



14643 - Imaging of three Ultra Diffuse Galaxies with measured stellar kinematics

Cycle: 24, 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	(2) DFX1+DFX2 ANY	ACS/WFC WFC3/UVIS	2	29-Jul-2016 14:15:04.0	yes
02	(2) DFX1+DFX2 ANY	ACS/WFC WFC3/UVIS	2	29-Jul-2016 14:15:07.0	yes
03	(1) DF42+DF44 ANY	ACS/WFC WFC3/UVIS	2	29-Jul-2016 14:15:09.0	yes
04	(1) DF42+DF44 ANY	ACS/WFC WFC3/UVIS	2	29-Jul-2016 14:15:11.0	yes

8 Total Orbits Used

ABSTRACT

In 2015 we discovered a new population of galaxies. Initially found in the Coma cluster, "Ultra Diffuse Galaxies", or UDGs, have the sizes of Milky Way-like galaxies but the luminosities of dwarf galaxies. We recently succeeded in measuring the absorption line kinematics of three Coma UDGs, using 20 hr integrations with DEIMOS on the Keck telescope. Surprisingly, the velocity dispersions of the galaxies span a large range, from ~ 20 km/s to ~ 80 km/s. The most straightforward interpretation is that UDGs span a very large range in dynamical mass, with the most massive UDGs having halo masses similar to that of the Milky Way. Here we propose to test this using deep HST imaging of the three UDGs with velocity dispersion measurements. The primary aim is to count their globular clusters: if the interpretation of the dispersions is correct, the galaxy with $\sigma=80$ km/s should have $\sim 10x$ more globular clusters than the galaxies with $\sigma=20-30$ km/s. Secondary goals include an analysis of the central regions of the UDGs; a search for star forming regions; a measurement of the radial variation in ellipticity and position angle; and a search for faint satellites around them. With primary ACS/WFC and parallel WFC3/UVIS observations we can image all three UDGs with dynamical measurements, as well as a fourth spectroscopically confirmed Coma UDG, in two pointings.

OBSERVING DESCRIPTION

The observations are split into 4 visits. Each visit consists of two orbits. Each orbit consists of 4 dithered exposures with ACS/WFC and WFC3/UVIS:

visit 1: target DFX1+DFX2, 1 orbit F814W and 1 orbit F606W

visit 2: target DFX1+DFX2, 2 orbits F606W

visit 3: target DF42+DF44, 1 orbit F814W and 1 orbit F606W

visit 4: target DF42+DF44, 2 orbits F606W

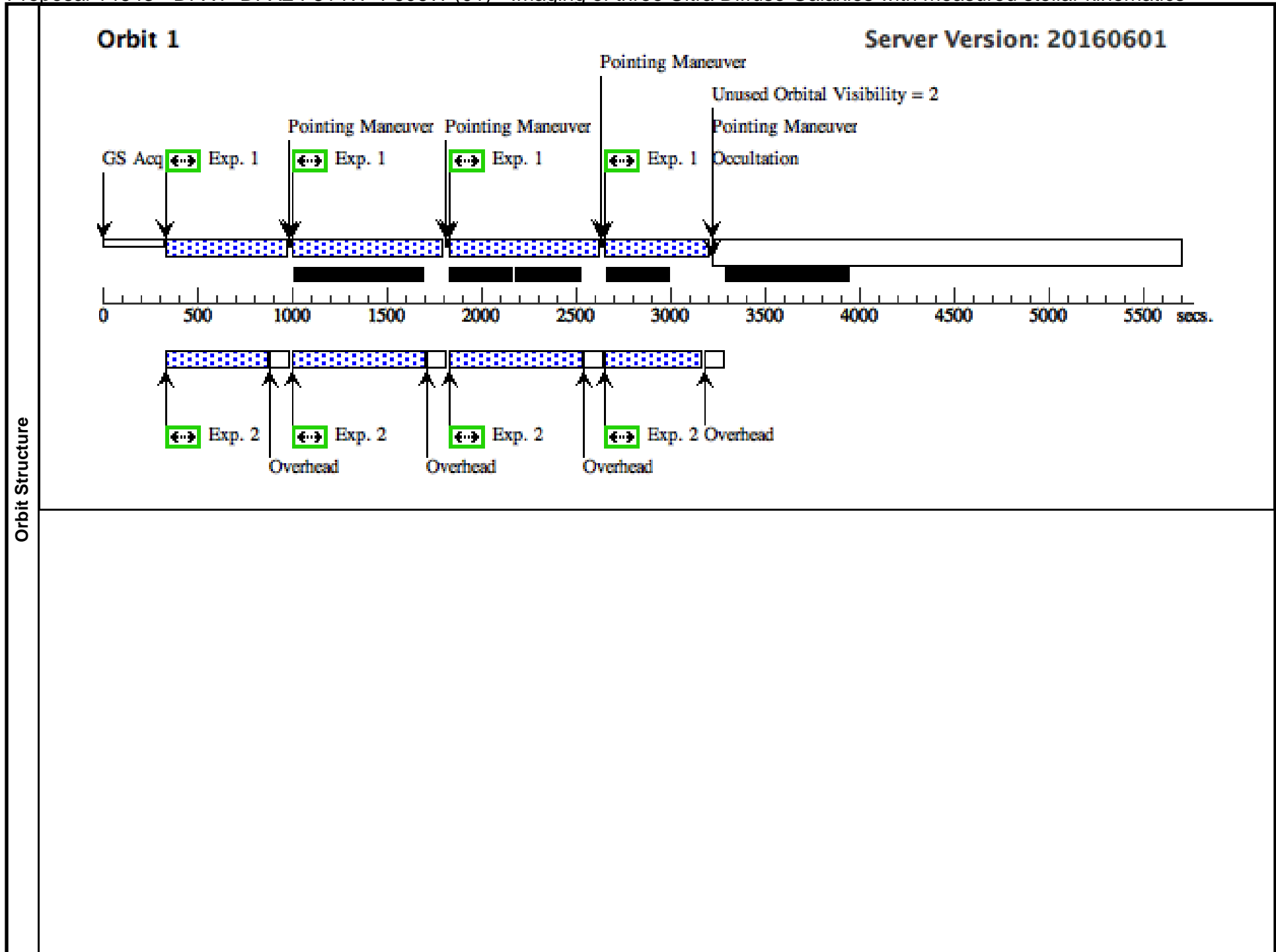
A standard small box dither pattern is used. There is no need to dither over the ACS chip gap.

