



# 17439 - Skeletons in the Cluster: Unveiling the Stellar Mass Backbone of $z=1.6$ Galaxies

Cycle: 31, Proposal Category: GO  
(Availability Mode: SUPPORTED)

## INVESTIGATORS

<i>Name</i>	<i>Institution</i>
<b>Dr. Allison Noble (PI) (Contact)</b>	<b>Arizona State University</b>
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Dr. Julie Nantais (CoI)	Universidad Andres Bello
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Prof. Michael Cooper (CoI)	University of California - Irvine
Alex Pigarelli (CoI)	Arizona State University
Dr. Tracy Webb (CoI) (CSA Member)	McGill University
Prof. Ricardo Demarco (CoI)	Universidad de Concepcion
Dr. Michael L. Balogh (CoI) (CSA Member)	University of Waterloo
Dr. Benedetta Vulcani (CoI) (ESA Member)	INAF - Osservatorio Astronomico di Padova
Dr. Patrick S. Kamienieski (CoI)	Arizona State University

## 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) SPARCS-J0225	WFC3/IR	2	11-Jun-2024 18:01:01.0	yes
02	(1) SPARCS-J0225	WFC3/IR	1	11-Jun-2024 18:01:02.0	yes
03	(1) SPARCS-J0225	WFC3/IR	2	11-Jun-2024 18:01:03.0	yes
04	(1) SPARCS-J0225	WFC3/IR	2	11-Jun-2024 18:01:03.0	yes

7 Total Orbits Used

## **ABSTRACT**

The conversion of gas into stars on small spatial scales, and its connection to the underlying stellar backbone is key to understanding quenching in cluster galaxies. However, the dearth of high-resolution maps of the molecular gas, star formation, and stars has made it impossible to understand these processes. Recently, a new window into spatially-resolved molecular gas and far-IR emission has been opened through ALMA observations of high-redshift clusters. These gains have been mainly due to the high source density of star forming galaxies in young clusters, which allows for large multiplexing. The ALMA observations have delivered spatial and kinematic maps of the molecular gas at exquisite resolution for the first large sample of high-redshift galaxies, while the available rest-frame UV HST and ALMA FIR data have yielded star formation maps. We will combine these novel ALMA and HST data with new imaging in F105W, F140W, and F160W to derive stellar mass maps and to investigate the spatial distribution of the dominant baryonic components in main-sequence cluster galaxies at  $z \sim 1.6$ . The target cluster contains galaxies in remarkable states of transformation and will be combined with analogous available data on 2 other  $z \sim 1.6$  clusters for a total sample of 29 galaxies at the same redshift with high-resolution spatial maps of their star formation, stellar mass, and gas. With these data we will, for the first time: 1) measure where star formation in cluster galaxies is halted (outskirts, centers, or everywhere); 2) connect deviations from scaling relationships to the stellar backbone of the galaxy; and 3) learn what role clumps play in driving mass buildup in cluster galaxies.

## **OBSERVING DESCRIPTION**

The goal of this program is to obtain WFC3 imaging over a galaxy cluster at  $z=1.6$  in three filters: F105W (4.5 orbits), F140W (1.5 orbits), and F160W (1 orbit). The observations are designed to cover in-hand ALMA, WFC3, and ACS imaging; the pointing coordinates have been chosen to maximize overlap with these images, in particular the existing (shallower) F160W imaging. Most of the primary targets of interest are within the central 80x80" diameter, with K band fluxes around 21-23 mags, and effective radii averaging around 0.7". We do not place orient constraints to maximize schedulability.

Orbit / visit strategy:

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Each visit consists of 1-2 orbits, over various filters.

Visit 1 = 1 orbit in F140W and 1 orbit in F105W

Visit 2 = 1/2 orbit in F140W and 1/2 orbit in F105W

Visit 3 = 1 orbit in F160W and 1 orbit in F105W

Visit 4 = 2 orbits in F105W

In visits which contain F105W with another filter, we have placed the F105W exposures toward the middle of the orbit to help reduce the sky background from the airglow line of He I, which can affect some orbits. In these visits, the 4-point dither pattern (described below) for each filter is thus split over 2 orbits, which also reduces pointing maneuvers.

