



17311 - Resolving Star Formation At the Star Cluster Scale Down to ~30 pc at $z=2.5$

Cycle: 30, 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) SGASJ1110+6459	WFC3/UVIS	1	28-Jun-2024 15:00:32.0	yes
02	(1) SGASJ1110+6459	WFC3/UVIS	1	28-Jun-2024 15:00:32.0	yes

<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>
03	(1) SGASJ1110+6459	WFC3/UVIS	1	28-Jun-2024 15:00:33.0	yes
04	(1) SGASJ1110+6459	WFC3/UVIS	1	28-Jun-2024 15:00:33.0	yes
05	(1) SGASJ1110+6459	WFC3/UVIS	1	28-Jun-2024 15:00:33.0	yes

5 Total Orbits Used

ABSTRACT

Understanding the modes and physical scale of star-formation in the distant universe requires resolved studies of individual star-forming regions and their stellar populations. This is a proposal to use one of the most spectacular strongly lensed galaxies known to spatially resolve the properties of dozens of individual compact, star-forming clumps with physical sizes $\sim < 30$ pc at $z=2.5$. The fortuitous strong lensing configuration of the target system provides a truly unique opportunity to perform a spatially resolved census of the diffuse and clumpy star formation and ionized nebular gas in a lensed starburst galaxy at Cosmic Noon. We will obtain broadband NIRC*am* imaging and NIRS*pec* IFU spectroscopy to measure the stellar continuum from 0.13-1.3 microns, and nebular emission lines between 0.3-0.9 microns. Spectroscopy will inform spectral diagnostics of the nebular gas (ionization state, metallicity, dust extinction) and map the velocity structure of the galaxy. The spectroscopy and broadband SEDs will be used to jointly constrain the star formation histories and stellar populations of individual clumps and diffuse star-formation across the galaxy. All of this will be done on spatially resolved scales down to $\sim < 30$ pc. These analyses will reveal whether the compact star forming regions are associated with the larger galaxy structure, or if they have different phase space and chemical properties that identify them as proto- or newly formed young globular clusters. This program will unpack the diversity of star-forming structures and star formation histories, including any "pure" single-burst star-forming regions, within a starburst galaxy at $z=2.5$.

OBSERVING DESCRIPTION

This is a joint HST program to obtain UVIS F555W imaging of a strongly lensed galaxy. The total depth is 5 orbits, split into 5 individual single-orbit visits. Each of these visits is to be separated by at least 1 month to produce a dataset to test for variability within the strongly lensed galaxy.

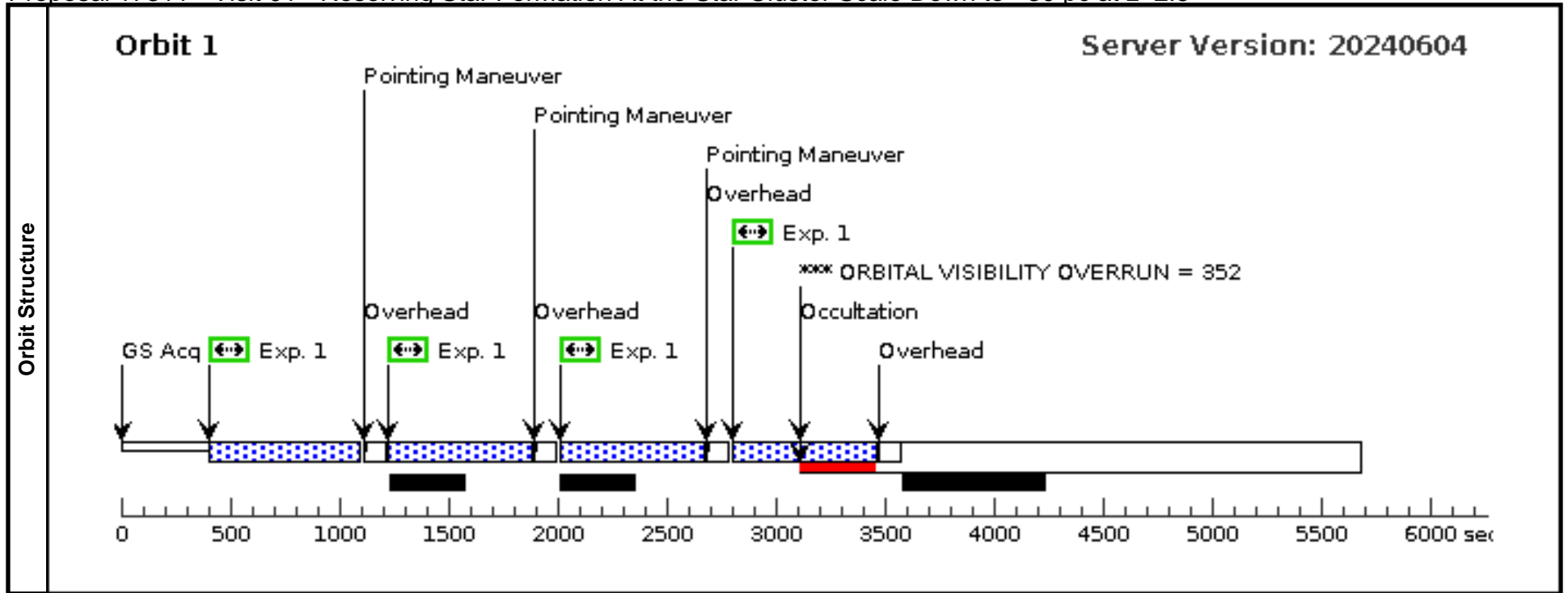
The joint JWST proposal requests NIRS*pec* IFU spectroscopy and NIRC*am* imaging of a strongly lensed galaxy containing 26 resolved star-forming clumps with physical sizes of ~ 30 -60 pc. The proposed observations (in combination with archival HST imaging) are designed to measure spatially resolved H-alpha nebular emission and broadband spectral energy distributions spanning 0.12-1.3 microns rest-frame. Nebular lines will inform spatially resolved diagnostics of the ionized gas, including the Balmer Decrement, N2/Ha and R23 metallicity proxies, and O3/O2 and O3/Hb ionization parameter measurements. The H-alpha emission line will also be measured with velocity precisions of < 30 km/s, informing a high quality

