



15315 - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

Cycle: 25, 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) SPT-CLJ2344-4243	ACS/WFC	2	13-Jun-2018 20:00:55.0	yes
02	(1) SPT-CLJ2344-4243	ACS/WFC	2	13-Jun-2018 20:00:56.0	yes
03	(1) SPT-CLJ2344-4243	ACS/WFC	2	13-Jun-2018 20:00:56.0	yes
04	(1) SPT-CLJ2344-4243	ACS/WFC	2	13-Jun-2018 20:00:57.0	yes
05	(1) SPT-CLJ2344-4243	ACS/WFC	2	13-Jun-2018 20:00:57.0	yes
06	(1) SPT-CLJ2344-4243	ACS/WFC	2	13-Jun-2018 20:00:58.0	yes
07	(1) SPT-CLJ2344-4243	ACS/WFC	1	13-Jun-2018 20:00:59.0	yes
57	(1) SPT-CLJ2344-4243	ACS/WFC	1	13-Jun-2018 20:01:00.0	yes
58	(1) SPT-CLJ2344-4243	ACS/WFC	1	13-Jun-2018 20:01:00.0	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>
59	(1) SPT-CLJ2344-4243	ACS/WFC	1	13-Jun-2018 20:01:01.0	yes
60	(1) SPT-CLJ2344-4243	ACS/WFC	1	13-Jun-2018 20:01:01.0	yes
61	(1) SPT-CLJ2344-4243	ACS/WFC	1	13-Jun-2018 20:01:02.0	yes
62	(1) SPT-CLJ2344-4243	ACS/WFC	1	13-Jun-2018 20:01:02.0	yes

19 Total Orbits Used

ABSTRACT

The Phoenix cluster is the most relaxed cluster known, and hosts the strongest cool core of any cluster yet discovered. At the center of this cluster is a massive starburst galaxy, with a SFR of 500-1000 Msun/yr, seemingly satisfying the early cooling flow predictions, despite the presence of strong AGN feedback from the central supermassive black hole. Here we propose deep narrow-band imaging of the central ~ 120 kpc of the cluster, to map the warm (10^4 K) ionized gas via the [O II] emission line. In low- z clusters, such as Perseus and Abell 1795, the warm, ionized phase is of critical importance to map out thermal instabilities in the hot gas, and maps of H α and [O II] have been used for decades to understand how (and how not) cooling proceeds in the intracluster medium. The data proposed for here, combined with deep ALMA data, a recently-approved Large Chandra Program, and recently-approved multi-frequency JVLA data, will allow us to probe the cooling ICM, the cool, filamentary gas, the cold molecular gas, the star-forming population, and the AGN jets all on scales of < 10 kpc. This multi-observatory campaign, focusing on the most extreme cooling cluster, will lead to a more complete understanding of how and why thermal instabilities develop in the hot ICM of cool core clusters.

OBSERVING DESCRIPTION

Our goal is to obtain a deep, high-angular resolution map of [O II] $\lambda\lambda 3726, 3729$ in the Phoenix cluster over the full cool core area ($r_{cool} \sim 150$ kpc). This is possible using the ramp filters on ACS, which provide narrow-band filters over the range 3700-10700Å. At the redshift of the Phoenix cluster ($z = 0.597$), [O II] is at 5952Å the filter width is 119Å. The width of this filter means that we will (easily) obtain both lines in the [O II] doublet, while avoiding any other strong lines. While the H α line would be favorable due to the reduced extinction and better comparisons in the literature, we note that this line is redshifted to 1.05 μ m, where the decreased sensitivity (reduced signal) and larger PSF (increased noise in extraction area) leads to exposure times inflated by a factor of > 200 to achieve the same depth. We stress that intrinsic extinction at rest-frame 3727Å is not a major issue, given that our goal is not to understand the flux of the line, but rather the morphology of the line emitting gas and its correspondence to the cooling ICM, star forming clumps, and radio jets/bubbles. Given the inherent challenge in flux calibrating and flat fielding HST ramp filter data,

achieving a reliable flux map would be challenging even with perfect knowledge of the intrinsic extinction.

Our goal is to achieve similar depth to the narrow-band H α imaging of low- z clusters from McDonald et al. (2010), to allow a fair comparison. We use Abell 1795 as a test case, and require that we will be able to detect the full 50 kpc filament. Our spatial resolution for Abell 1795 was 0.70 kpc (0.6"x1.17"/kpc), which is comparable to the resolution of 0.67 kpc that we will achieve for Phoenix (0.1"x6.7"/kpc). We define two separate sensitivity limits: that we can detect filaments down to the same relative intensity in Phoenix, and that we can detect filaments over the full radial extent for which we see star formation in Phoenix. For the former requirement, we measure the faintest section of the filament in Abell 1795 to contain 0.08% of the total H α flux of the system in a single resolution element. Given that the total observed flux in [O II] is 1.7×10^{-14} ergs/s/cm 2 (McDonald et al. 2014), this leads to a limiting depth of 1.36×10^{-17} ergs/s/cm 2 per resolution element. Per the exposure time calculator (ACS.rf.929661), we can achieve this depth at the 10 σ level in 24,370s, or 8.1 orbits. Thus, if the distribution of cool gas in Phoenix is similar to that in Abell 1795 (with the former having overall more gas), we will achieve the same sensitivity as these low- z observations.

As a second requirement, we would like to detect [O II] along the full extent (>100 kpc) of the star-forming filaments shown in Figure 2. The faintest UV clumps in this filament have SFR ~ 0.3 Msun/yr, which we choose as our second sensitivity requirement. This corresponds to a limiting [O II] flux of 1.44×10^{-17} ergs/s/cm 2 . We note that neither the UV flux used to derive the limiting SFR or the [O II] flux are extinction corrected, which is fine - we want to achieve the same relative depth, and these are both measured at similar wavelengths (3000 \AA vs 3727 \AA). This limiting flux can be detected at the 10 σ level in 22,229s, or 7.4 orbits (ACS.rf.929680). Given this depth, we expect to, at the very minimum, detect [O II] everywhere there is rest-frame UV emission (Figure 2), and more realistically on larger scales, given that the warm gas is less clumpy than the young stars due to additional, more uniform, sources of ionization.

