15883 - Robust and efficient HST weak lensing mass measurements for high-z clusters: A pilot study targeting the most-massive SZ cluster known at z>1

Cycle: 27, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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Dr. Lindsey Bleem (CoI)	Argonne National Laboratory	lbleem@anl.gov

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) SPT-CL-J2106-5844	WFC3/IR	1	07-Oct-2019 17:00:19.0	yes
02	(1) SPT-CL-J2106-5844	WFC3/IR	1	07-Oct-2019 17:00:21.0	yes
03	(1) SPT-CL-J2106-5844	WFC3/IR	1	07-Oct-2019 17:00:23.0	yes
04	(1) SPT-CL-J2106-5844	WFC3/IR	1	07-Oct-2019 17:00:25.0	yes

4 Total Orbits Used

ABSTRACT

Deep Sunyaev-Zel'dovich (SZ) surveys are discovering massive galaxy clusters out to redshifts z>1. These powerful samples probe the cosmological growth of structure at an epoch well before dark energy started to dominate the cosmic expansion. In order to derive competitive cosmological constraints from these clusters we first need to tightly constrain their absolute mass scale, requiring deep weak lensing (WL) follow-up observations for a large number of targets. This is within the reach of an HST Large Program (LP) if the observations are carefully designed.

We have identified a suitable observing strategy that is both efficient and yields well-controlled systematics. To prepare for a future LP proposal we propose a pilot investigation that allows us to demonstrate this new strategy and study one of the most extreme objects in the distant Universe: According to its SZ signature SPT-CLJ2106-5844 (z=1.132) constitutes the single most massive SZ-discovered cluster at z>1 known to date.

An existing 2x2 ACS F606W mosaic provides WL shape measurements out to the virial radius, but needs to be complemented with a matching WFC3/IR mosaic in F105W and F160W to robustly select the distant background galaxies carrying the WL signal. Continuous Viewing Zone (CVZ) opportunities and a background-minimizing exposure sequence allow us to obtain the required 8-pointing, 2-filter WFC3/IR mosaic to the required depth in 4 CVZ orbits only.

The new observations are expected to tighten the previous WL mass constraints of the cluster by a factor ~2.2. This also allows us to quantify how well the cluster mass agrees with the expected mass range for the most massive high-z clusters.

OBSERVING DESCRIPTION

This program aims to obtain an 8 pointing WFC3/IR mosaic in F105W+F160W that covers the outer parts of the massive galaxy cluster SPT-CL-J2106-5844, thereby complementing WFC3/IR observations that have already been obtained for the cluster core by other programs.

The WFC3/IR mosaic should be aligned such that it provides good overlap with an existing ACS/WFC 2x2 mosaic in F606W. In combination, the three band observations will facilitate an efficient photometric selection of high-redshift background galaxies for weak lensing measurements.

To reach the target depth in a minimum number of orbits the observations will employ continuous viewing zone (CVZ) opportunities that are available for the target.

Their increased orbital visibility allows us to reach the depth
requirements for two WFC3/IR pointings and both filters in a single CVZ orbit.
For this, we request permission to craft the
orbits, scheduling the F105W imaging, whose depth is
key for the weak lensing source selection, during the half of the orbit
when HST is in Earth's shadow.
This keeps the background contributions from coronal Helium I emission
and earth shine low.
F160W is not affected by coronal Helium I emission and
only moderately affected by earth shine, which is why
the required F160W depth can be reached during the remaining half of the orbit.
This observing strategy provides an exposure time of 1009s in F160W (959s in F105W) in each pointing, split into three exposures each.

In order to maximize the overlap with the ACS data, the exact WFC3 pointings
and orientations need to be adjusted, depending on the CVZ opportunity
in which the observations are scheduled.

This phase 2 submission (with 89d<ORIENT<91d) corresponds to
the CVZ opportunity occurring in the time windows
2019.328:16:21:14- 2019.328:22:45:40
and
2019.330:16:01:01- 2019.330:22:25:43, which provides good overlap with
the ACS mosaic and moderate zodiacal background.