Proposal 17311 (STScI Edit Number: 3, Created: Friday, June 28, 2024 at 2:00:34 PM Eastern Standard Time) - Overview
velocity map across the entire galaxy, including peculiar velocities of the dozens of individual compact star forming regions.

Proposal 17311 - Visit 01 - Resolving Star Formation At the Star Cluster Scale Down to ~30 pc at z=2.5

Fri Jun 28 19:00:34 GMT 2024

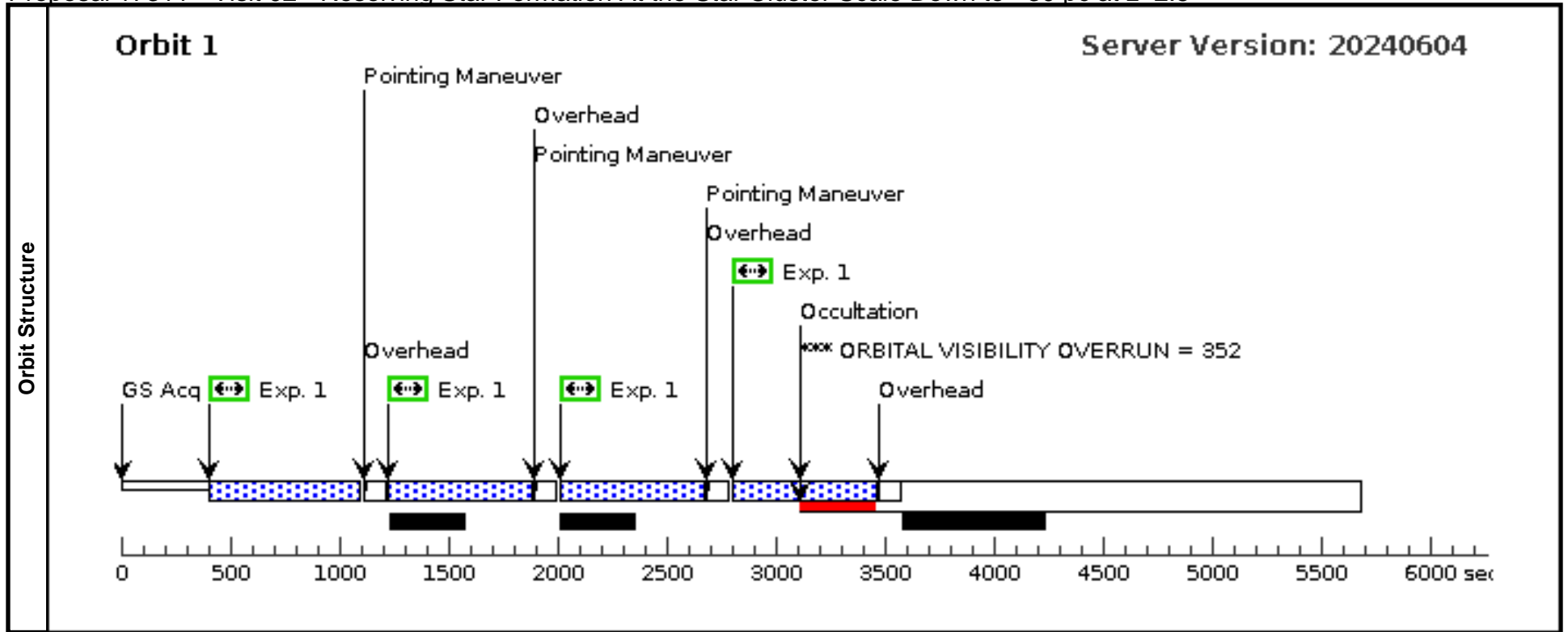
Visit	Proposal 17311, Visit 01, completed Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: (none)									
	(Visit 01) Warning (Orbit Planner): GS ACQ SCENARIO REQUESTED INCONSISTENT WITH VISIT GYRO MODE (Visit 01) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (Exposure 1 (Pattern 2, Exps 1-1 in Visit 01) special requirements) Warning (Form): The specified GS Acq Scenario is not in the current list of valid scenarios.									
Diagnosics										
Patterns	#	Primary Pattern	Secondary Pattern	Exposures						
	(2)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112 Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SGASJ1110+6459 Alt Name1: SDSSJ1110+6459	RA: 11 10 19.8996 (167.5829150d) Dec: +64 59 51.85 (64.99774d) Equinox: J2000	Epoch of Position: 2000	V=27.7+/-0.1	Reference Frame: ICRS				
Comments: Category=GALAXY Description=[GRAVITATIONAL LENS, HIGH REDSHIFT GALAXY, STAR FORMING REGION]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) SGASJ1110+6459 9	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F555W		GS ACQ SCENARI O BASE1BE	Pattern 2, Exps 1-1 i n Visit 01 (2)	640 Secs (2636 Secs) [=>659.0 Secs (Pattern 1)] [=>659.0 Secs (Pattern 2)] [=>659.0 Secs (Pattern 3)] [=>659.0 Secs (Pattern 4)]	[1]