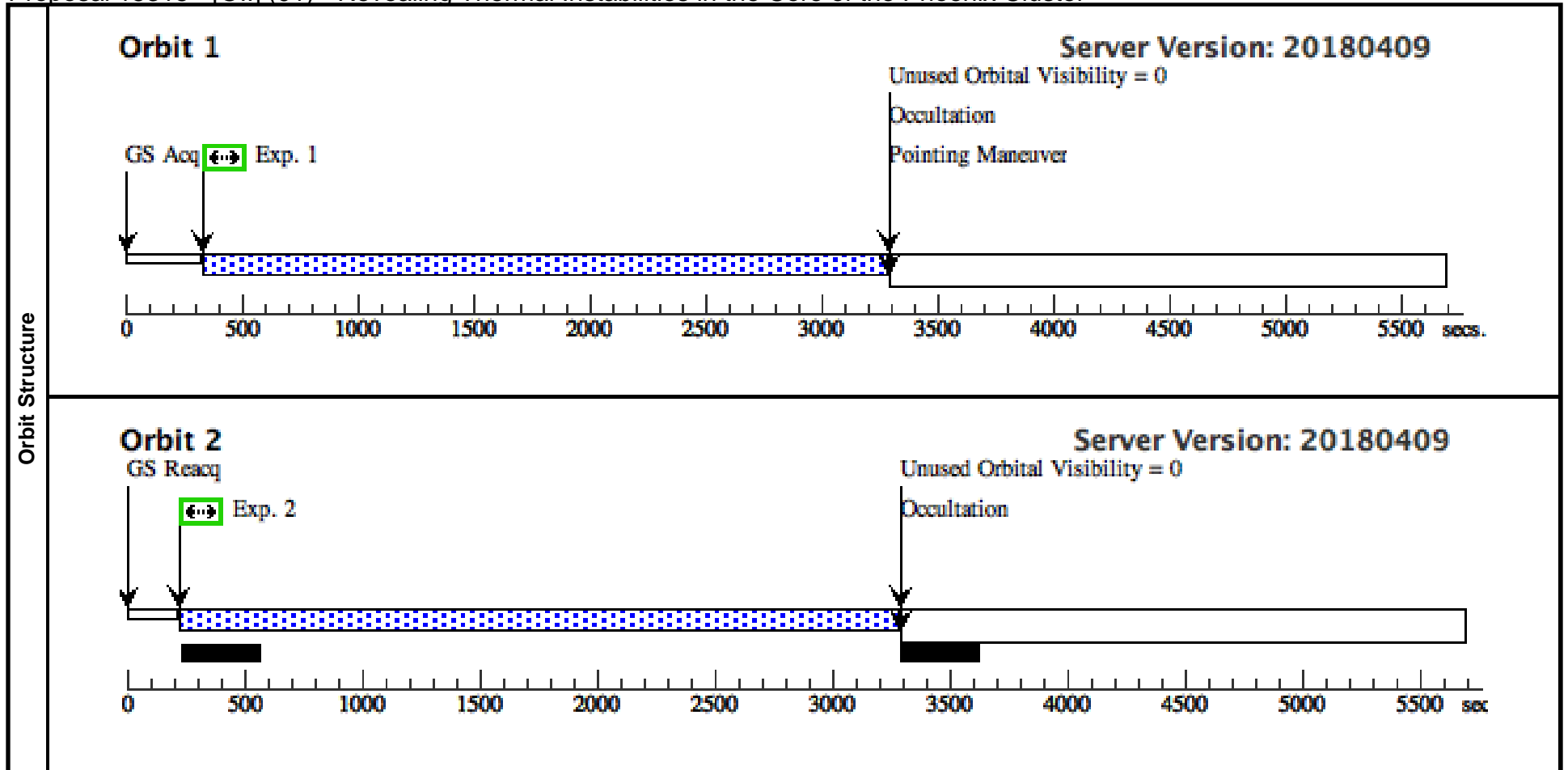
In addition, we require a series of broadband observations in order to subtract continuum emission, which will contribute significantly to the narrow bandpass. The data currently in hand from HST (Figure 2) is significantly affected by cosmic rays, due to overall very short, undithered exposures. Thus, we request two additional orbits each at F475W, F775W, and one at F850LP, which is significantly wider. The first two filters, which span 4031-5489 \AA and 7000-8528 \AA , bracket the narrow band (avoiding overlap) which is centered at 5952 \AA . We request the third redder filter in order to allow rough pixel-by-pixel SED fits using the superposition of an old and young population, allowing a more precise estimate of the continuum level at 5952 \AA . These broadband filters are a factor of ~ 10 x wider than the narrow-band filter, providing similar sensitivity to the continuum in a single orbit as we achieve over 8 exposures in the narrow band. Combining the two bands bracketing the [OII] line, we will have a factor of 5x deeper exposure in the continuum, compared to the narrow-band exposure. Without these deep continuum images, we would add significant amounts of noise during the continuum-subtraction procedure, reducing the effective depth of our narrow-band images.

In total, we request 13 orbits of HST ACS, of which 8 will be narrow-band observations with the ramp filter tuned to 5952A, and 5 orbits to constrain the continuum, allowing a deep continuum-free image of the [O II] emission line over the full cluster core.