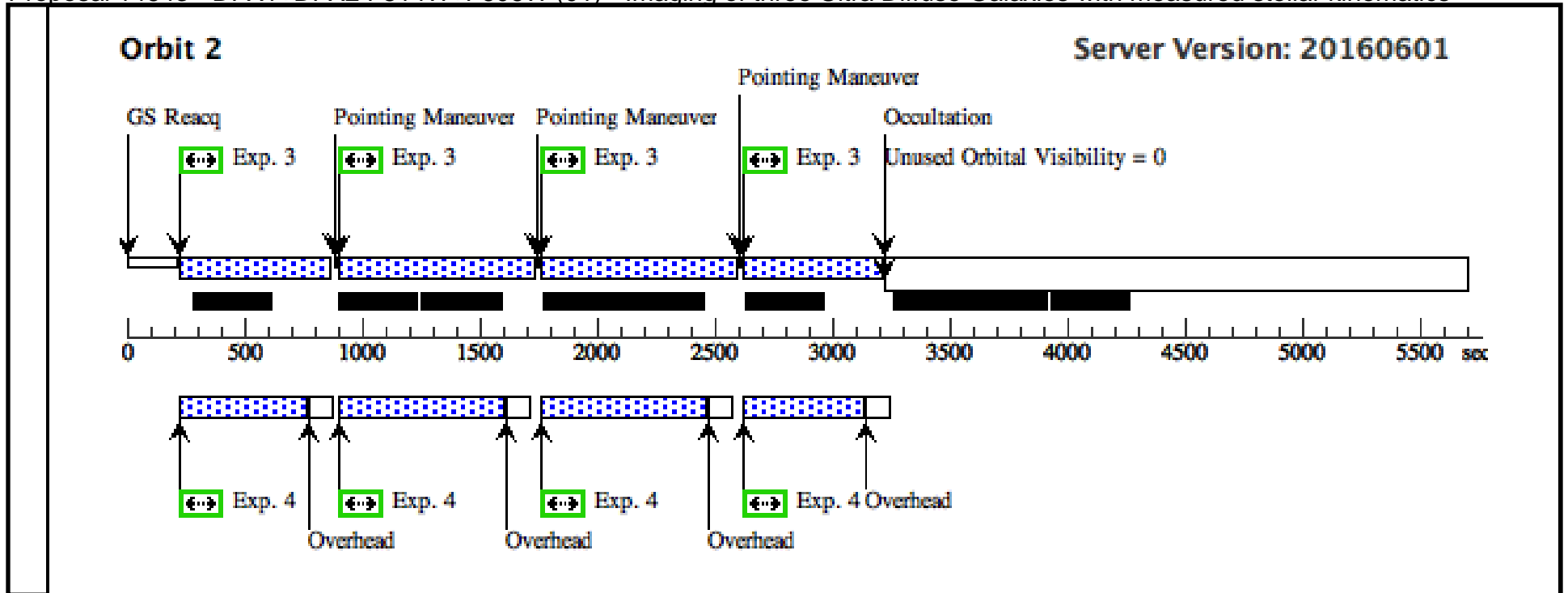
The ORIENT constraints are necessary as two targets are observed simultaneously with ACS and WFC3. The ORIENT ranges are the maximum allowed with both objects having proper coverage within the WFC and UVIS chips. The visibility is limited to a few weeks around the end of April 2017; unfortunately this is the maximum visibility that is possible for this program (given the necessary ORIENT constraints).

Proposal 14643 - DFX1+DFX2 F814W+F606W (01) - Imaging of three Ultra Diffuse Galaxies with measured stellar kinematics

Fri Jul 29 18:15:12 GMT 2016

Visit	Proposal 14643, DFX1+DFX2 F814W+F606W (01), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 158D TO 171 D									
	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)	DFX1+DFX2	RA: 13 01 19.7000 (195.3320833d) Dec: +27 13 7.00 (27.21861d) Equinox: J2000		V=25	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) DFX1+DFX2	ACS/WFC, ACCUM, WFC1	F814W		GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-2 in DFX1+DFX2 F814W+F606W (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in DFX1+DFX2 F814W+F606W (01)	500 Secs (2200 Secs) [==>430.0 Secs (Pattern 1)] [==>670.0 Secs (Pattern 2)] [==>670.0 Secs (Pattern 3)] [==>430.0 Secs (Pattern 4)]	[1]
	2		ANY	WFC3/UVIS, ACCUM, UVIS1	F814W			Pattern 1, Exps 1-2 in DFX1+DFX2 F814W+F606W (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in DFX1+DFX2 F814W+F606W (01)	500 Secs (2420 Secs) [==>510.0 Secs (Pattern 1)] [==>700.0 Secs (Pattern 2)] [==>700.0 Secs (Pattern 3)] [==>510.0 Secs (Pattern 4)]	[1]
	3		(2) DFX1+DFX2	ACS/WFC, ACCUM, WFC1	F606W			Pattern 1, Exps 3-4 in DFX1+DFX2 F814W+F606W (01) (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in DFX1+DFX2 F814W+F606W (01)	500 Secs (2340 Secs) [==>465.0 Secs (Pattern 1)] [==>705.0 Secs (Pattern 2)] [==>705.0 Secs (Pattern 3)] [==>465.0 Secs (Pattern 4)]	[2]
	4		ANY	WFC3/UVIS, ACCUM, UVIS1	F606W			Pattern 1, Exps 3-4 in DFX1+DFX2 F814W+F606W (01) (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in DFX1+DFX2 F814W+F606W (01)	500 Secs (2430 Secs) [==>520.0 Secs (Pattern 1)] [==>700 Secs (Pattern 2)] [==>700 Secs (Pattern 3)] [==>510 Secs (Pattern 4)]	[2]





