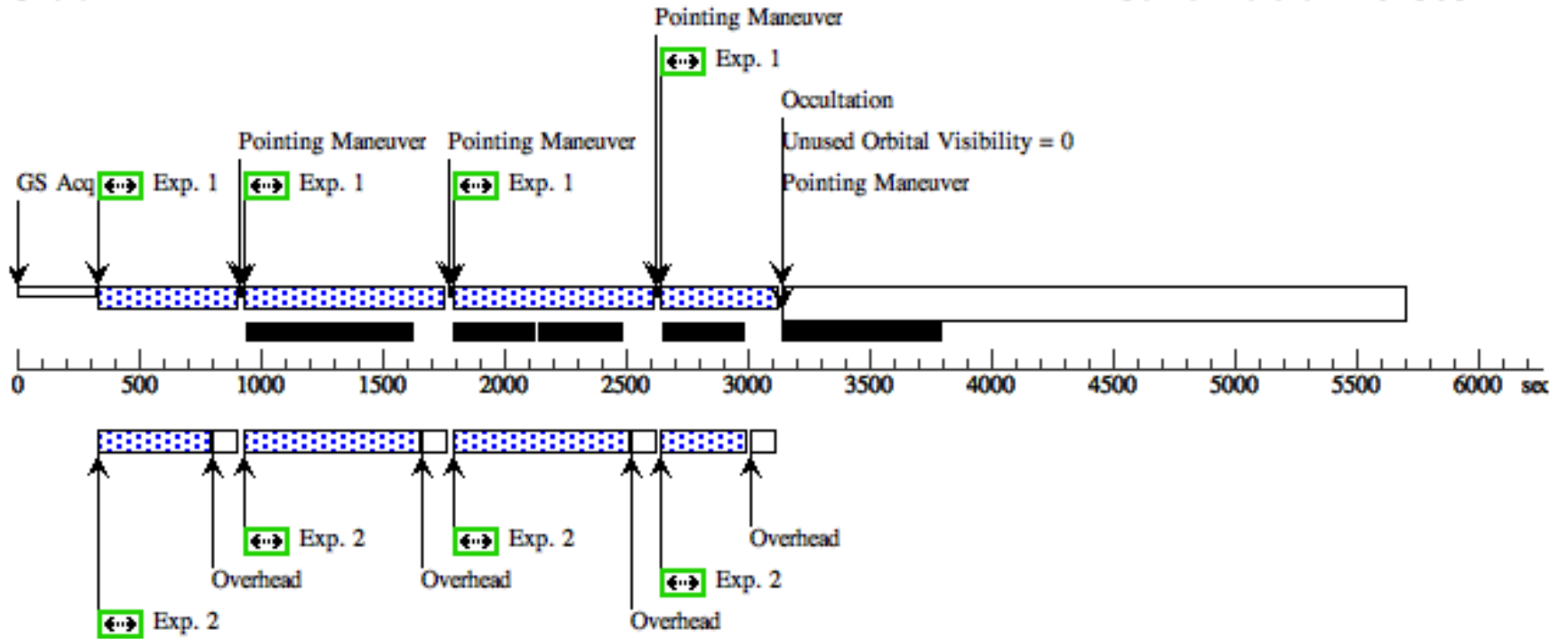
Note that this dataset was requested through the joint NRAO program. We will also be acquiring VLA HI observations of the two ultradiffuse galaxy targets in this proposal to get a more complete picture and narrow down the formation scenarios of these two remarkable galaxies. We do not require concurrent VLA and HST imaging.