Proposal 15315 - [OII] (01) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

Thu Jun 14 00:01:03 GMT 2018

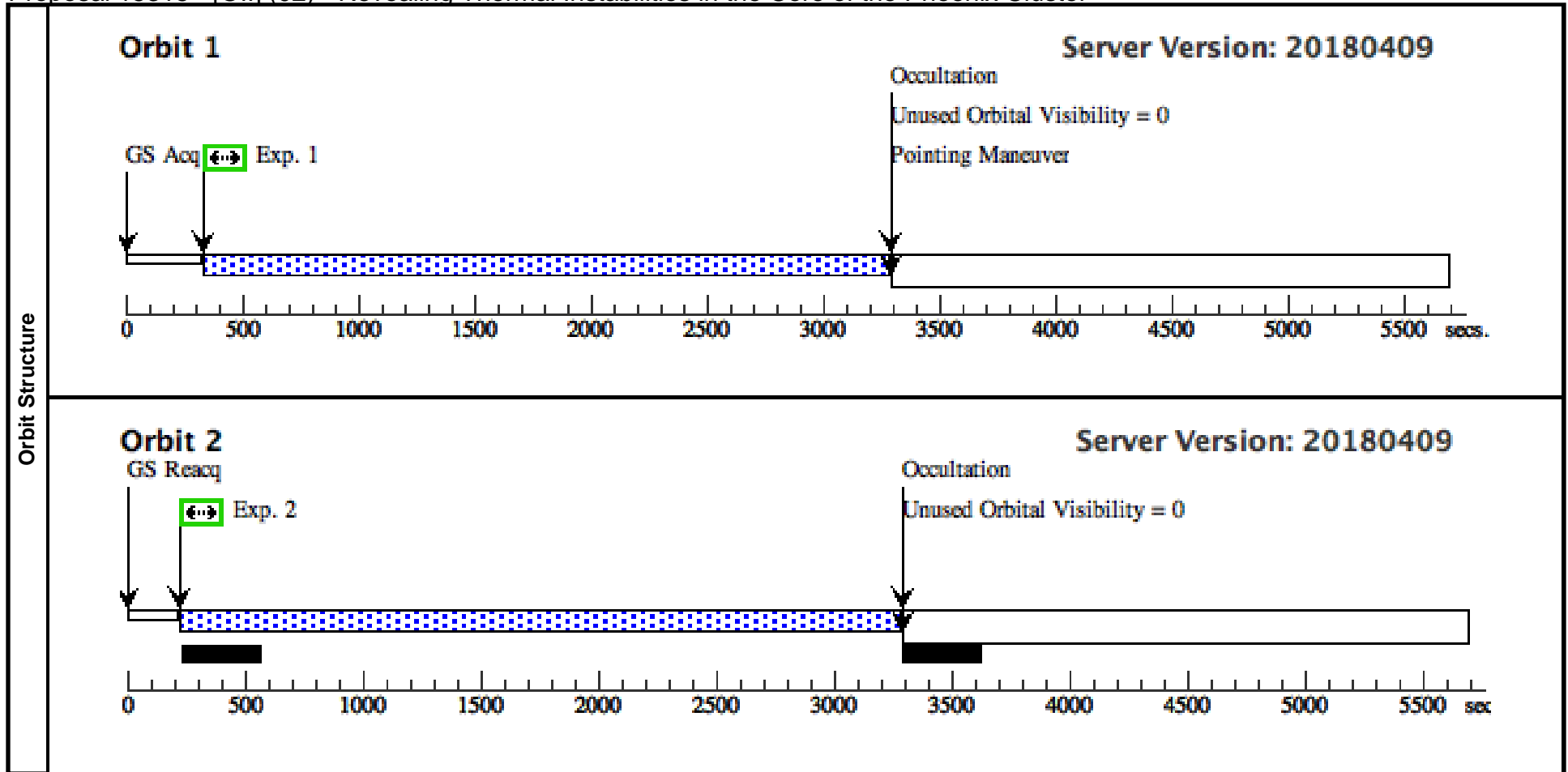
Visit	Proposal 15315, [OII] (01), completed Diagnostic Status: Warning Scientific Instruments: ACS/WFC Special Requirements: (none)										
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Diagnosics											
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(1)	SPT-CLJ2344-4243	RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000				V=18	Reference Frame: ICRS			
Comments: Category=GALAXY Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST] Extended=YES											
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(ACS.rf.929 661)	(1) SPT-CLJ2344-42 43	ACS/WFC, ACCUM, WFC2-ORAMP	FR601N 5952.0 A		POS TARG 0,0; GS ACQ SCENARI O BASE1B3		2500 Secs (2745 Secs) [=>2745.0 Secs]		[1]
	2	(ACS.rf.929 661)	(1) SPT-CLJ2344-42 43	ACS/WFC, ACCUM, WFC2-ORAMP	FR601N 5952.0 A		POS TARG 0.247,0. 094		2500 Secs (2938 Secs) [=>2938.0 Secs]		[2]



Proposal 15315 - [OII] (02) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

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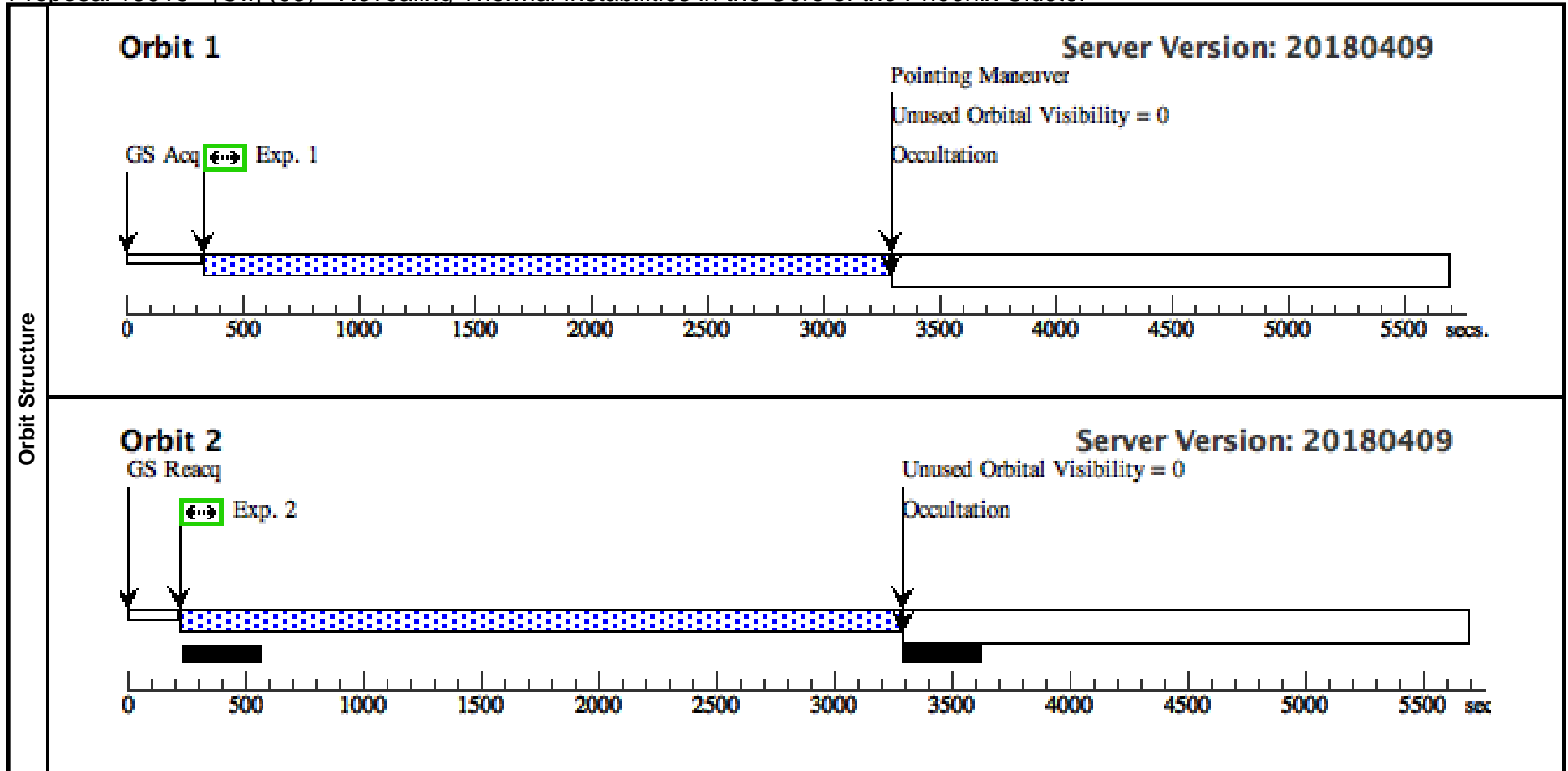
Visit	Proposal 15315, [OII] (02), completed Diagnostic Status: Warning Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01									
	(Exposure 1 ([OII] (02))) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp filters as central wavelengths & transmission efficiencies vary within the apertures. (Exposure 2 ([OII] (02))) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp filters as central wavelengths & transmission efficiencies vary within the apertures.									
Diagnosics										
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SPT-CLJ2344-4243	RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000		V=18	Reference Frame: ICRS				
<i>Comments:</i> Category=GALAXY Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST] Extended=YES										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(ACS.rf.929 661)	(1) SPT-CLJ2344-42 43	ACS/WFC, ACCUM, WFC2-ORAMP	FR601N 5952.0 A		POS TARG 0.124,0.232; GS ACQ SCENARI O BASE1B3		2500 Secs (2745 Secs) [=>2745.0 Secs]	[1]
2	(ACS.rf.929 661)	(1) SPT-CLJ2344-42 43	ACS/WFC, ACCUM, WFC2-ORAMP	FR601N 5952.0 A		POS TARG -0.124,0.138		2500 Secs (2938 Secs) [=>2938.0 Secs]	[2]	