Dithering strategy:

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We use a dither pattern with a combination of 1/2 pixel shifts to improve sampling of the PSF, and integer pixel shifts to enable rejection of hot/bad pixels and mitigate persistence from bright compact sources. We use a larger version of the standard WFC3-IR-DITHER-BOX-MIN pattern, which has only 1-4 pixel offsets between pointings. As some bad pixels come in clumps we prefer a slightly larger pattern. We use POS-TARG offsets to execute our dither pattern.

The general 4-point dither pattern we use is:

POS-TARG: (0,0) (1.36,0.428) (0.884,1.216) (-0.476,0.788)

pixels: (0,0) (10.0,3.5) (6.5,10.0) (-3.5,6.5)

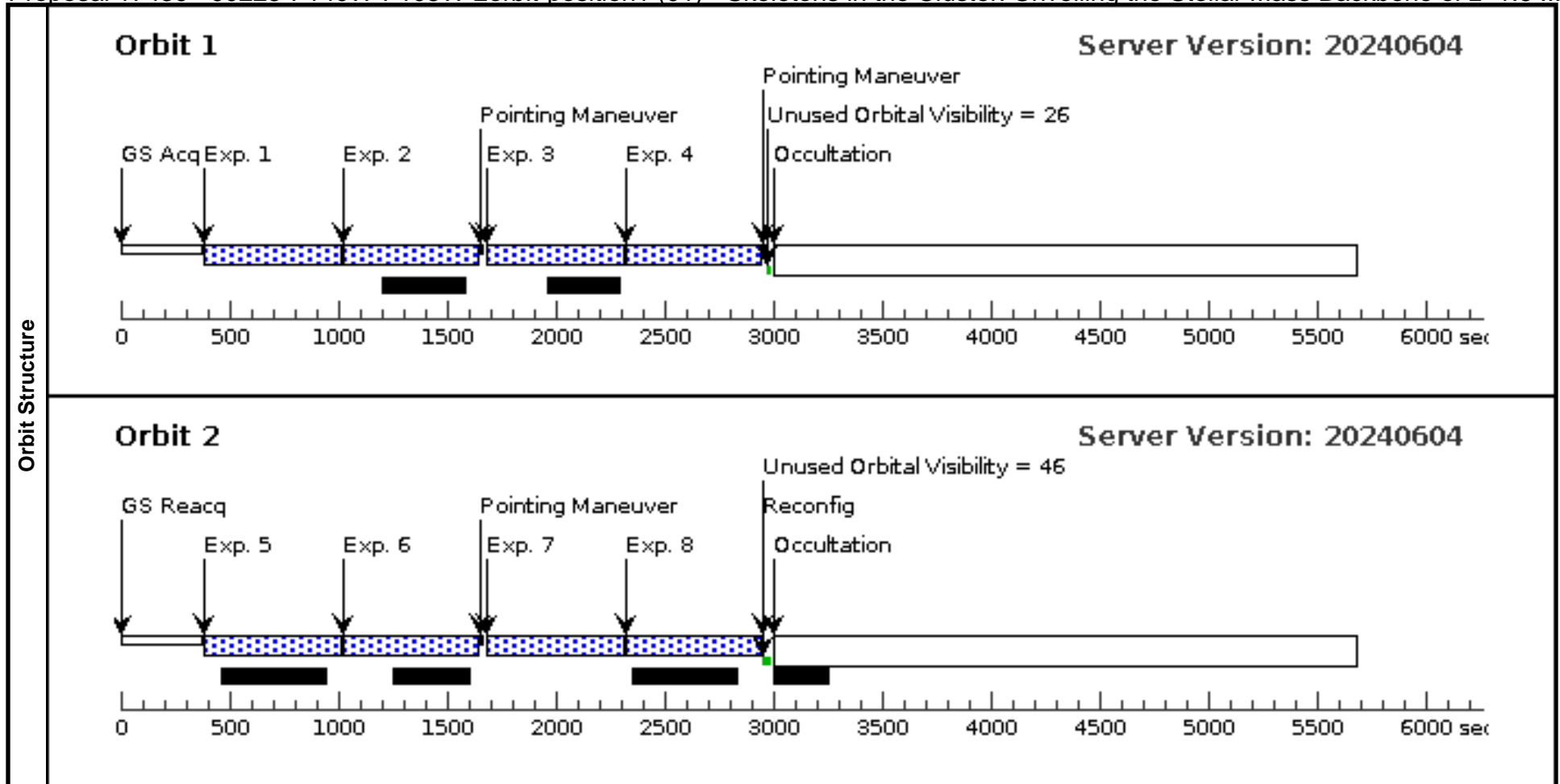
To further mitigate for blobs, which can be 10-15 pixels in size, we apply shifts of +/-1.5 arcseconds in x and y to the starting position of the dither pattern for F105W and F140W filters, which have multiple orbits over several visits. This is again done through POS-TARG offsets, with the subsequent dither positions following the same overall pattern as above, calibrated to the new starting point. No attempt is made to dither over the "Death Star", as large dithers introduce large differential distortion.