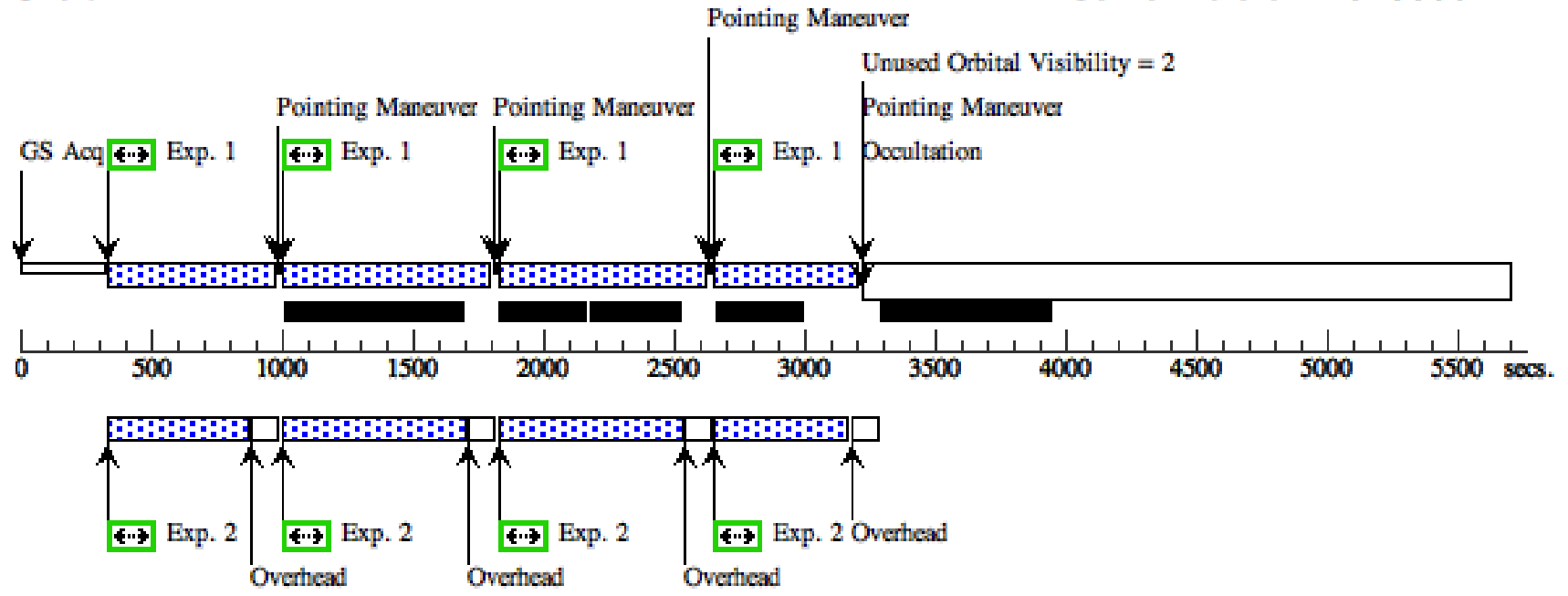
Proposal 14643 - DFX1+DFX2 F606W+F606W (02) - Imaging of three Ultra Diffuse Galaxies with measured stellar kinematics