Proposal 15315 - [OII] (03) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

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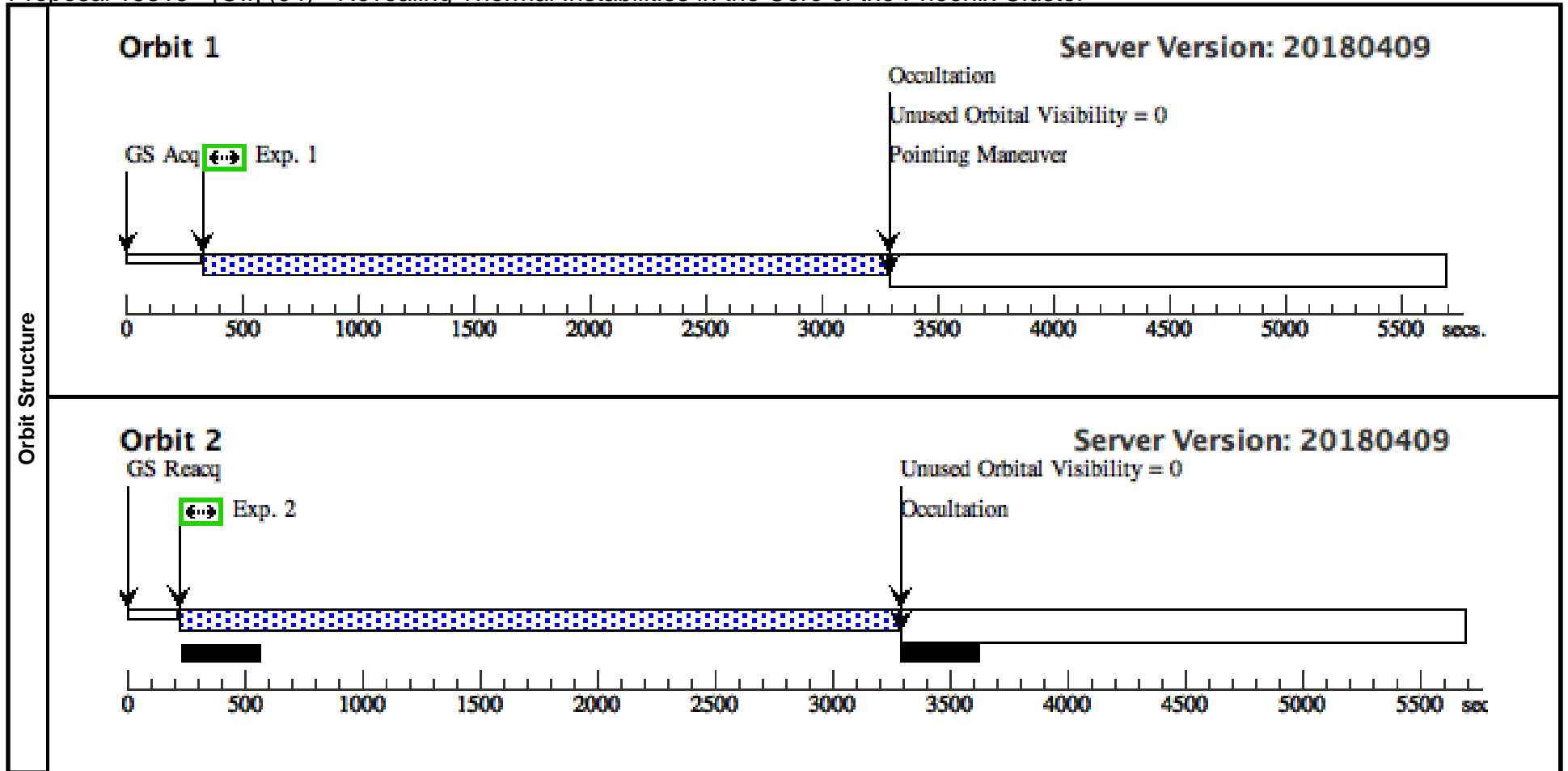
Visit	Proposal 15315, [OII] (03), completed Diagnostic Status: Warning Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01										
	(Exposure 1 ([OII] (03))) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp filters as central wavelengths & transmission efficiencies vary within the apertures. (Exposure 2 ([OII] (03))) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp filters as central wavelengths & transmission efficiencies vary within the apertures.										
Diagnosics											
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(1)	SPT-CLJ2344-4243	RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000				V=18	Reference Frame: ICRS			
Comments: Category=GALAXY Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST] Extended=YES											
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(ACS.rf.929 661)	(1) SPT-CLJ2344-42 43	ACS/WFC, ACCUM, WFC2-ORAMP	FR601N 5952.0 A		POS TARG -0.1,-0.2 06; GS ACQ SCENARI O BASE1B3		2500 Secs (2745 Secs) [=>2745.0 Secs]		[1]
	2	(ACS.rf.929 661)	(1) SPT-CLJ2344-42 43	ACS/WFC, ACCUM, WFC2-ORAMP	FR601N 5952.0 A		POS TARG 0.147,-0 .112		2500 Secs (2938 Secs) [=>2938.0 Secs]		[2]