Proposal 17311 - Visit 02 - Resolving Star Formation At the Star Cluster Scale Down to ~30 pc at z=2.5

Fri Jun 28 19:00:34 GMT 2024

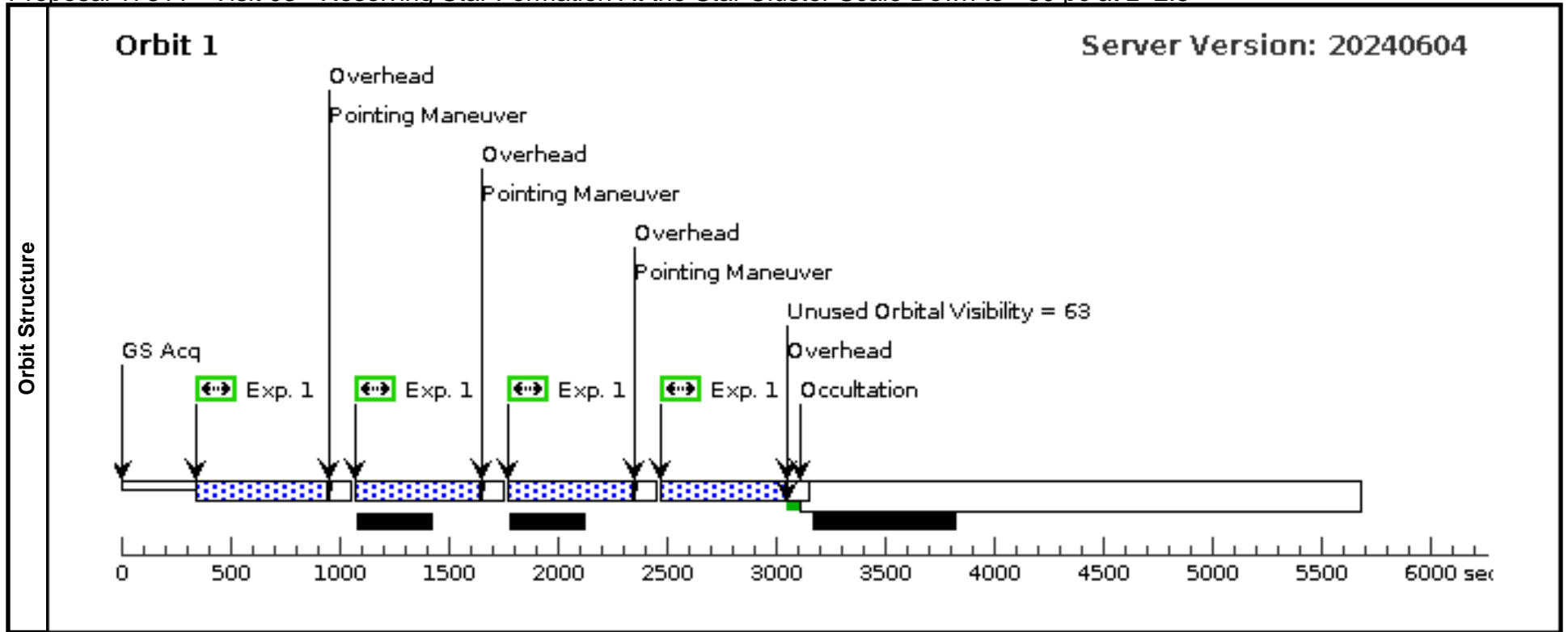
Visit	Proposal 17311, Visit 02, completed Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01 BY 30 D TO 90 D									
	(Visit 02) Warning (Orbit Planner): GS ACQ SCENARIO REQUESTED INCONSISTENT WITH VISIT GYRO MODE (Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (Exposure 1 (Pattern 2, Exps 1-1 in Visit 02) special requirements) Warning (Form): The specified GS Acq Scenario is not in the current list of valid scenarios.									
Diagnosics										
Patterns	#	Primary Pattern	Secondary Pattern	Exposures						
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Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SGASJ1110+6459 Alt Name1: SDSSJ1110+6459	RA: 11 10 19.8996 (167.5829150d) Dec: +64 59 51.85 (64.99774d) Equinox: J2000	Epoch of Position: 2000	V=27.7+/-0.1	Reference Frame: ICRS				
Comments: Category=GALAXY Description=[GRAVITATIONAL LENS, HIGH REDSHIFT GALAXY, STAR FORMING REGION]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) SGASJ1110+6459 9	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F555W		GS ACQ SCENARI O BASE1BE	Pattern 2, Exps 1-1 i n Visit 02 (2)	659 Secs (2636 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]