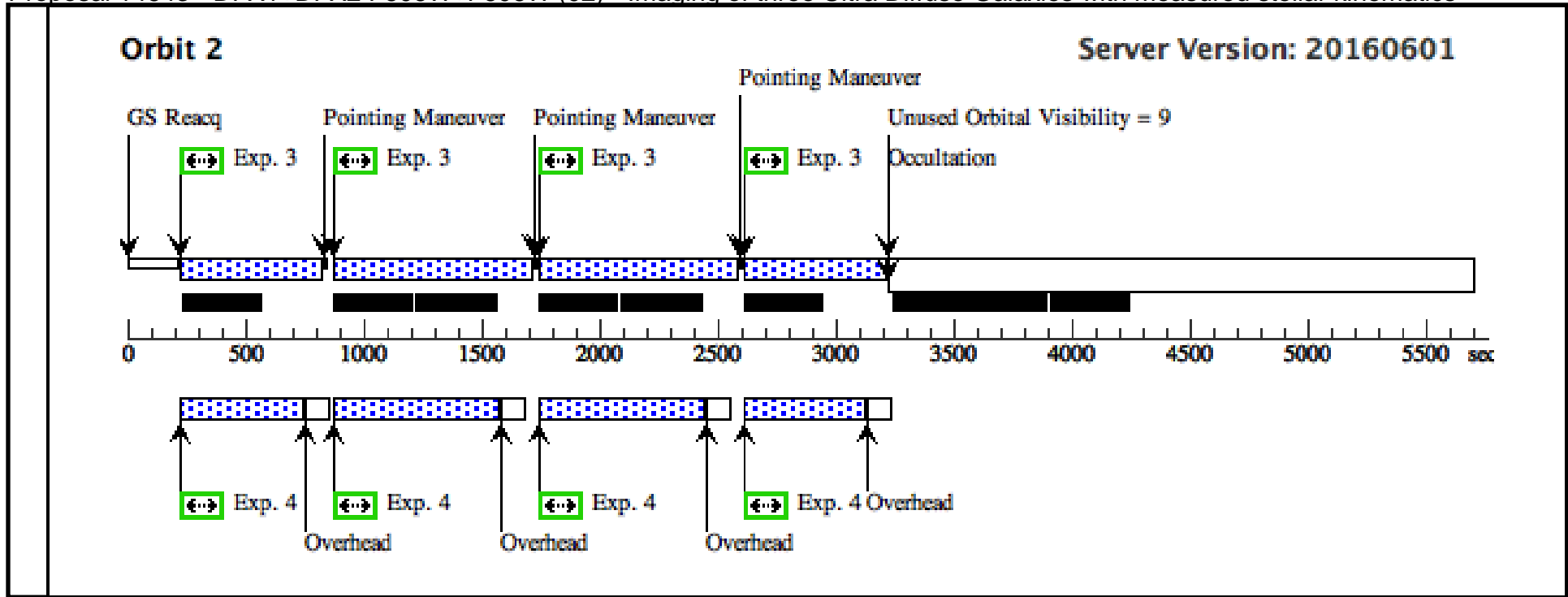
Fri Jul 29 18:15:12 GMT 2016

Visit	Proposal 14643, DFX1+DFX2 F606W+F606W (02), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 158D TO 171 D									
	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)	DFX1+DFX2	RA: 13 01 19.7000 (195.3320833d) Dec: +27 13 7.00 (27.21861d) Equinox: J2000		V=25	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) DFX1+DFX2	ACS/WFC, ACCUM, WFC1	F606W		GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-2 in DFX1+DFX2 F606W+F606W (02) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in DFX1+DFX2 F606W+F606W (02)	500 Secs (2200 Secs) [==>430.0 Secs (Pattern 1)] [==>670.0 Secs (Pattern 2)] [==>670.0 Secs (Pattern 3)] [==>430.0 Secs (Pattern 4)]	[1]
	2		ANY	WFC3/UVIS, ACCUM, UVIS1	F606W			Pattern 1, Exps 1-2 in DFX1+DFX2 F606W+F606W (02) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in DFX1+DFX2 F606W+F606W (02)	500 Secs (2420 Secs) [==>510.0 Secs (Pattern 1)] [==>700.0 Secs (Pattern 2)] [==>700.0 Secs (Pattern 3)] [==>510.0 Secs (Pattern 4)]	[1]
	3		(2) DFX1+DFX2	ACS/WFC, ACCUM, WFC1	F606W			Pattern 1, Exps 3-4 in DFX1+DFX2 F606W+F606W (02) (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in DFX1+DFX2 F606W+F606W (02)	500 Secs (2368 Secs) [==>472.0 Secs (Pattern 1)] [==>712.0 Secs (Pattern 2)] [==>712.0 Secs (Pattern 3)] [==>472.0 Secs (Pattern 4)]	[2]
	4		ANY	WFC3/UVIS, ACCUM, UVIS1	F606W			Pattern 1, Exps 3-4 in DFX1+DFX2 F606W+F606W (02) (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in DFX1+DFX2 F606W+F606W (02)	500 Secs (2430 Secs) [==>520.0 Secs (Pattern 1)] [==>700 Secs (Pattern 2)] [==>700 Secs (Pattern 3)] [==>510 Secs (Pattern 4)]	[2]

