15464 - Resolving the Stellar Histories of Herschel-Red Dusty Star Forming Galaxies at z~4

Cycle: 25, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) SMG1	WFC3/IR	1	18-Sep-2018 12:02:32.0	yes
02	(2) SMG2	WFC3/IR	1	18-Sep-2018 12:02:33.0	yes
10	(10) SMG2-COPY	WFC3/IR	1	18-Sep-2018 12:02:34.0	yes
03	(3) SMG3	WFC3/IR	1	18-Sep-2018 12:02:34.0	yes
04	(4) SMG4	WFC3/IR	1	18-Sep-2018 12:02:35.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
09	(9) SMG4-COPY	WFC3/IR	1	18-Sep-2018 12:02:36.0	yes
05	(5) SMG5	WFC3/IR	1	18-Sep-2018 12:02:36.0	yes
06	(6) SMG6	WFC3/IR	1	18-Sep-2018 12:02:37.0	yes
07	(7) SMG7	WFC3/IR	1	18-Sep-2018 12:02:38.0	yes
08	(8) SMG8	WFC3/IR	1	18-Sep-2018 12:02:38.0	yes

10 Total Orbits Used

ABSTRACT

We have identified a sample of eight z~4 objects from a new class of powerful high-redshift dusty, star forming galaxies through their rising Herschel SPIRE flux densities and spectroscopic redshifts. A complete, multiwavelength analysis of these objects would increase the sample size of known z~4 SPIRE 'red' starbursts with accurate stellar mass profiles more than two times over, helping to bridge the evolutionary gap between z~2 and z~6 DSFGs, and between high redshift starburst galaxies and their massive 'red-and-dead' counterparts at z=1-2. The deep rest-frame optical observations required for the stellar mass estimates of these galaxies has not yet been observed. Moreover, we recently obtained deep corresponding IRAC images that show clear counterparts to the starbursts, but the true nature of this near-IR emission is elusive due to the blended IRAC image. With the large IRAC PSF, we cannot determine if the near-IR emission is in fact a massive lensing foreground galaxy, or indeed the rest-frame optical emission of the high-z star-forming galaxy(s). We also now have complementary high-resolution ALMA images that suggest complex structures and/or multiple objects are creating the extreme far-IR intensities. To fully understand the nature of these structures, we must understand both their stellar mass and dust mass distributions, the former of which requires high resolution WFC3 observations to de-blend, and potentially de-magnify, the IRAC images. The proposed high resolution WFC3 F125W imaging of each object is crucial to resolve IRAC counterparts, extend individual SEDs into the rest-frame optical regime, and measure more reliable stellar masses than ever before.

OBSERVING DESCRIPTION

The goal of this program is to (a) detect and characterize the profile of any potential foreground lensing galaxy or galaxies, and/or (b) measure the rest-frame UV emission of z~4 dusty, starforming galaxies (DSFGs). HST data will also be used to de-blend/resolve the detected Spizter IRAC flux into the appropriate components, using gravitational lensing source plane reconstruction tools where necessary. Combined, these measurements will inform the optical/UV end of the DSFG spectral energy distributions, thereby constraining their stellar masses, gas masses and mass to light ratios.

To achieve these goals, we will use the WFC3 F125W band with an integration time of 48 minutes per target to achieve a S/N > 5 (WFC3IR.im.1155145), including a four-point dither pattern to better sample the PSF. This integration time is sufficiently long to capture a potential z = 1-2 foreground lensing elliptical galaxy at a S/N > 10. In ALMA imaging, the morphologies of each of the eight z~4 sources is different, with typical dust emission extending about 1 arcsec in diameter across.