Proposal 15874 - Visit 01 - Ultra-Diffuse Galaxy Formation through Interactions

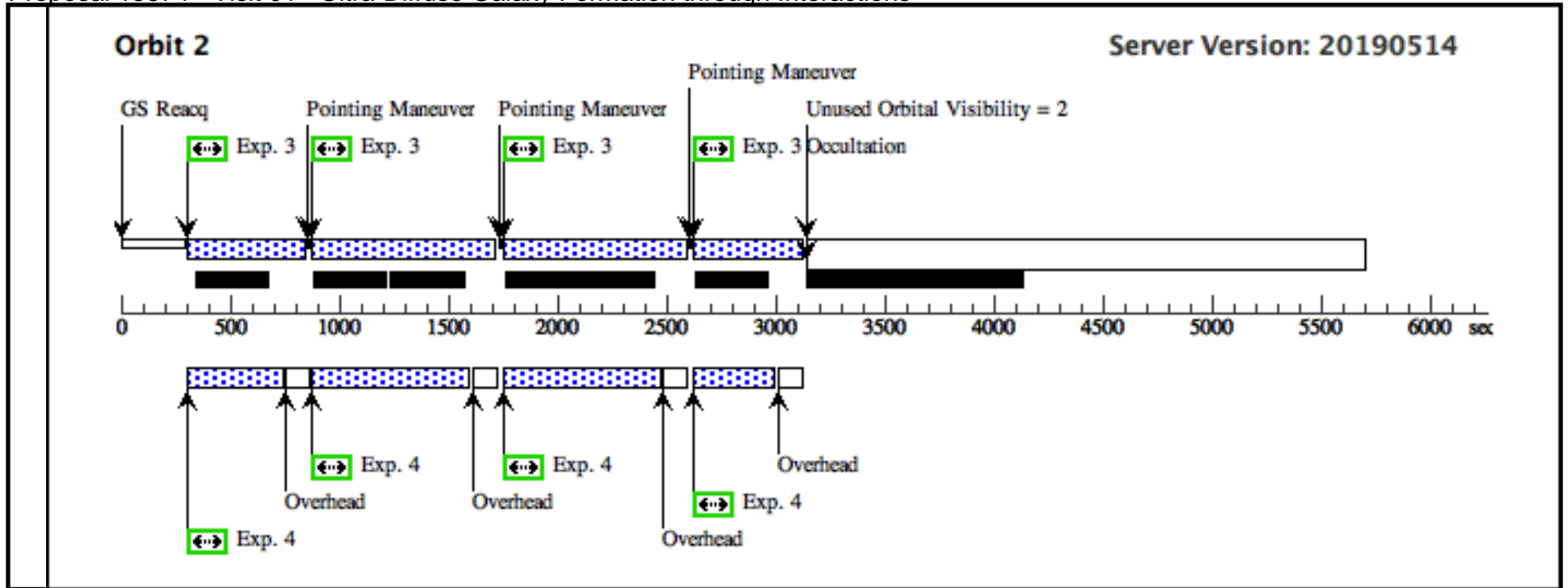
Tue Sep 24 15:03:14 GMT 2019

Visit	Proposal 15874, Visit 01, implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 110D TO 140 D									
	(Parallel Exposure 2 (Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in Visit 01)) Warning (Form): FLASH level may be too high for this exposure or a long subexposure. See extended explanation in the diagnostic browser (Parallel Exposure 4 (Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in Visit 01)) Warning (Form): FLASH level may be too high for this exposure or a long subexposure. See extended explanation in the diagnostic browser									
Diagnos										
Patterns	#	Primary Pattern	Secondary Pattern	Exposures						
	(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false	(1-2), (3-4)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	NGC2708DW1	RA: 08 56 12.7000 (134.0529167d) Dec: -03 25 14.80 (-3.42078d) Equinox: J2000		V=19.3	Reference Frame: ICRS				
<i>Comments:</i> Category=GALAXY Description=[DWARF SPHEROIDAL] Extended=YES										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) NGC2708DW1	ACS/WFC, ACCUM, WFC1	F555W			Pattern 1, Exps 1-2 in Visit 01 (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in Visit 01	600 Secs (2115 Secs) [==>360.0 Secs (Pattern 1)] [==>700.0 Secs (Pattern 2)] [==>700.0 Secs (Pattern 3)] [==>355.0 Secs (Pattern 4)]	[1]
	2		ANY	WFC3/UVIS, ACCUM, UVIS1	F555W	FLASH=2.0		Pattern 1, Exps 1-2 in Visit 01 (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in Visit 01	355 Secs (2225 Secs) [==>430.0 Secs (Pattern 1)] [==>720.0 Secs (Pattern 2)] [==>720.0 Secs (Pattern 3)] [==>(Pattern 4)]	[1]
	3		(1) NGC2708DW1	ACS/WFC, ACCUM, WFC1	F814W			Pattern 1, Exps 3-4 in Visit 01 (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in Visit 01	600 Secs (2187 Secs) [==>378.0 Secs (Pattern 1)] [==>718.0 Secs (Pattern 2)] [==>718.0 Secs (Pattern 3)] [==>373.0 Secs (Pattern 4)]	[2]
	4		ANY	WFC3/UVIS, ACCUM, UVIS1	F814W	FLASH=3.0		Pattern 1, Exps 3-4 in Visit 01 (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in Visit 01	369 Secs (2243 Secs) [==>426.0 Secs (Pattern 1)] [==>724.0 Secs (Pattern 2)] [==>724.0 Secs (Pattern 3)] [==>369.0 Secs (Pattern 4)]	[2]