Visit

Proposal 15883, D90-1 (01), implementation Mon Oct 07 21:00:25 GMT 2019

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: CVZ; ORIENT 89D TO 91 D

Diagnostics

(D90-1 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
(D90-1 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
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(D90-1 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

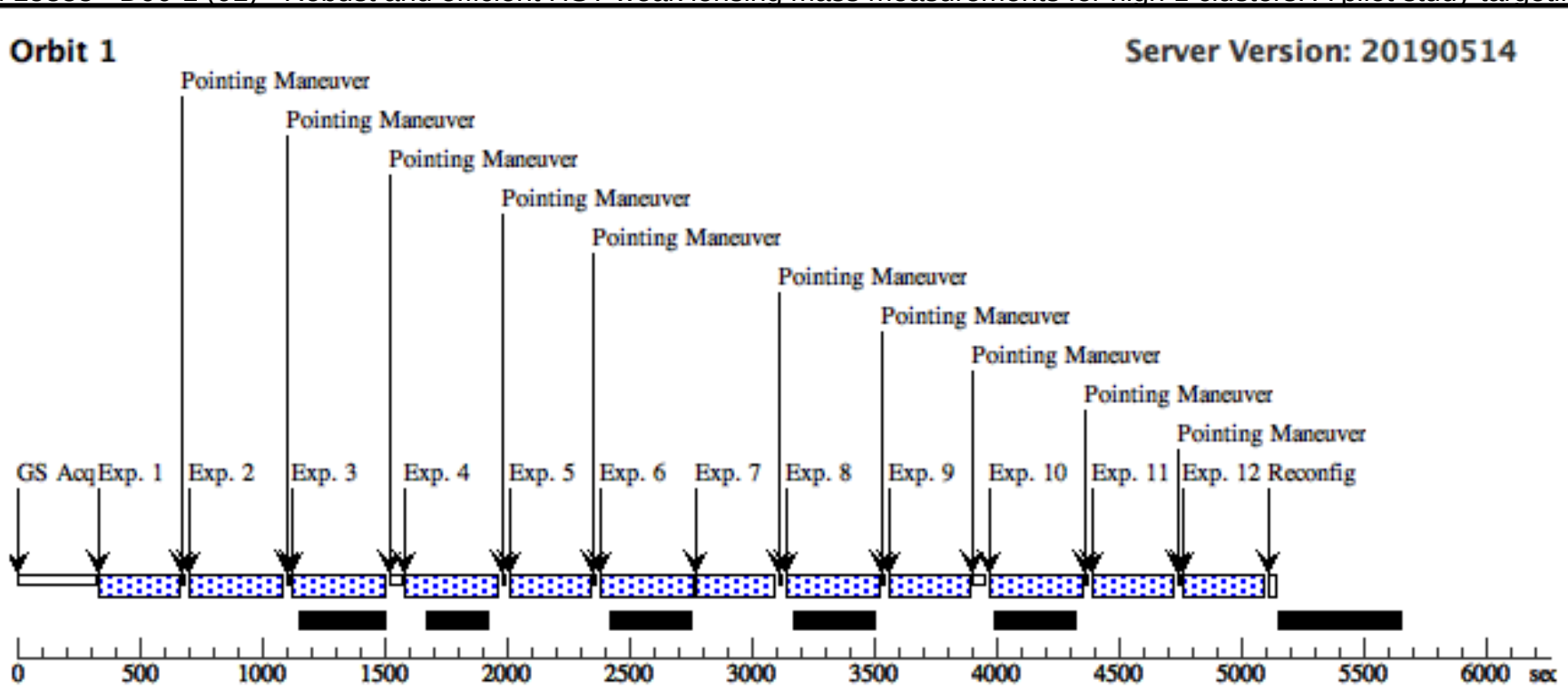
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SPT-CL-J2106-5844	RA: 21 06 4.0000 (316.5166667d) Dec: -58 44 36.00 (-58.74333d) Equinox: J2000	Epoch of Position: 2015.5	V=26.2	Reference Frame: SIMBAD