Visit

Proposal 15464, Visit 01, completed Tue Sep 18 16:02:39 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

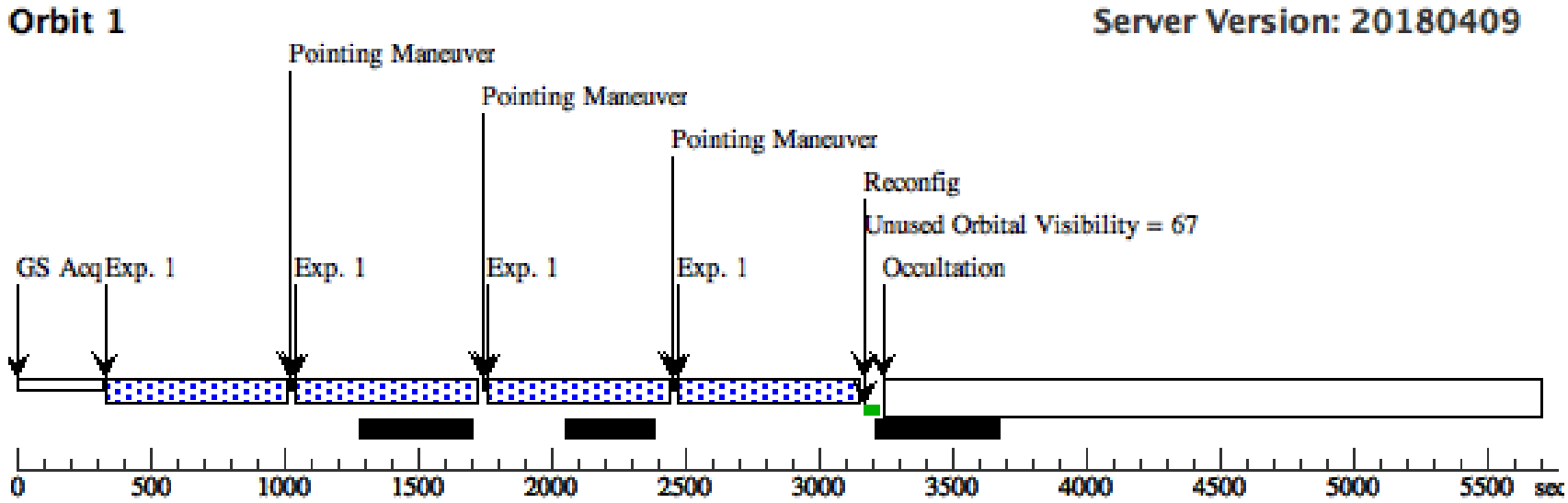
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SMG1	RA: 00 03 7.1750 (.7798958d) Dec: -33 02 50.87 (-33.04746d) Equinox: J2000	Redshift: 4.425	V=(?) 21.2 (AB; IRAC CH1)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[HIGH REDSHIFT GALAXY, INTERACTING GALAXY, STARBURST]

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(1155145)	(1) SMG1	WFC3/IR, MULTIACCUM, IR	F125W	SAMP-SEQ=SPARS 50; NSAMP=14		Pattern 1, Exps 1-1 in Visit 01 (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15464, Visit 02, failed Tue Sep 18 16:02:39 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