Orbit 1

Server Version: 20160601

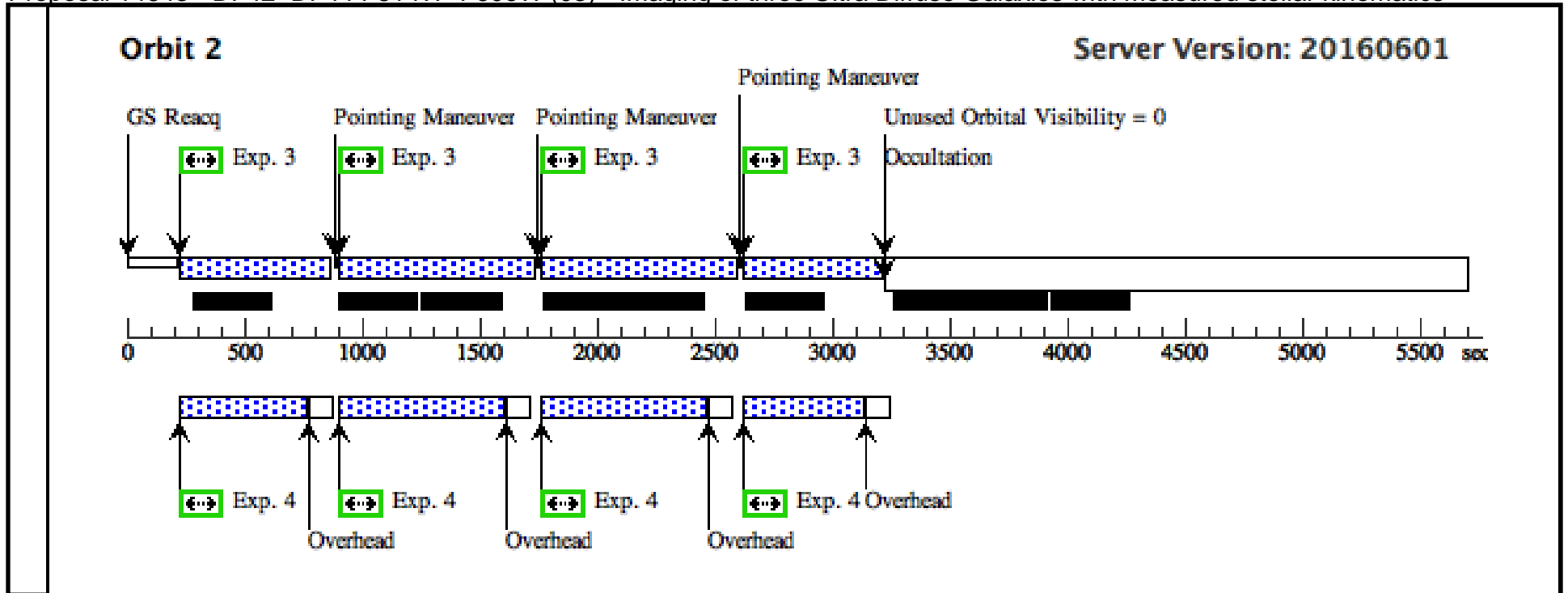




Proposal 14643 - DF42+DF44 F814W+F606W (03) - Imaging of three Ultra Diffuse Galaxies with measured stellar kinematics