Comments:
Category=CLUSTER OF GALAXIES
Description=[GRAVITATIONAL LENS, HIGH REDSHIFT CLUSTER, RICH CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 132.934576332508 ,-2.26609465548357 ; GS ACQ SCENARIO BASE1B3	Sequence 1-12 Non-Int in D90-1 (01)	302.934997 Secs (302.935 Secs)	
								[==>]	***[1]***
2		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 129.065423667492 ,-5.73390534451644	Sequence 1-12 Non-Int in D90-1 (01)	352.935448 Secs (352.935 Secs)	
								[==>]	***[1]***
3		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 126.995042130376 ,0.45682266536493	Sequence 1-12 Non-Int in D90-1 (01)	352.935448 Secs (352.935 Secs)	
								[==>]	***[1]***
4		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 129.934576332508 ,119.733905344516	Sequence 1-12 Non-Int in D90-1 (01)	352.935448 Secs (352.935 Secs)	
								[==>]	***[1]***
5		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 126.065423667492 ,116.266094655484	Sequence 1-12 Non-Int in D90-1 (01)	302.934997 Secs (302.935 Secs)	
								[==>]	***[1]***
6		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 123.995042130376 ,122.456822665365	Sequence 1-12 Non-Int in D90-1 (01)	352.935448 Secs (352.935 Secs)	
								[==>]	***[1]***
7		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 123.995042130376 ,122.456822665365	Sequence 1-12 Non-Int in D90-1 (01)	302.934997 Secs (302.935 Secs)	
								[==>]	***[1]***
8		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 126.065423667492 ,116.266094655484	Sequence 1-12 Non-Int in D90-1 (01)	352.935448 Secs (352.935 Secs)	
								[==>]	***[1]***
9		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 129.934576332508 ,119.733905344516	Sequence 1-12 Non-Int in D90-1 (01)	302.934997 Secs (302.935 Secs)	
								[==>]	***[1]***
10		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 126.995042130376 ,0.45682266536493	Sequence 1-12 Non-Int in D90-1 (01)	352.935448 Secs (352.935 Secs)	
								[==>]	***[1]***
11		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 129.065423667492 ,-5.73390534451644	Sequence 1-12 Non-Int in D90-1 (01)	302.934997 Secs (302.935 Secs)	
								[==>]	***[1]***
12		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 132.934576332508 ,-2.26609465548357	Sequence 1-12 Non-Int in D90-1 (01)	302.934997 Secs (302.935 Secs)	
								[==>]	***[1]***

Orbit Structure



Visit

Proposal 15883, D90-2 (02), implementation Mon Oct 07 21:00:26 GMT 2019

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: CVZ; SAME ORIENT AS 01

Diagnostics

(D90-2 (02)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
(D90-2 (02)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
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Fixed Targets