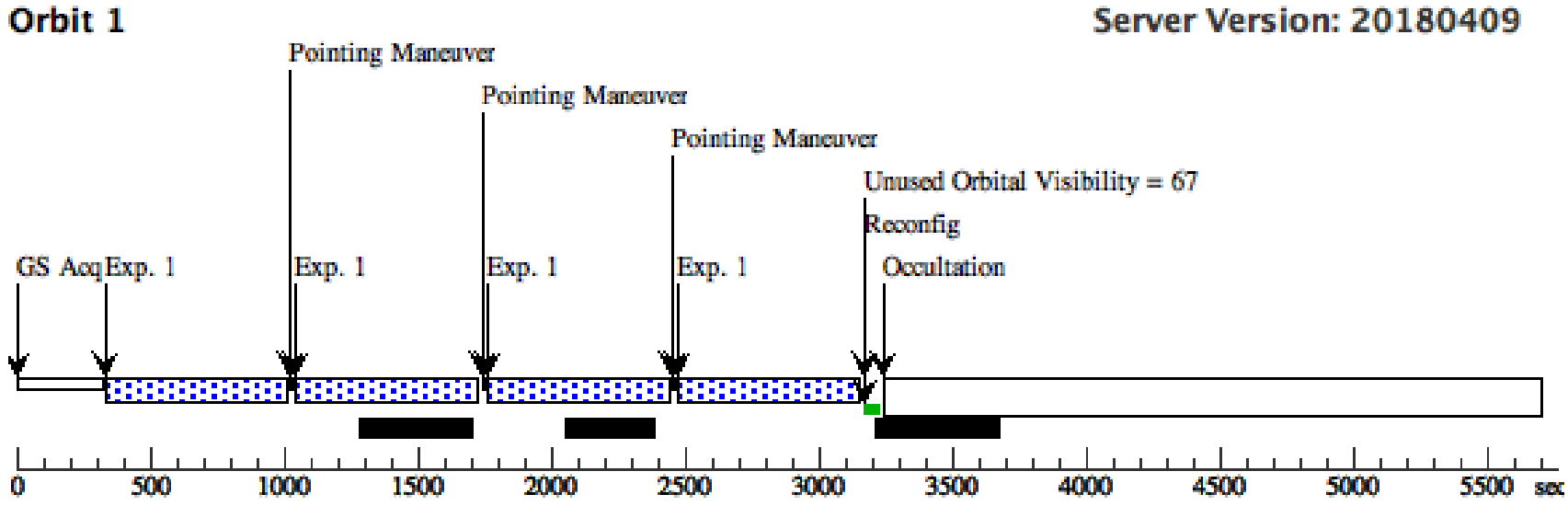
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SMG2	RA: 00 06 7.5250 (1.5313542d) Dec: -32 26 39.64 (-32.44434d) Equinox: J2000	Redshift: 4.242	V=(?) 20.5 (AB; IRAC CH1)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[GRAVITATIONAL LENS, HIGH REDSHIFT GALAXY, INTERACTING GALAXY, STARBURST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) SMG2	WFC3/IR, MULTIACCUM, IR	F125W	SAMP-SEQ=SPARS50; NSAMP=14		Pattern 1, Exps 1-1 in Visit 02 (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15464, Visit 10 (10), implementation Tue Sep 18 16:02:39 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

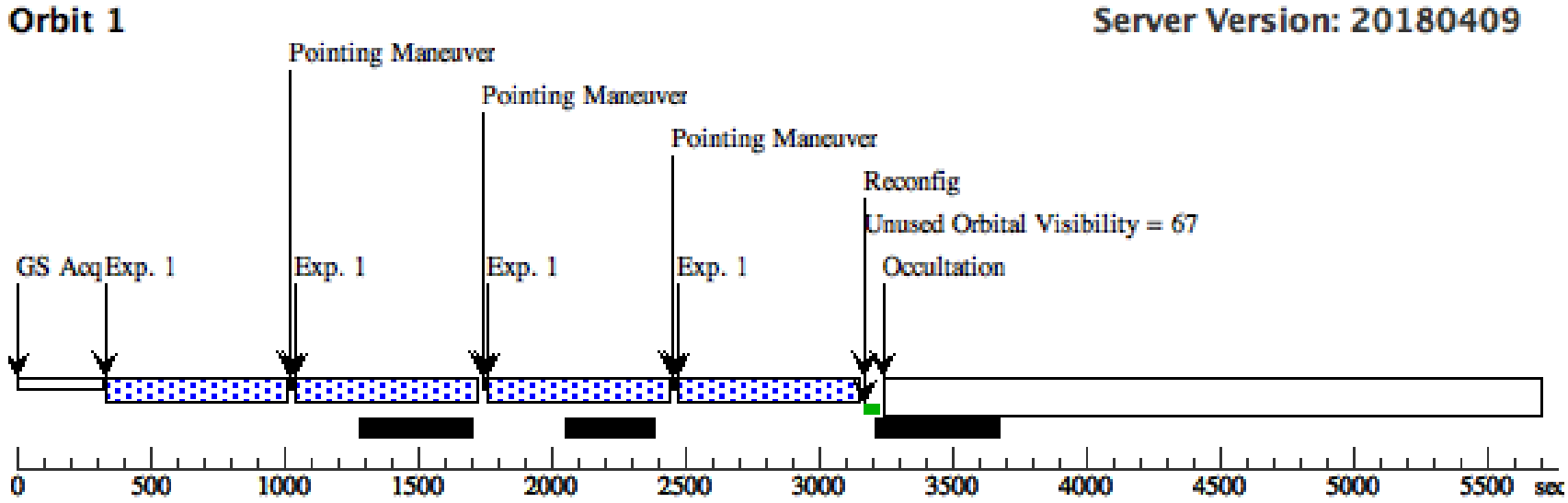
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(10)	SMG2-COPY	RA: 00 06 7.5250 (1.5313542d) Dec: -32 26 39.64 (-32.44434d) Equinox: J2000	Redshift: 4.242	V=(?) 20.5 (AB; IRAC CH1)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[GRAVITATIONAL LENS, HIGH REDSHIFT GALAXY, INTERACTING GALAXY, STARBURST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(10) SMG2-COPY	WFC3/IR, MULTIACCUM, IR	F125W	SAMP-SEQ=SPARS50; NSAMP=14		Pattern 1, Exps 1-1 in Visit 10 (10) (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15464, Visit 03, completed Tue Sep 18 16:02:39 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