Proposal 17439 - J0225-F140W-F105W-2orbit-position1 (01) - Skeletons in the Cluster: Unveiling the Stellar Mass Backbone of z=1.6 ...

<b>Visit</b>	<b>Proposal 17439, J0225-F140W-F105W-2orbit-position1 (01), implementation</b> <span style="float: right;">Tue Jun 11 22:01:04 GMT 2024</span>					
	<b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: (none) <i>Comments: 1 orbit in F140W and 1 orbit in F105W, each with 4-point dither pattern                  -2 exposures of F105W are in the middle of each orbit, with F140W at start and end of orbit to mitigate airglow issues with F105W</i>					
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(1)	SPARCS-J0225	RA: 02 25 46.1080 (36.4421167d) Dec: -03 55 29.47 (-3.92485d) Equinox: J2000		V=24+/-2 K = 22	Reference Frame: ICRS
<i>Comments:</i> Category=CLUSTER OF GALAXIES Description=[HIGH REDSHIFT CLUSTER]						

Proposal 17439 - J0225-F140W-F105W-2orbit-position1 (01) - Skeletons in the Cluster: Unveiling the Stellar Mass Backbone of  $z=1.6$  ...

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	F140W dither 1	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F140W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 0,0		602.937703 Secs (602.938 Secs) [==>]	[1]	
	<i>Comments: dither position 1 pos targ: 0",0" (0, 0 pixels)</i>										
	2	F105W dither 1	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 0,0		602.937703 Secs (602.938 Secs) [==>]	[1]	
	<i>Comments: dither position 1 pos targ: 0",0" (0, 0 pixels)</i>										
	3	F105W dither 2	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 1.36,0.428		602.937703 Secs (602.938 Secs) [==>]	[1]	
	<i>Comments: dither position 2 pos targ: 1.36", 0.428" (10, 3.5 pixels)</i>										
	4	F140W dither 2	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F140W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 1.36,0.428		602.937703 Secs (602.938 Secs) [==>]	[1]	
	<i>Comments: dither position 2 pos targ: 1.36", 0.428" (10, 3.5 pixels)</i>										
5	F140W dither 3	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F140W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 0.884,1.216		602.937703 Secs (602.938 Secs) [==>]	[2]		
<i>Comments: dither position 3 pos targ: 0.884", 1.216" (6.5, 10 pixels)</i>											
6	F105W dither 3	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 0.884,1.216		602.937703 Secs (602.938 Secs) [==>]	[2]		
<i>Comments: dither position 3 pos targ: 0.884", 1.216" (6.5, 10 pixels)</i>											
7	F105W dither 4	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG -0.476,0.788		602.937703 Secs (602.938 Secs) [==>]	[2]		
<i>Comments: dither position 4 pos targ: -0.476",0.788" (-3.5, 6.5 pixels)</i>											
8	F140W dither 4	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F140W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG -0.476,0.788		602.937703 Secs (602.938 Secs) [==>]	[2]		
<i>Comments: dither position 4 pos targ: -0.476",0.788" (-3.5, 6.5 pixels)</i>											