Proposal 15315 - [OII] (04) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

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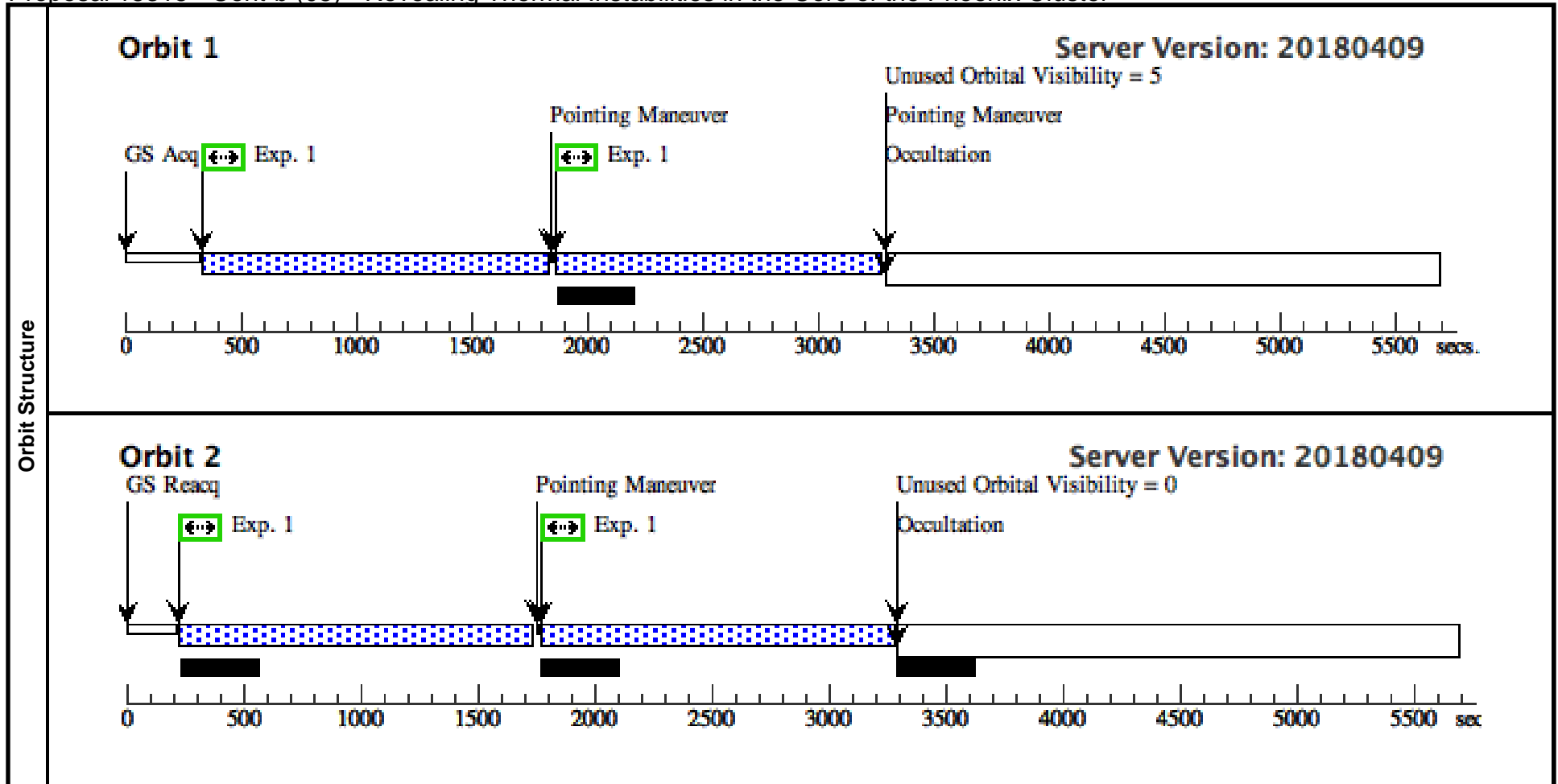
Visit	Proposal 15315, [OII] (04), completed Diagnostic Status: Warning Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01									
	(Exposure 1 ([OII] (04))) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp filters as central wavelengths & transmission efficiencies vary within the apertures. (Exposure 2 ([OII] (04))) Warning (Form): POS TARG & PATTERN should be used carefully with ACS ramp filters as central wavelengths & transmission efficiencies vary within the apertures.									
Diagnosics										
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SPT-CLJ2344-4243	RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000		V=18	Reference Frame: ICRS				
Comments: Category=GALAXY Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST] Extended=YES										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(ACS.rf.929 661)	(1) SPT-CLJ2344-42 43	ACS/WFC, ACCUM, WFC2-ORAMP	FR601N 5952.0 A		POS TARG 0.024,0.026; GS ACQ SCENARI O BASE1B3		2500 Secs (2745 Secs) [=>2745.0 Secs]	[1]
	2	(ACS.rf.929 661)	(1) SPT-CLJ2344-42 43	ACS/WFC, ACCUM, WFC2-ORAMP	FR601N 5952.0 A		POS TARG -0.224,-0.068		2500 Secs (2938 Secs) [=>2938.0 Secs]	[2]



Proposal 15315 - Cont-b (05) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