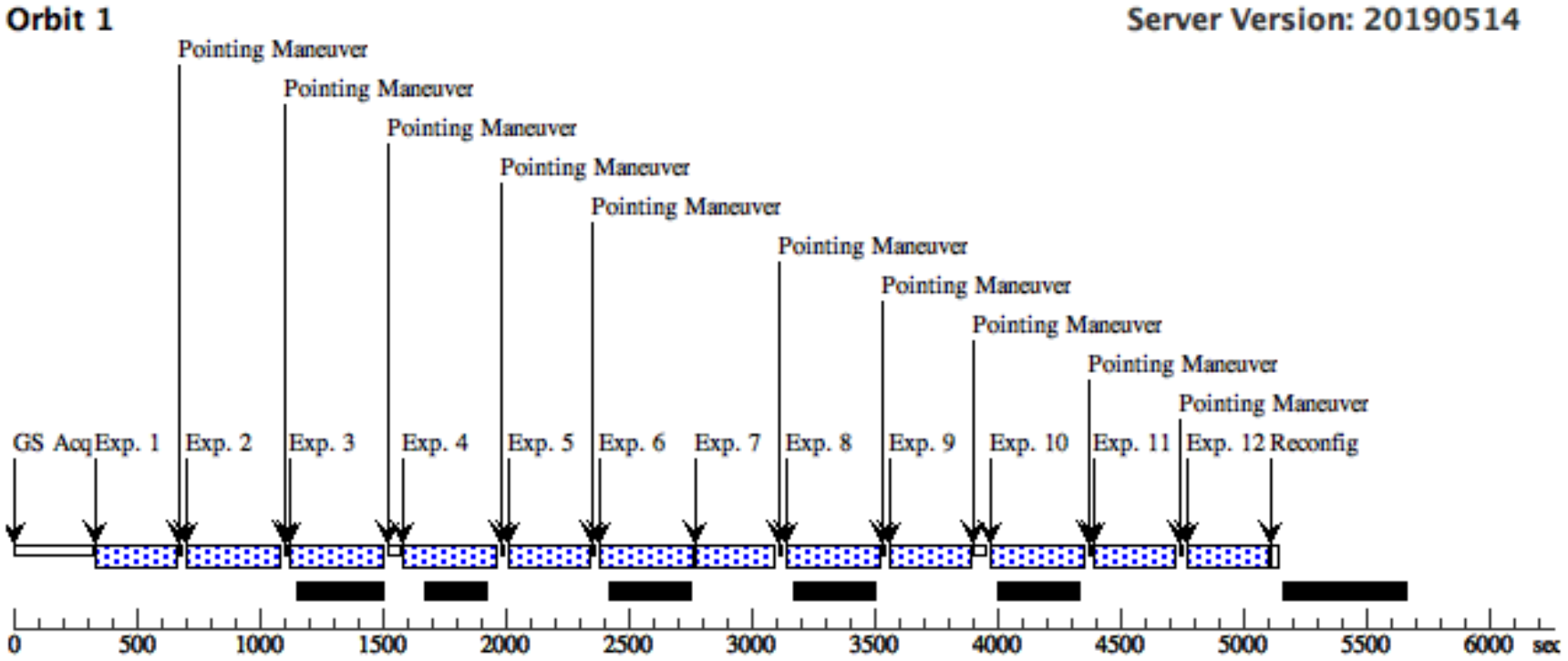
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SPT-CL-J2106-5844	RA: 21 06 4.0000 (316.5166667d) Dec: -58 44 36.00 (-58.74333d) Equinox: J2000	Epoch of Position: 2015.5	V=26.2	Reference Frame: SIMBAD

Comments:
Category=CLUSTER OF GALAXIES
Description=[GRAVITATIONAL LENS, HIGH REDSHIFT CLUSTER, RICH CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -133.065423667492 ,9.73390534451644 ; GS ACQ SCENARIO BASE1B3	Sequence 1-12 Non-Int in D90-2 (02)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
2		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -136.934576332508 ,6.26609465548357	Sequence 1-12 Non-Int in D90-2 (02)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
3		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -139.004957869624 ,12.4568226653649	Sequence 1-12 Non-Int in D90-2 (02)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
4		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -131.065423667492 ,-112.266094655484	Sequence 1-12 Non-Int in D90-2 (02)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
5		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -134.934576332508 ,-115.733905344516	Sequence 1-12 Non-Int in D90-2 (02)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
6		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -137.004957869624 ,-109.543177334635	Sequence 1-12 Non-Int in D90-2 (02)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
7		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -137.004957869624 ,-109.543177334635	Sequence 1-12 Non-Int in D90-2 (02)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
8		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -134.934576332508 ,-115.733905344516	Sequence 1-12 Non-Int in D90-2 (02)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
9		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -131.065423667492 ,-112.266094655484	Sequence 1-12 Non-Int in D90-2 (02)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
10		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -139.004957869624 ,12.4568226653649	Sequence 1-12 Non-Int in D90-2 (02)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
11		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -136.934576332508 ,6.26609465548357	Sequence 1-12 Non-Int in D90-2 (02)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
12		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -133.065423667492 ,9.73390534451644	Sequence 1-12 Non-Int in D90-2 (02)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 15883, D90-3 (03), implementation Mon Oct 07 21:00:26 GMT 2019