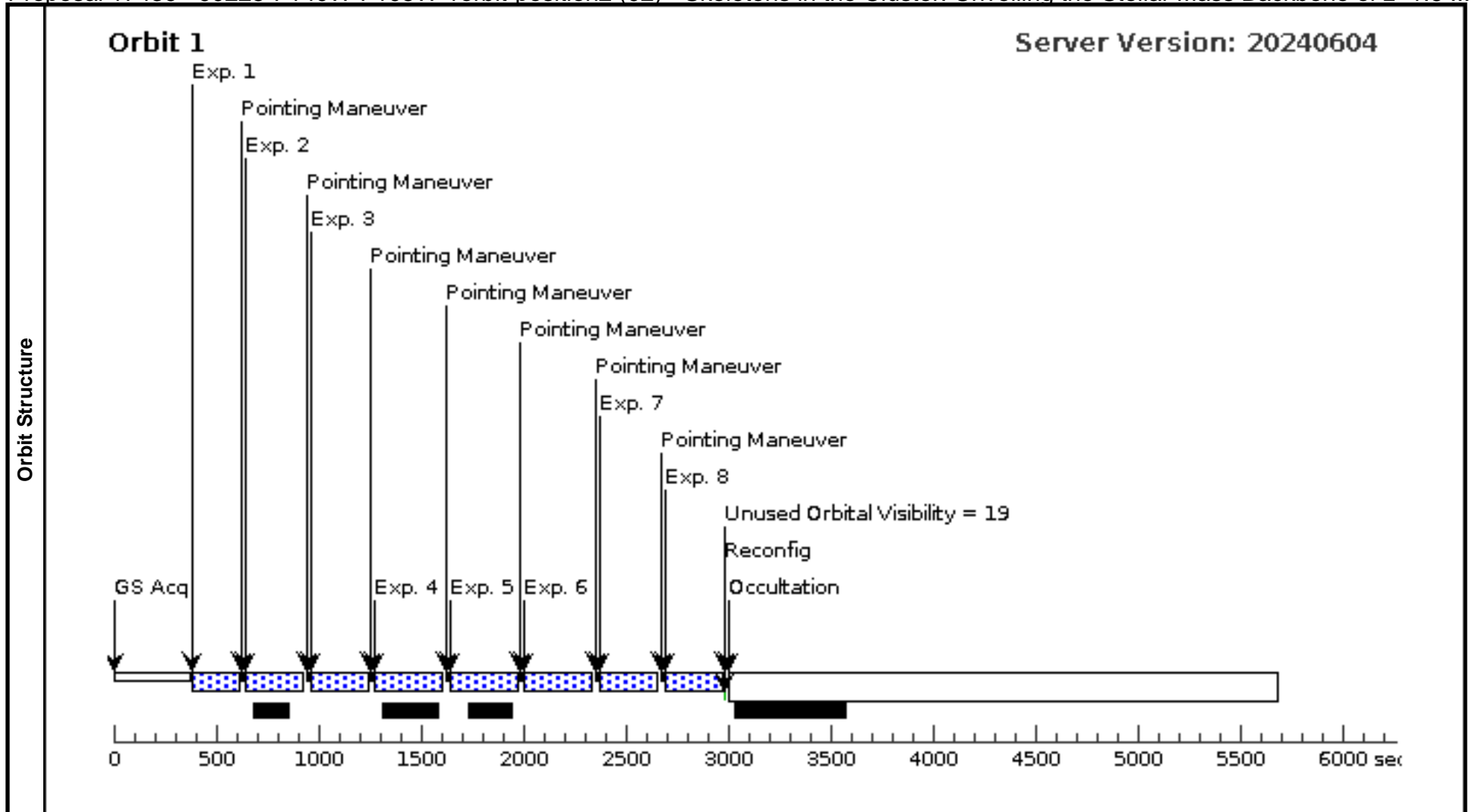


Proposal 17439 - J0225-F140W-F105W-1orbit-position2 (02) - Skeletons in the Cluster: Unveiling the Stellar Mass Backbone of z=1.6 ...