Proposal 17311 - Visit 03 - Resolving Star Formation At the Star Cluster Scale Down to ~30 pc at z=2.5

Fri Jun 28 19:00:34 GMT 2024

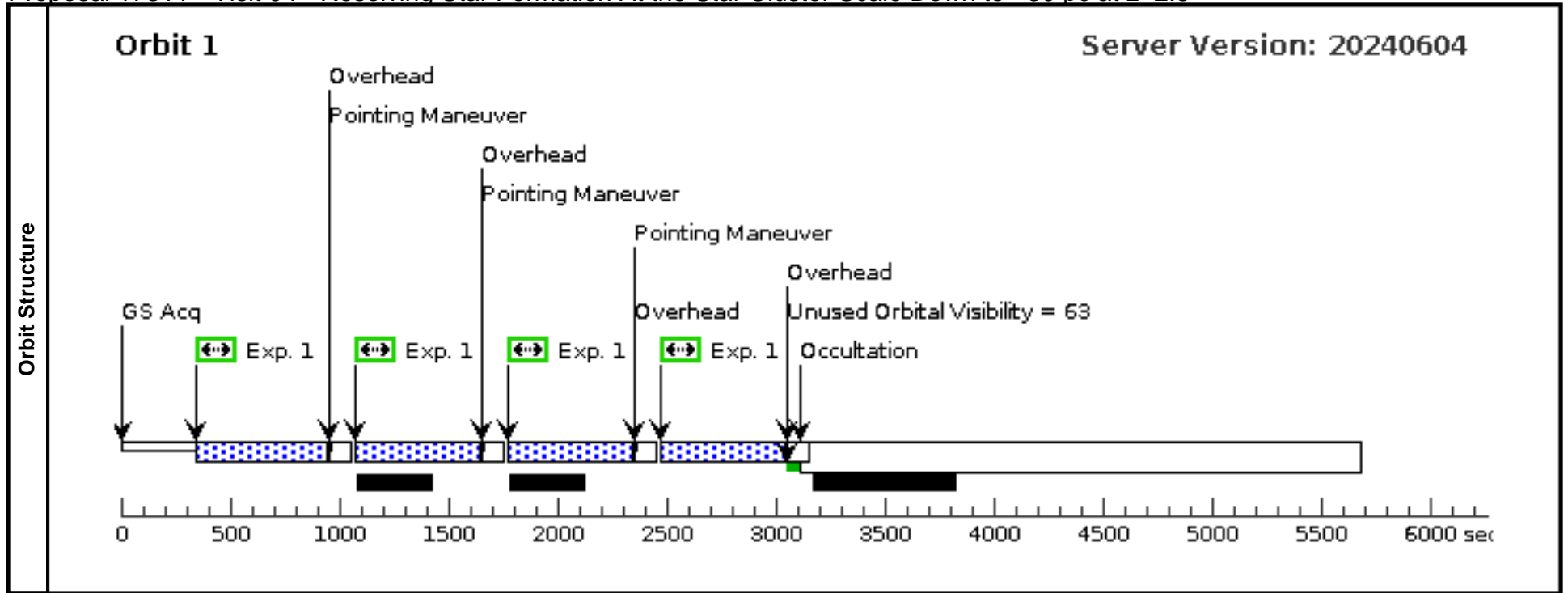
Visit	Proposal 17311, Visit 03, completed Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 02 BY 30 D TO 90 D									
	(Exposure 1 (Pattern 2, Exps 1-1 in Visit 03)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser									
Diagnosics										
Patterns	#	Primary Pattern	Secondary Pattern	Exposures						
	(2)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SGASJ1110+6459 Alt Name1: SDSSJ1110+6459	RA: 11 10 19.8996 (167.5829150d) Dec: +64 59 51.85 (64.99774d) Equinox: J2000	Epoch of Position: 2000	V=27.7+/-0.1	Reference Frame: ICRS				
Comments: Category=GALAXY Description=[GRAVITATIONAL LENS, HIGH REDSHIFT GALAXY, STAR FORMING REGION]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) SGASJ1110+6459 9	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F555W			Pattern 2, Exps 1-1 in Visit 03 (2)	659 Secs (2284 Secs) [=>571.0 Secs (Pattern 1)] [=>571.0 Secs (Pattern 2)] [=>571.0 Secs (Pattern 3)] [=>571.0 Secs (Pattern 4)]	[1]