Thu Jun 14 00:01:03 GMT 2018

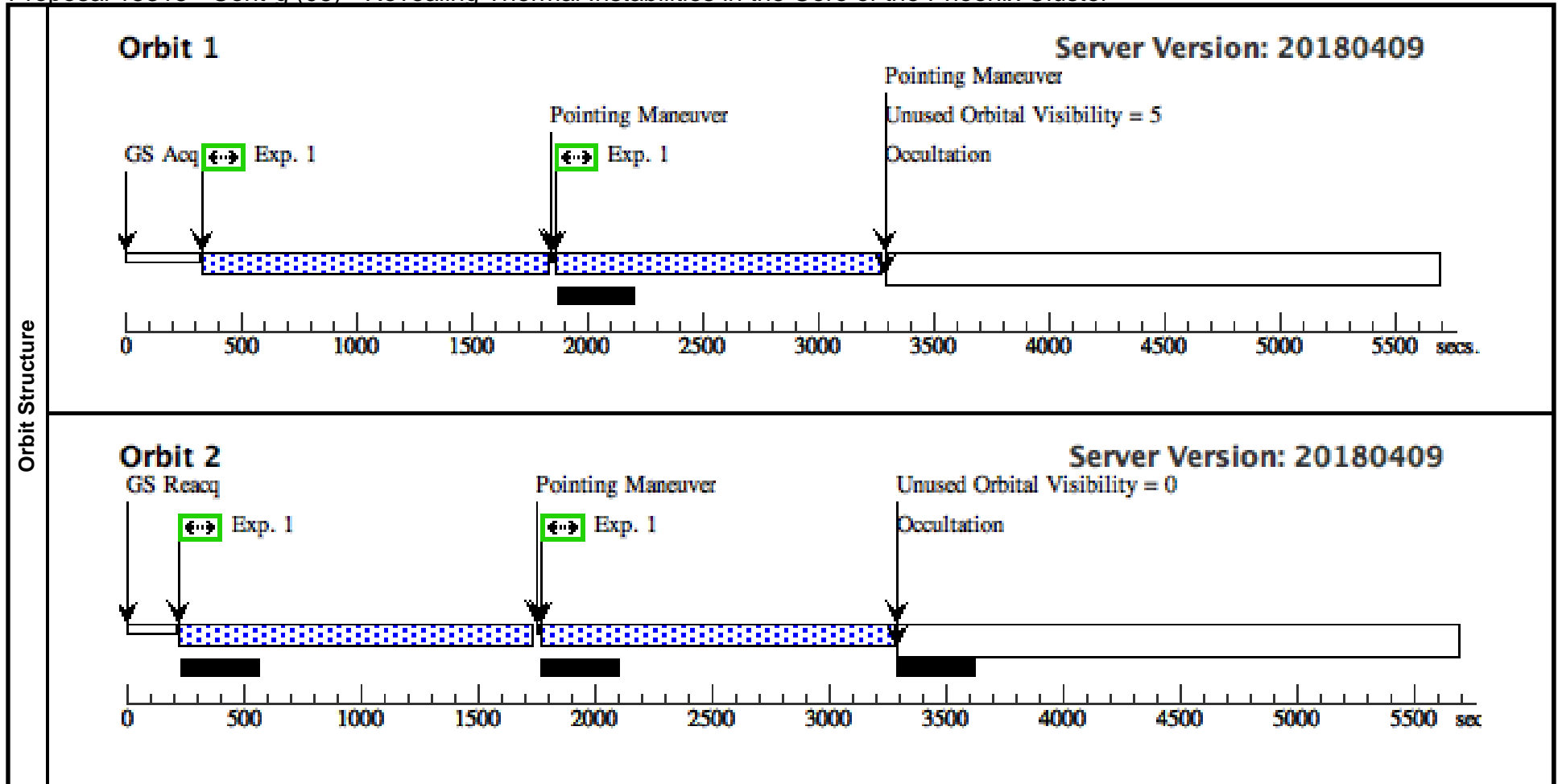
Visit	Proposal 15315, Cont-b (05), failed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01									
	Patterns	# (2)	Primary Pattern Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.262 Line Spacing=0.192	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 Center Pattern=false	Secondary Pattern	Exposures (1)				
Fixed Targets	# (1)	Name SPT-CLJ2344-4243	Target Coordinates RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000	Targ. Coord. Corrections	Fluxes V=18	Miscellaneous Reference Frame: ICRS				
Comments: Category=GALAXY Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST] Extended=YES										
Exposures	# 1	Label (1) SPT-CLJ2344-4243	Target ACS/WFC, ACCUM, WFC1	Config,Mode,Aperture F475W	Spectral Els.	Opt. Params. GS ACQ SCENARIO BASE1B3	Special Reqs. Pattern 2, Exps 1-1 in Cont-b (05) (2)	Groups	Exp. Time (Total)/[Actual Dur.] 1000 Secs (5362 Secs) [==>1291.0 Secs (Pattern 1)] [==>1291.0 Secs (Pattern 2)] [==>1390.0 Secs (Pattern 3)] [==>1390.0 Secs (Pattern 4)]	Orbit [1] [2]



Proposal 15315 - Cont-g (06) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

Thu Jun 14 00:01:03 GMT 2018

Visit	Proposal 15315, Cont-g (06), failed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(2)	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)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SPT-CLJ2344-4243	RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000		V=18	Reference Frame: ICRS				
	Comments: Category=GALAXY Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST] Extended=YES									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) SPT-CLJ2344-4243	(1) SPT-CLJ2344-4243	ACS/WFC, ACCUM, WFC1	F775W		GS ACQ SCENARIO BASE1B3	Pattern 2, Exps 1-1 in Cont-g (06) (2)	1000 Secs (5362 Secs)	
									[==>1291.0 Secs (Pattern 1)]	[1]
									[==>1291.0 Secs (Pattern 2)]	
								[==>1390.0 Secs (Pattern 3)]		
								[==>1390.0 Secs (Pattern 4)]	[2]	



Proposal 15315 - Cont-r (07) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

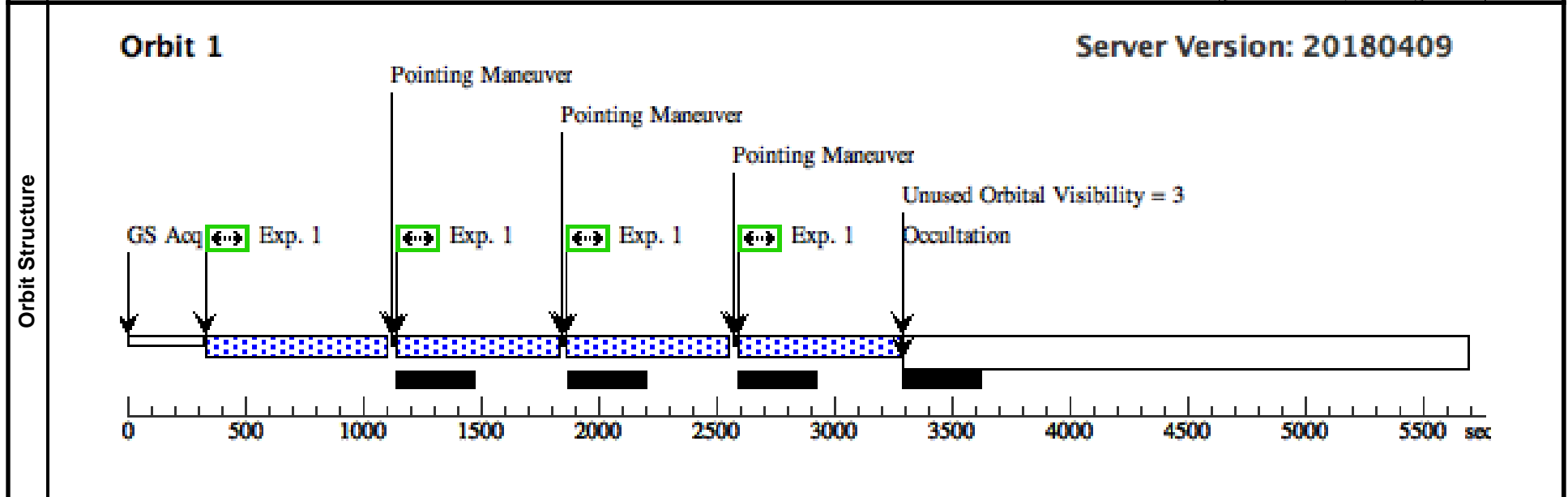
Thu Jun 14 00:01:03 GMT 2018

Visit	Proposal 15315, Cont-r (07), failed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01		

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(2)	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)

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	SPT-CLJ2344-4243	RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000		V=18	Reference Frame: ICRS
	<i>Comments:</i> Category=GALAXY Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST] Extended=YES					

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) SPT-CLJ2344-4243	(1) SPT-CLJ2344-4243	ACS/WFC, ACCUM, WFC1	F850LP		GS ACQ SCENARIO BASE1B3	Pattern 2, Exps 1-1 in Cont-r (07) (2)	500 Secs (2268 Secs)	
									[==>567.0 Secs (Pattern 1)] [==>567.0 Secs (Pattern 2)] [==>567.0 Secs (Pattern 3)] [==>567.0 Secs (Pattern 4)]	[1]