<b>Visit</b>	<b>Proposal 17439, J0225-F140W-F105W-1orbit-position2 (02), implementation</b> <span style="float: right;">Tue Jun 11 22:01:04 GMT 2024</span>					
	<b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/IR Special Requirements: (none) <i>Comments: 0.5 orbit in F140W and 0.5 orbit in F105W, each with 4-point dither pattern                  -4 exposures of F105W are in the middle of orbit, with 2 F140W exposures at the start and end of orbit to mitigate airglow issues with F105W                  -starting position has been offset by -1.5", 1.5", with same dither pattern</i>					
<b>Diagnostics</b>	(J0225-F140W-F105W-1orbit-position2 (02)) Warning (Orbit Planner): EXPOSURE CANNOT BE ADJUSTED					
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(1)	SPARCS-J0225	RA: 02 25 46.1080 (36.4421167d) Dec: -03 55 29.47 (-3.92485d) Equinox: J2000		V=24+/-2 K = 22	Reference Frame: ICRS
<i>Comments:                  Category=CLUSTER OF GALAXIES                  Description=[HIGH REDSHIFT CLUSTER]</i>						

Proposal 17439 - J0225-F140W-F105W-1orbit-position2 (02) - Skeletons in the Cluster: Unveiling the Stellar Mass Backbone of z=1.6 ...

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	F140W dither 1	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F140W	SAMP-SEQ=SPARS 50; NSAMP=5	POS TARG -1.5,1.5; MAX DUR 243.0 S		202.934095 Secs (202.934 Secs) [==>]	[1]	
	<i>Comments: dither position 1 pos targ: -1.5", 1.5" (-11.0, 12.4 pixels)</i>										
	2	F140W dither 2	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F140W	SAMP-SEQ=SPARS 50; NSAMP=6	POS TARG -0.14,1. 928		252.934546 Secs (252.935 Secs) [==>]	[1]	
	<i>Comments: dither position 2 pos targ:-0.14",1.928" (-1.0, 15.9 pixels)</i>										
	3	F105W dither 1	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=6	POS TARG -1.5,1.5		252.934546 Secs (252.935 Secs) [==>]	[1]	
	<i>Comments: dither position 1 pos targ: -1.5", 1.5" (-11.0, 12.4 pixels)</i>										
	4	F105W dither 2	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=7	POS TARG -0.14,1. 928		302.934997 Secs (302.935 Secs) [==>]	[1]	
	<i>Comments: dither position 2 pos targ:-0.14",1.928" (-1.0, 15.9 pixels)</i>										
5	F105W dither 3	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=7	POS TARG -0.616,2 .716		302.934997 Secs (302.935 Secs) [==>]	[1]		
<i>Comments: dither position 3 pos targ: -0.616", 2.716" (-4.5, 22.4 pixels)</i>											
6	F105W dither 4	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=7	POS TARG -1.976,2 .288		302.934997 Secs (302.935 Secs) [==>]	[1]		
<i>Comments: dither position 4 pos targ: -1.976", 2.288" (-14.5, 18.9 pixels)</i>											
7	F140W dither 3	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F140W	SAMP-SEQ=SPARS 50; NSAMP=6	POS TARG -0.616,2 .716		252.934546 Secs (252.935 Secs) [==>]	[1]		
<i>Comments: dither position 3 pos targ: -0.616", 2.716" (-4.5, 22.4 pixels)</i>											
8	F140W dither 4	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F140W	SAMP-SEQ=SPARS 50; NSAMP=6	POS TARG -1.976,2 .288		252.934546 Secs (252.935 Secs) [==>]	[1]		
<i>Comments: dither position 4 pos targ: -1.976", 2.288" (-14.5, 18.9 pixels)</i>											