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: CVZ; SAME ORIENT AS 01

Diagnostics

(D90-3 (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
(D90-3 (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
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(D90-3 (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

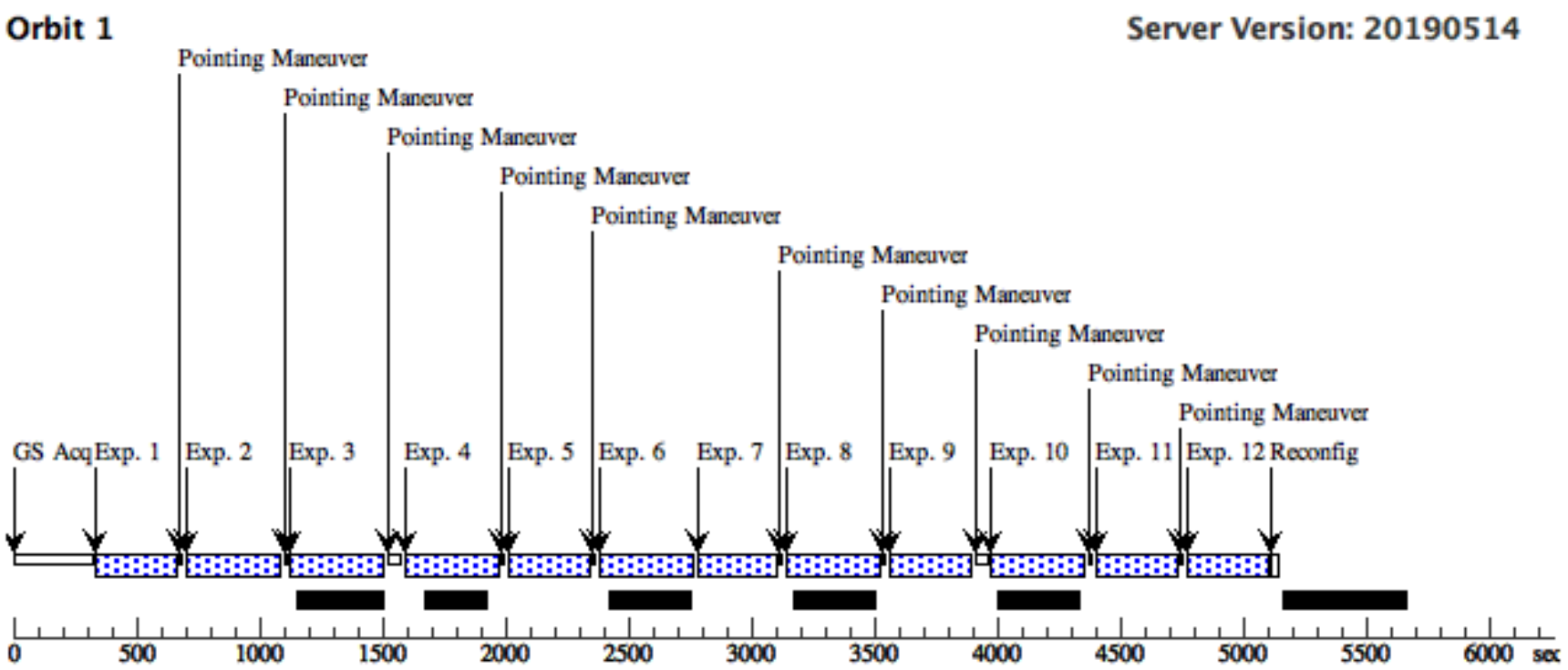
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SPT-CL-J2106-5844	RA: 21 06 4.0000 (316.5166667d) Dec: -58 44 36.00 (-58.74333d) Equinox: J2000	Epoch of Position: 2015.5	V=26.2	Reference Frame: SIMBAD