Proposal 17311 - Visit 04 - Resolving Star Formation At the Star Cluster Scale Down to ~30 pc at z=2.5

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Visit	Proposal 17311, Visit 04, pi Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 03 BY 30 D TO 110 D									
	(Exposure 1 (Pattern 2, Exps 1-1 in Visit 04)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser									
Diagnosics										
Patterns	#	Primary Pattern	Secondary Pattern			Exposures				
	(2)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false				(1)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SGASJ1110+6459 Alt Name1: SDSSJ1110+6459	RA: 11 10 19.8996 (167.5829150d) Dec: +64 59 51.85 (64.99774d) Equinox: J2000	Epoch of Position: 2000	V=27.7+/-0.1	Reference Frame: ICRS				
Comments: Category=GALAXY Description=[GRAVITATIONAL LENS, HIGH REDSHIFT GALAXY, STAR FORMING REGION]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) SGASJ1110+6459 9	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F555W			Pattern 2, Exps 1-1 in Visit 04 (2)	659 Secs (2284 Secs) [=>571.0 Secs (Pattern 1)] [=>571.0 Secs (Pattern 2)] [=>571.0 Secs (Pattern 3)] [=>571.0 Secs (Pattern 4)]	[1]



Proposal 17311 - Visit 05 - Resolving Star Formation At the Star Cluster Scale Down to ~30 pc at z=2.5

Fri Jun 28 19:00:34 GMT 2024

Visit	Proposal 17311, Visit 05, pi Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 04 BY 30 D TO 90 D									
	(Exposure 1 (Pattern 2, Exps 1-1 in Visit 05)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser									
Diagnosics										
Patterns	#	Primary Pattern	Secondary Pattern			Exposures				
	(2)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false				(1)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SGASJ1110+6459 Alt Name1: SDSSJ1110+6459	RA: 11 10 19.8996 (167.5829150d) Dec: +64 59 51.85 (64.99774d) Equinox: J2000	Epoch of Position: 2000	V=27.7+/-0.1	Reference Frame: ICRS				
Comments: Category=GALAXY Description=[GRAVITATIONAL LENS, HIGH REDSHIFT GALAXY, STAR FORMING REGION]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) SGASJ1110+6459 9	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F555W			Pattern 2, Exps 1-1 in Visit 05 (2)	659 Secs (2284 Secs) [=>571.0 Secs (Pattern 1)] [=>571.0 Secs (Pattern 2)] [=>571.0 Secs (Pattern 3)] [=>571.0 Secs (Pattern 4)]	[1]