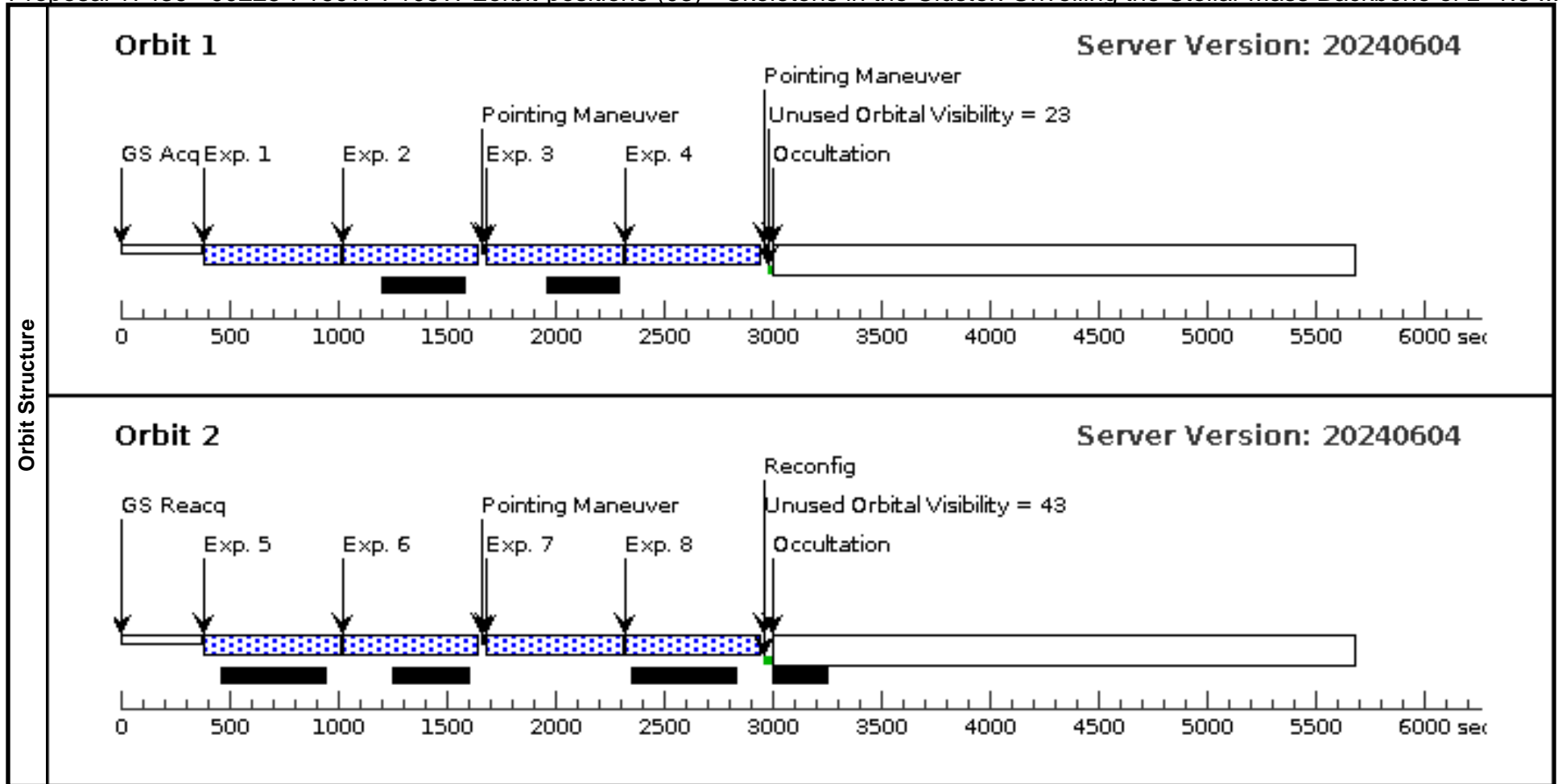


Proposal 17439 - J0225-F160W-F105W-2orbit-position3 (03) - Skeletons in the Cluster: Unveiling the Stellar Mass Backbone of z=1.6 ...