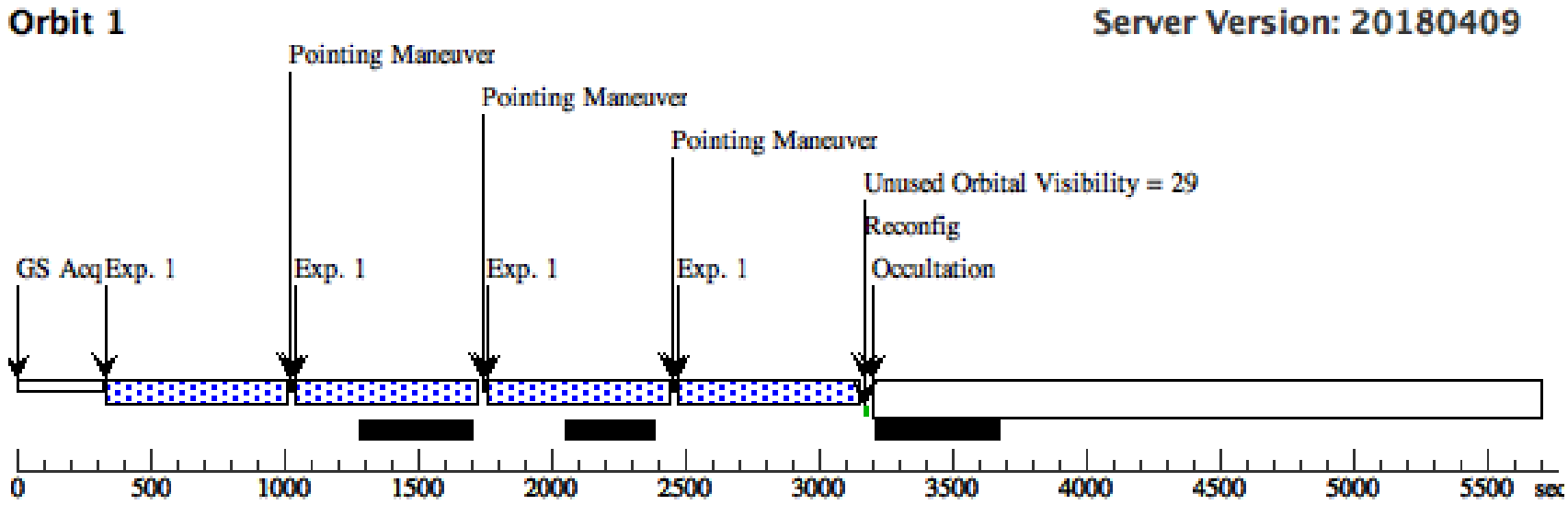
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	SMG3	RA: 00 22 20.8010 (5.5866708d) Dec: -01 55 20.88 (-1.92247d) Equinox: J2000	Redshift: 5.161	V=(?) 20.0 (AB; IRAC CH1)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[HIGH REDSHIFT GALAXY, INTERACTING GALAXY, STARBURST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) SMG3	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 1, Exps 1-1 in Visit 03 (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15464, Visit 04, failed