Orbit 1



Orbit Structure

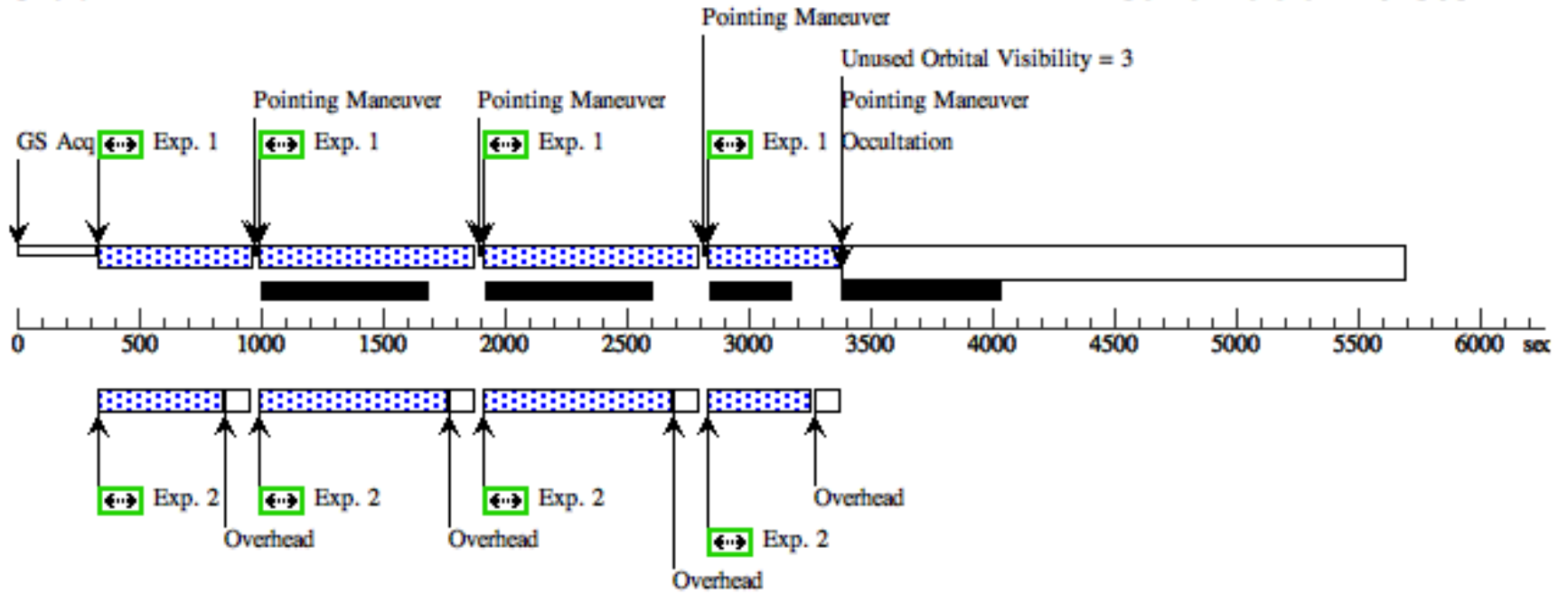


Proposal 15874 - Visit 02 - Ultra-Diffuse Galaxy Formation through Interactions

Tue Sep 24 15:03:15 GMT 2019

Visit	Proposal 15874, Visit 02, implementation Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 190D TO 300 D									
	(Parallel Exposure 2 (Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in Visit 02)) Warning (Form): FLASH level may be too high for this exposure or a long subexposure. See extended explanation in the diagnostic browser (Parallel Exposure 4 (Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in Visit 02)) Warning (Form): FLASH level may be too high for this exposure or a long subexposure. See extended explanation in the diagnostic browser									
Diagnosics										
Patterns	#	Primary Pattern	Secondary Pattern		Exposures					
	(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false		(1-2), (3-4)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	NGC5631DW1	RA: 14 26 13.6000 (216.5566667d) Dec: +56 31 50.20 (56.53061d) Equinox: J2000		V=20.5	Reference Frame: ICRS				
<i>Comments:</i> Category=GALAXY Description=[DWARF SPHEROIDAL] Extended=YES										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) NGC5631DW1	ACS/WFC, ACCUM, WFC1	F555W		GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-2 in Visit 02 (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in Visit 02	600 Secs (2359 Secs) [==>421.0 Secs (Pattern 1)] [==>761.0 Secs (Pattern 2)] [==>761.0 Secs (Pattern 3)] [==>416.0 Secs (Pattern 4)]	[1]
	2		ANY	WFC3/UVIS, ACCUM, UVIS1	F555W	FLASH=2.0		Pattern 1, Exps 1-2 in Visit 02 (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in Visit 02	355 Secs (2449 Secs) [==>481.0 Secs (Pattern 1)] [==>771.0 Secs (Pattern 2)] [==>771.0 Secs (Pattern 3)] [==>426.0 Secs (Pattern 4)]	[1]
	3		(2) NGC5631DW1	ACS/WFC, ACCUM, WFC1	F814W			Pattern 1, Exps 3-4 in Visit 02 (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in Visit 02	600 Secs (2435 Secs) [==>440.0 Secs (Pattern 1)] [==>780.0 Secs (Pattern 2)] [==>780.0 Secs (Pattern 3)] [==>435.0 Secs (Pattern 4)]	[2]
	4		ANY	WFC3/UVIS, ACCUM, UVIS1	F814W	FLASH=2.0		Pattern 1, Exps 3-4 in Visit 02 (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in Visit 02	369 Secs (2497 Secs) [==>472.0 Secs (Pattern 1)] [==>790.0 Secs (Pattern 2)] [==>790.0 Secs (Pattern 3)] [==>445.0 Secs (Pattern 4)]	[2]

Orbit 1



Orbit Structure