<b>Visit</b>	<p><b>Proposal 17439, J0225-F160W-F105W-2orbit-position3 (03), implementation</b> <span style="float: right;">Tue Jun 11 22:01:04 GMT 2024</span></p> <p><b>Diagnostic Status: No Diagnostics</b></p> <p>Scientific Instruments: WFC3/IR</p> <p>Special Requirements: (none)</p> <p><i>Comments: 1 orbit in F160W and 1 orbit in F105W, each with 4-point dither pattern</i></p> <p><i>-2 exposures of F105W are in the middle of each orbit, with F160W at start and end of orbit to mitigate airglow issues with F105W</i></p> <p><i>-starting position has been offset by -1.5", -1.5", with same dither pattern</i></p>																
	<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>SPARCS-J0225</td> <td>RA: 02 25 46.1080 (36.4421167d) Dec: -03 55 29.47 (-3.92485d) Equinox: J2000</td> <td></td> <td>V=24+/-2 K = 22</td> <td>Reference Frame: ICRS</td> </tr> </tbody> </table> <p><i>Comments:</i></p> <p><i>Category=CLUSTER OF GALAXIES</i></p> <p><i>Description=[HIGH REDSHIFT CLUSTER]</i></p>					#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	SPARCS-J0225	RA: 02 25 46.1080 (36.4421167d) Dec: -03 55 29.47 (-3.92485d) Equinox: J2000		V=24+/-2 K = 22
#		Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous											
(1)	SPARCS-J0225	RA: 02 25 46.1080 (36.4421167d) Dec: -03 55 29.47 (-3.92485d) Equinox: J2000		V=24+/-2 K = 22	Reference Frame: ICRS												

Proposal 17439 - J0225-F160W-F105W-2orbit-position3 (03) - Skeletons in the Cluster: Unveiling the Stellar Mass Backbone of  $z=1.6$  ...

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	F160W dither 1	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG -1.5,-1.5		602.937703 Secs (602.938 Secs) [==>]	[1]	
	<i>Comments: dither position 1 pos targ: -1.5", -1.5" (-11.0,-12.3 pixels)</i>										
	2	F105W dither 1	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG -1.5,-1.5		602.937703 Secs (602.938 Secs) [==>]	[1]	
	<i>Comments: dither position 1 pos targ: -1.5", -1.5" (-11.0,-12.3 pixels)</i>										
	3	F105W dither 2	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG -0.14,-1.072		602.937703 Secs (602.938 Secs) [==>]	[1]	
	<i>Comments: dither position 2 pos targ: -0.14", -1.072" (-1, -8.8 pixels)</i>										
	4	F160W dither 2	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG -0.14,-1.072		602.937703 Secs (602.938 Secs) [==>]	[1]	
	<i>Comments: dither position 2 pos targ: -0.14", -1.072" (-1, -8.8 pixels)</i>										
5	F160W dither 3	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG -0.616,-0.284		602.937703 Secs (602.938 Secs) [==>]	[2]		
<i>Comments: dither position 3 pos targ: -0.616", -0.284" (-4.5, -2.3 pixels)</i>											
6	F105W dither 3	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG -0.616,-0.284		602.937703 Secs (602.938 Secs) [==>]	[2]		
<i>Comments: dither position 3 pos targ: -0.616", -0.284" (-4.5, -2.3 pixels)</i>											
7	F105W dither 4	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG -1.976,-0.712		602.937703 Secs (602.938 Secs) [==>]	[2]		
<i>Comments: dither position 4 pos targ: -1.976", 0.712" (-14.5, -5.8 pixels)</i>											
8	F160W dither 4	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG -1.976,-0.712		602.937703 Secs (602.938 Secs) [==>]	[2]		
<i>Comments: dither position 4 pos targ: -1.976", 0.712" (-14.5, -5.8 pixels)</i>											



Proposal 17439 - J0225-F105W-2orbit-positions4-5 (04) - Skeletons in the Cluster: Unveiling the Stellar Mass Backbone of z=1.6 Gala...