Fri Jul 29 18:15:12 GMT 2016

Visit	Proposal 14643, DF42+DF44 F814W+F606W (03), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 170D TO 185 D									
	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)	DF42+DF44	RA: 13 01 19.3600 (195.3306667d) Dec: +27 02 44.00 (27.04556d) Equinox: J2000		V=25	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) DF42+DF44	ACS/WFC, ACCUM, WFC1	F814W			Pattern 1, Exps 1-2 in DF42+DF44 F814W+F606W (03) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in DF42+DF44 F814W+F606W (03)	500 Secs (2200 Secs) [==>430.0 Secs (Pattern 1)] [==>670.0 Secs (Pattern 2)] [==>670.0 Secs (Pattern 3)] [==>430.0 Secs (Pattern 4)]	[1]
	2		ANY	WFC3/UVIS, ACCUM, UVIS1	F814W			Pattern 1, Exps 1-2 in DF42+DF44 F814W+F606W (03) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in DF42+DF44 F814W+F606W (03)	500 Secs (2420 Secs) [==>510.0 Secs (Pattern 1)] [==>700.0 Secs (Pattern 2)] [==>700.0 Secs (Pattern 3)] [==>510.0 Secs (Pattern 4)]	[1]
	3		(1) DF42+DF44	ACS/WFC, ACCUM, WFC1	F606W			Pattern 1, Exps 3-4 in DF42+DF44 F814W+F606W (03) (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in DF42+DF44 F814W+F606W (03)	500 Secs (2340 Secs) [==>465.0 Secs (Pattern 1)] [==>705.0 Secs (Pattern 2)] [==>705.0 Secs (Pattern 3)] [==>465.0 Secs (Pattern 4)]	[2]
	4		ANY	WFC3/UVIS, ACCUM, UVIS1	F606W			Pattern 1, Exps 3-4 in DF42+DF44 F814W+F606W (03) (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in DF42+DF44 F814W+F606W (03)	500 Secs (2430 Secs) [==>520.0 Secs (Pattern 1)] [==>700 Secs (Pattern 2)] [==>700 Secs (Pattern 3)] [==>510 Secs (Pattern 4)]	[2]



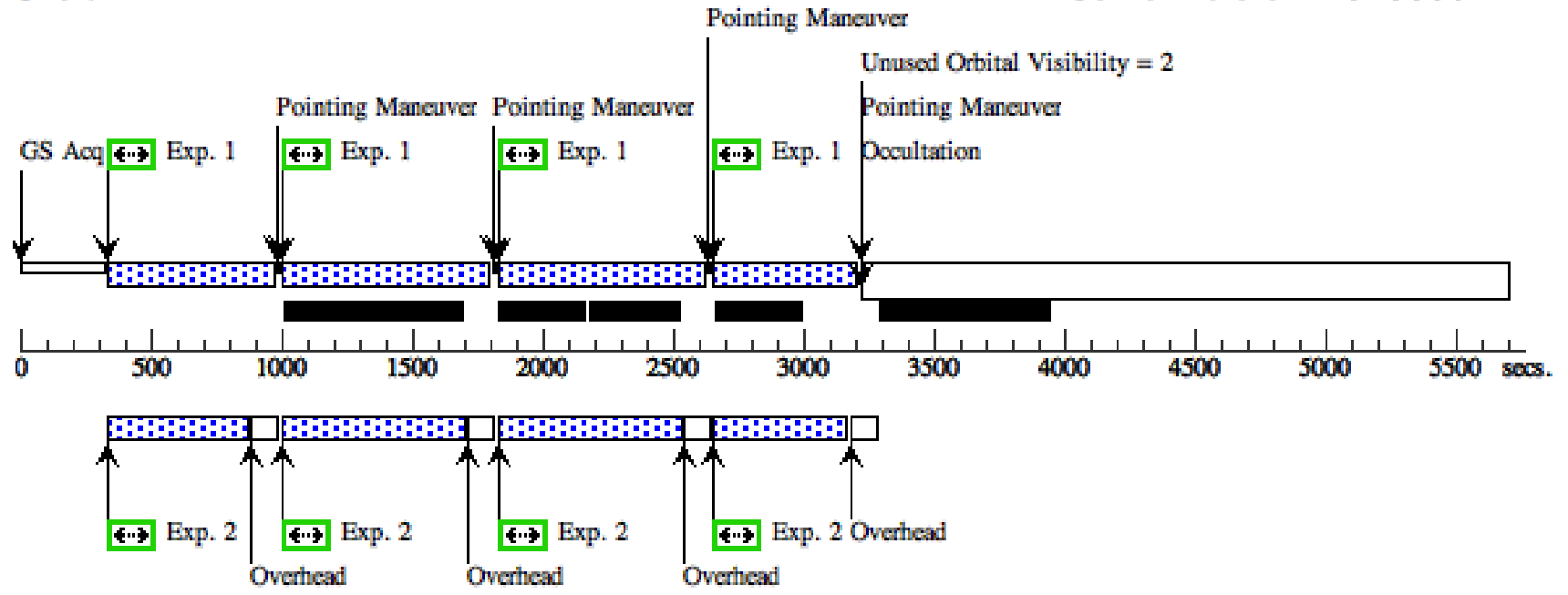
Proposal 14643 - DF42+DF44 F606W+F606W (04) - Imaging of three Ultra Diffuse Galaxies with measured stellar kinematics