Proposal 15315 - Cont-r (57) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

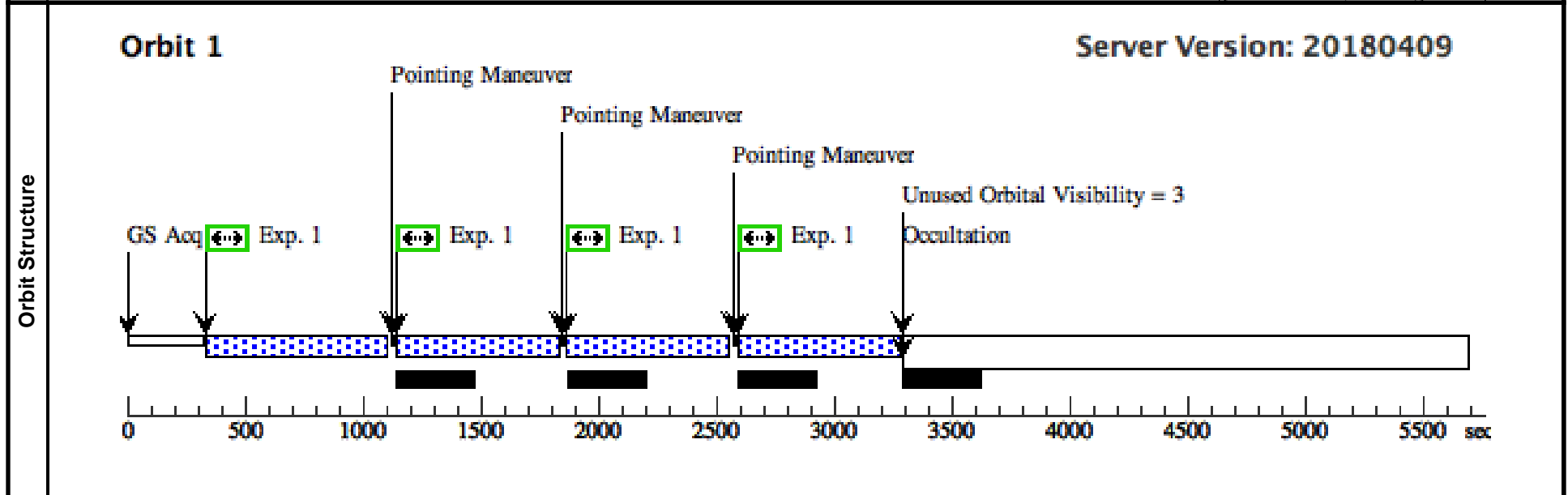
Thu Jun 14 00:01:03 GMT 2018

Visit	Proposal 15315, Cont-r (57), completed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01 <i>Comments: Repeat observation of failed visit 07.</i>		

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(2)	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)

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	SPT-CLJ2344-4243	RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000		V=18	Reference Frame: ICRS
	<i>Comments:</i> Category=GALAXY Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST] Extended=YES					

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) SPT-CLJ2344-4243	(1) SPT-CLJ2344-4243	ACS/WFC, ACCUM, WFC1	F850LP		GS ACQ SCENARIO BASE1B3	Pattern 2, Exps 1-1 in Cont-r (57) (2)	500 Secs (2268 Secs)	
									[==>567.0 Secs (Pattern 1)] [==>567.0 Secs (Pattern 2)] [==>567.0 Secs (Pattern 3)] [==>567.0 Secs (Pattern 4)]	[1]



Proposal 15315 - Cont-b (58) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

Thu Jun 14 00:01:03 GMT 2018

Visit	Proposal 15315, Cont-b (58), failed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01 <i>Comments: Re-observation of failed second orbit from visit 05.</i>					
	Patterns	# (3) Primary Pattern Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.262 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides= Center Pattern=false	Secondary Pattern	Exposures (1)	
Fixed Targets	# (1)	Name: SPT-CLJ2344-4243 Target Coordinates: RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000	Targ. Coord. Corrections	Fluxes: V=18	Miscellaneous: Reference Frame: ICRS	
Exposures	# 1	Label: (1) SPT-CLJ2344-4243 Target: ACS/WFC, ACCUM, WFC1	Config,Mode,Aperture: F475W Spectral Els.: POS TARG -0.121,0 .145; Opt. Params.: GS ACQ SCENARI O BASE1B3	Special Reqs.: Pattern 3, Exps 1-1 in Cont-b (58) (3)	Groups: 1230 Secs (2460 Secs) Exp. Time (Total)/[Actual Dur.] [==>(Pattern 1)] [==>(Pattern 2)]	Orbit: [1]
Orbit Structure	<p>Orbit 1 Server Version: 20180409</p> <p>The diagram shows a horizontal timeline from 0 to 5500 seconds. A blue checkered bar represents the observation period, starting at approximately 300 seconds and ending at 3200 seconds. Above the timeline, 'GS Acq' is marked at ~300s and 'Pointing Maneuver' at ~1800s. A green box with a target icon and 'Exp. 1' is shown above the observation period. Below the timeline, a green bar indicates 'Unused Orbital Visibility = 127' between 3200s and 3500s. The text 'Occultation' is also present above the timeline at ~3200s.</p>					

Proposal 15315 - Cont-b (59) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

Thu Jun 14 00:01:03 GMT 2018

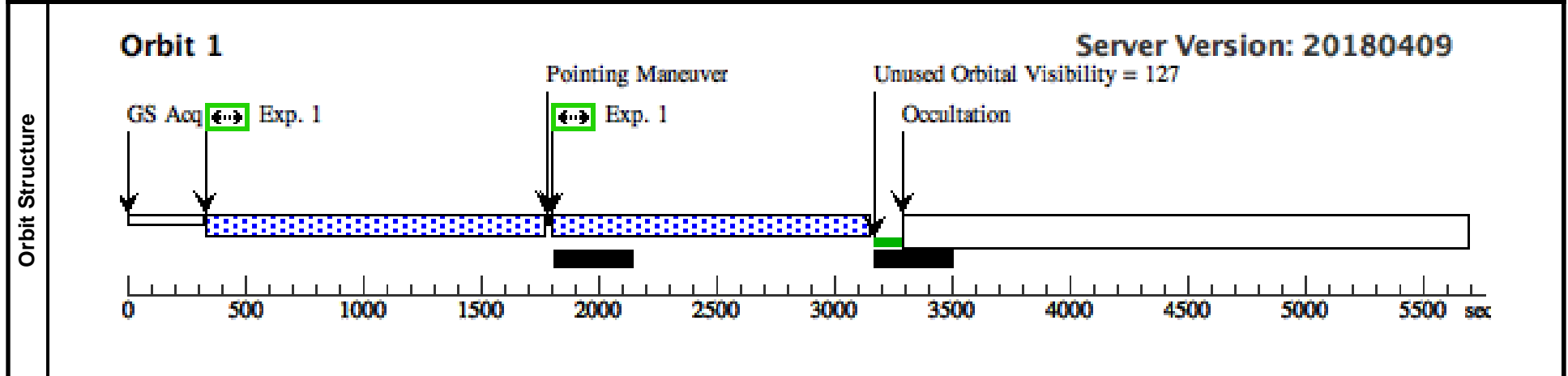
Visit	Proposal 15315, Cont-b (59), withdrawn		
	Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01 <i>Comments: Re-observation from failed second orbit of visit 06.</i>		