<b>Visit</b>	<p><b>Proposal 17439, J0225-F105W-2orbit-positions4-5 (04), implementation</b> <span style="float: right;">Tue Jun 11 22:01:04 GMT 2024</span></p> <p><b>Diagnostic Status: No Diagnostics</b></p> <p>Scientific Instruments: WFC3/IR</p> <p>Special Requirements: (none)</p> <p><i>Comments: two full orbits in F105W, over 4-point boxed dither pattern</i></p> <p><i>-pos4: starting position has been offset by 1.5", -1.5", with same dither pattern</i></p> <p><i>-pos5: starting position has been offset by 1.5", 1.5", with same dither pattern</i></p>																												
	<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>SPARCS-J0225</td> <td>RA: 02 25 46.1080 (36.4421167d)</td> <td></td> <td>V=24+/-2</td> <td>Reference Frame: ICRS</td> </tr> <tr> <td></td> <td></td> <td>Dec: -03 55 29.47 (-3.92485d)</td> <td></td> <td>K = 22</td> <td></td> </tr> <tr> <td></td> <td></td> <td>Equinox: J2000</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p><i>Comments:</i></p> <p><i>Category=CLUSTER OF GALAXIES</i></p> <p><i>Description=[HIGH REDSHIFT CLUSTER]</i></p>					#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	SPARCS-J0225	RA: 02 25 46.1080 (36.4421167d)		V=24+/-2	Reference Frame: ICRS			Dec: -03 55 29.47 (-3.92485d)		K = 22				Equinox: J2000		
#		Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous																							
(1)	SPARCS-J0225	RA: 02 25 46.1080 (36.4421167d)		V=24+/-2	Reference Frame: ICRS																								
		Dec: -03 55 29.47 (-3.92485d)		K = 22																									
		Equinox: J2000																											

Proposal 17439 - J0225-F105W-2orbit-positions4-5 (04) - Skeletons in the Cluster: Unveiling the Stellar Mass Backbone of z=1.6 Gala...

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	F105W dither 1, pos4	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=12	POS TARG 1.5,-1.5			552.937252 Secs (552.937 Secs) [==>]	[1]
	<i>Comments: dither position 1 pos targ: 1.5", -1.5" (11.0, -12.4 pixels)</i>										
	2	F105W dither 2, pos4	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 2.86,-1.072			602.937703 Secs (602.938 Secs) [==>]	[1]
	<i>Comments: dither position 2 pos targ: 2.86", -1.072" (21.0, -8.9 pixels)</i>										
	3	F105W dither 3, pos4	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 2.384,-0.284			602.937703 Secs (602.938 Secs) [==>]	[1]
	<i>Comments: dither position 3 pos targ: 2.384", -0.284" (17.5, -2.4 pixels)</i>										
	4	F105W dither 4, pos4	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 1.024,-0.712			602.937703 Secs (602.938 Secs) [==>]	[1]
	<i>Comments: dither position 4 pos targ: 1.024", -0.712" (7.5, -5.9 pixels)</i>										
5	F105W dither 1, pos5	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=12	POS TARG 1.5,1.5			552.937252 Secs (552.937 Secs) [==>]	[2]	
<i>Comments: dither position 1 pos targ: 1.5", 1.5" (11.0, 12.3 pixels)</i>											
6	F105W dither 2, pos5	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 2.86,1.928			602.937703 Secs (602.938 Secs) [==>]	[2]	
<i>Comments: dither position 2 pos targ: 2.86", 1.928" (21.0, 15.8 pixels)</i>											
7	F105W dither 3, pos5	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 2.384,2.716			602.937703 Secs (602.938 Secs) [==>]	[2]	
<i>Comments: dither position 3 pos targ: 2.384", 2.716" (17.5, 22.3 pixels)</i>											
8	F105W dither 4, pos5	(1) SPARCS-J0225	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=13	POS TARG 1.024,2.288			602.937703 Secs (602.938 Secs) [==>]	[2]	
<i>Comments: dither position 4 pos targ: 1.024", 2.288" (7.5, 18.8 pixels)</i>											