Comments:
Category=CLUSTER OF GALAXIES
Description=[GRAVITATIONAL LENS, HIGH REDSHIFT CLUSTER, RICH CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -127.065423667492 ,129.733905344516 ; GS ACQ SCENARIO BASE1B3	Sequence 1-12 Non-Int in D90-3 (03)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
2		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -130.934576332508 ,126.266094655484	Sequence 1-12 Non-Int in D90-3 (03)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
3		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -133.004957869624 ,132.456822665365	Sequence 1-12 Non-Int in D90-3 (03)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
4		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -4.06542366749224 ,134.733905344516	Sequence 1-12 Non-Int in D90-3 (03)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
5		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -7.93457633250776 ,131.266094655484	Sequence 1-12 Non-Int in D90-3 (03)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
6		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -10.0049578696236 ,137.456822665365	Sequence 1-12 Non-Int in D90-3 (03)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
7		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -10.0049578696236 ,137.456822665365	Sequence 1-12 Non-Int in D90-3 (03)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
8		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -7.93457633250776 ,131.266094655484	Sequence 1-12 Non-Int in D90-3 (03)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
9		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -4.06542366749224 ,134.733905344516	Sequence 1-12 Non-Int in D90-3 (03)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
10		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -133.004957869624 ,132.456822665365	Sequence 1-12 Non-Int in D90-3 (03)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
11		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -130.934576332508 ,126.266094655484	Sequence 1-12 Non-Int in D90-3 (03)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
12		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -127.065423667492 ,129.733905344516	Sequence 1-12 Non-Int in D90-3 (03)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 15883, D90-4 (04), implementation Mon Oct 07 21:00:26 GMT 2019

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: CVZ; SAME ORIENT AS 01

Diagnostics

(D90-4 (04)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
(D90-4 (04)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
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(D90-4 (04)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
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Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SPT-CL-J2106-5844	RA: 21 06 4.0000 (316.5166667d) Dec: -58 44 36.00 (-58.74333d) Equinox: J2000	Epoch of Position: 2015.5	V=26.2	Reference Frame: SIMBAD

Comments:
Category=CLUSTER OF GALAXIES
Description=[GRAVITATIONAL LENS, HIGH REDSHIFT CLUSTER, RICH CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 126.934576332508 ,-122.266094655484 ; GS ACQ SCENARIO BASE1B3	Sequence 1-12 Non-Int in D90-4 (04)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
2		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 123.065423667492 ,-125.733905344516	Sequence 1-12 Non-Int in D90-4 (04)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
3		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 120.995042130376 ,-119.543177334635	Sequence 1-12 Non-Int in D90-4 (04)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
4		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 3.93457633250776 ,-128.266094655484	Sequence 1-12 Non-Int in D90-4 (04)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
5		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 0.065423667492243 ,-131.733905344516	Sequence 1-12 Non-Int in D90-4 (04)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
6		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG -2.00495786962358 ,-125.543177334635	Sequence 1-12 Non-Int in D90-4 (04)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
7		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG -2.00495786962358 ,-125.543177334635	Sequence 1-12 Non-Int in D90-4 (04)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
8		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 0.065423667492243 ,-131.733905344516	Sequence 1-12 Non-Int in D90-4 (04)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
9		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 3.93457633250776 ,-128.266094655484	Sequence 1-12 Non-Int in D90-4 (04)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
10		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=8; SAMP-SEQ=SPARS50	POS TARG 120.995042130376 ,-119.543177334635	Sequence 1-12 Non-Int in D90-4 (04)	352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
11		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 123.065423667492 ,-125.733905344516	Sequence 1-12 Non-Int in D90-4 (04)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*
12		(1) SPT-CL-J2106-5844	WFC3/IR, MULTIACCUM, IR-FIX	F105W	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 126.934576332508 ,-122.266094655484	Sequence 1-12 Non-Int in D90-4 (04)	302.934997 Secs (302.935 Secs) *[==>]*	*[1]*

Orbit Structure