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(3)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.262 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides= Center Pattern=false	

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	SPT-CLJ2344-4243	RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000		V=18	Reference Frame: ICRS

Comments:
 Category=GALAXY
 Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST]
 Extended=YES

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) SPT-CLJ2344-4243	ACS/WFC, ACCUM, WFC1	F475W		POS TARG -0.121,0 .145;	GS ACQ SCENARI O BASE1B3	Pattern 3, Exps 1-1 in Cont-b (59) (3)	1230 Secs (2460 Secs) [=>(Pattern 1)] [=>(Pattern 2)]



Proposal 15315 - Cont-b (60) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

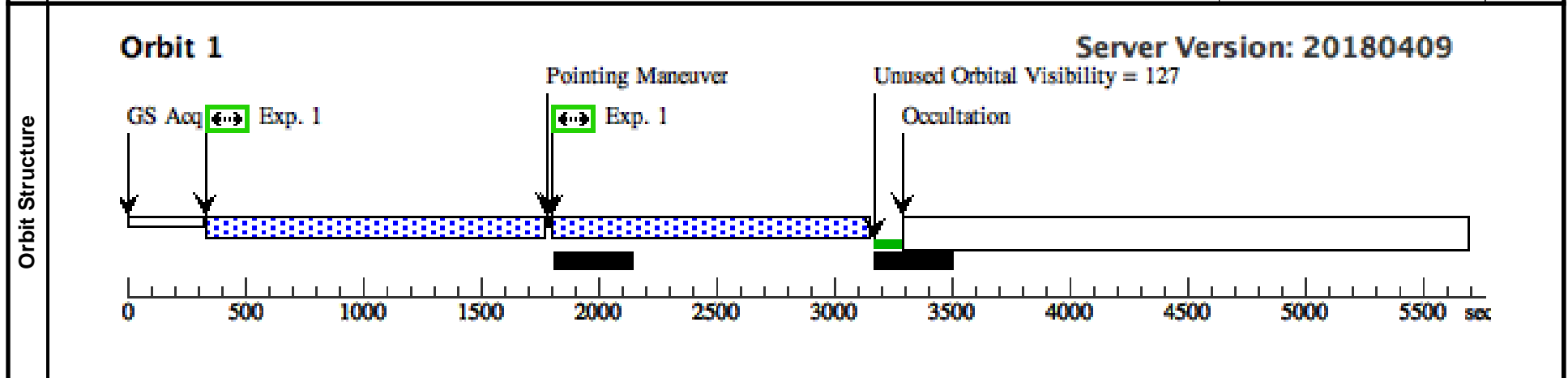
Thu Jun 14 00:01:03 GMT 2018

Visit	Proposal 15315, Cont-b (60), failed Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SAME ORIENT AS 01 <i>Comments: Re-observation from failed second orbit of visit 06.</i>		

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(3)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.262 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides= Center Pattern=false	

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	SPT-CLJ2344-4243	RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000		V=18	Reference Frame: ICRS
<i>Comments:</i> Category=GALAXY Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST] Extended=YES						

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) SPT-CLJ2344-4243	ACS/WFC, ACCUM, WFC1	F775W		POS TARG -0.121,0 .145;	GS ACQ SCENARI O BASE1B3	Pattern 3, Exps 1-1 in Cont-b (60) (3)	1230 Secs (2460 Secs) [=>(Pattern 1)] [=>(Pattern 2)]



Proposal 15315 - Cont-b (61) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

Thu Jun 14 00:01:03 GMT 2018

Visit	Proposal 15315, Cont-b (61) Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: (none) <i>Comments: Re-observation of failed second orbit from visit 05.</i>					
	Patterns	# (3) Primary Pattern Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.262 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides= Center Pattern=false	Secondary Pattern	Exposures (1)	
Fixed Targets	# (1)	Name: SPT-CLJ2344-4243 Target Coordinates: RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000	Targ. Coord. Corrections	Fluxes: V=18	Miscellaneous: Reference Frame: ICRS	
Exposures	# 1	Label: (1) SPT-CLJ2344-4243 Target: ACS/WFC, ACCUM, WFC1	Config,Mode,Aperture: F475W Spectral Els.: POS TARG -0.121,0 .145; Opt. Params.: GS ACQ SCENARI O BASE1B3	Special Reqs.: Pattern 3, Exps 1-1 in Cont-b (61) (3)	Groups: 1230 Secs (2460 Secs) Exp. Time (Total)/[Actual Dur.] [==>(Pattern 1)] [==>(Pattern 2)]	Orbit: [1]
Orbit Structure	<p>Orbit 1 Server Version: 20180409</p> <p>The diagram shows a horizontal timeline from 0 to 5500 seconds. A blue checkered bar represents the observation period, starting at approximately 300 seconds and ending at 3200 seconds. Above the timeline, 'GS Acq' is marked at ~300s and 'Pointing Maneuver' at ~1800s. A green bar above the timeline from ~3200s to ~3300s is labeled 'Unused Orbital Visibility = 127'. Below the timeline, 'Occultation' is marked at ~3200s. Two green boxes with a camera icon and 'Exp. 1' are placed above the observation period.</p>					

Proposal 15315 - Cont-b (62) - Revealing Thermal Instabilities in the Core of the Phoenix Cluster

Thu Jun 14 00:01:03 GMT 2018

Visit	Proposal 15315, Cont-b (62) Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: (none) <i>Comments: Re-observation from failed second orbit of visit 06.</i>		

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
		(3)	Pattern Type=LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.262 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides= Center Pattern=false

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
		(1)	SPT-CLJ2344-4243	RA: 23 44 43.8950 (356.1828958d) Dec: -42 43 12.45 (-42.72012d) Equinox: J2000		V=18
	<i>Comments:</i> Category=GALAXY Description=[COOLING FLOW, ELLIPTICAL, EMISSION LINE NEBULA, STARBURST] Extended=YES					

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
		1		(1) SPT-CLJ2344-4243	ACS/WFC, ACCUM, WFC1	F775W		POS TARG -0.121,0 .145; GS ACQ SCENARI O BASE1B3	Pattern 3, Exps 1-1 i n Cont-b (62) (3)	1230 Secs (2460 Secs) [==>(Pattern 1)] [==>(Pattern 2)]