Fri Jul 29 18:15:12 GMT 2016

Visit	Proposal 14643, DF42+DF44 F606W+F606W (04), implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 170D TO 185 D									
	#	Primary Pattern	Secondary Pattern	Exposures						
Patterns	(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)	DF42+DF44	RA: 13 01 19.3600 (195.3306667d) Dec: +27 02 44.00 (27.04556d) Equinox: J2000		V=25	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) DF42+DF44	ACS/WFC, ACCUM, WFC1	F606W			Pattern 1, Exps 1-2 in DF42+DF44 F606W+F606W (04) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in DF42+DF44 F606W+F606W (04)	500 Secs (2200 Secs) [==>430.0 Secs (Pattern 1)] [==>670.0 Secs (Pattern 2)] [==>670.0 Secs (Pattern 3)] [==>430.0 Secs (Pattern 4)]	[1]
	2		ANY	WFC3/UVIS, ACCUM, UVIS1	F606W			Pattern 1, Exps 1-2 in DF42+DF44 F606W+F606W (04) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in DF42+DF44 F606W+F606W (04)	500 Secs (2420 Secs) [==>510.0 Secs (Pattern 1)] [==>700.0 Secs (Pattern 2)] [==>700.0 Secs (Pattern 3)] [==>510.0 Secs (Pattern 4)]	[1]
	3		(1) DF42+DF44	ACS/WFC, ACCUM, WFC1	F606W			Pattern 1, Exps 3-4 in DF42+DF44 F606W+F606W (04) (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in DF42+DF44 F606W+F606W (04)	500 Secs (2368 Secs) [==>472.0 Secs (Pattern 1)] [==>712.0 Secs (Pattern 2)] [==>712.0 Secs (Pattern 3)] [==>472.0 Secs (Pattern 4)]	[2]
	4		ANY	WFC3/UVIS, ACCUM, UVIS1	F606W			Pattern 1, Exps 3-4 in DF42+DF44 F606W+F606W (04) (1) Prime + Parallel Group 3-4 in Pattern 1, Exps 3-4 in DF42+DF44 F606W+F606W (04)	500 Secs (2430 Secs) [==>520.0 Secs (Pattern 1)] [==>700 Secs (Pattern 2)] [==>700 Secs (Pattern 3)] [==>510 Secs (Pattern 4)]	[2]

Orbit 1

Server Version: 20160601



Orbit Structure