Tue Sep 18 16:02:39 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

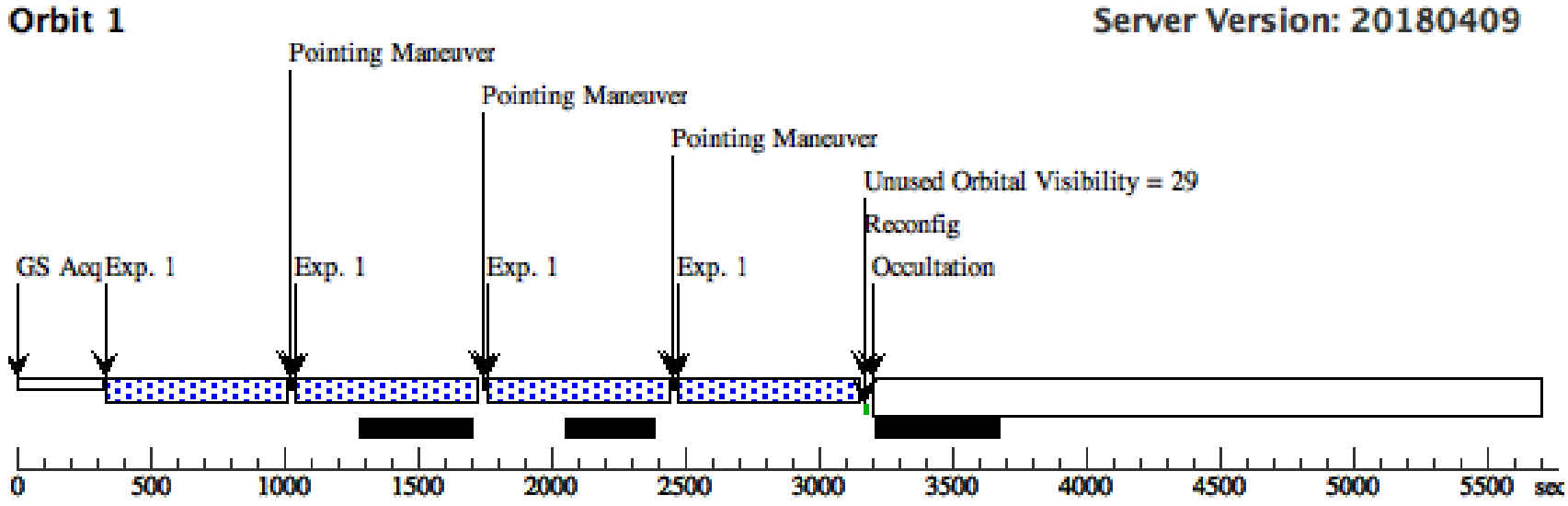
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	SMG4	RA: 00 27 37.3680 (6.9057000d) Dec: -02 07 58.63 (-2.13295d) Equinox: J2000	Redshift: 3.798	V=(?) 19.6 (AB; IRAC CH1)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[HIGH REDSHIFT GALAXY, PROTOGALAXY]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(4) SMG4	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 1, Exps 1-1 in Visit 04 (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15464, Visit 09, implementation

Tue Sep 18 16:02:39 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

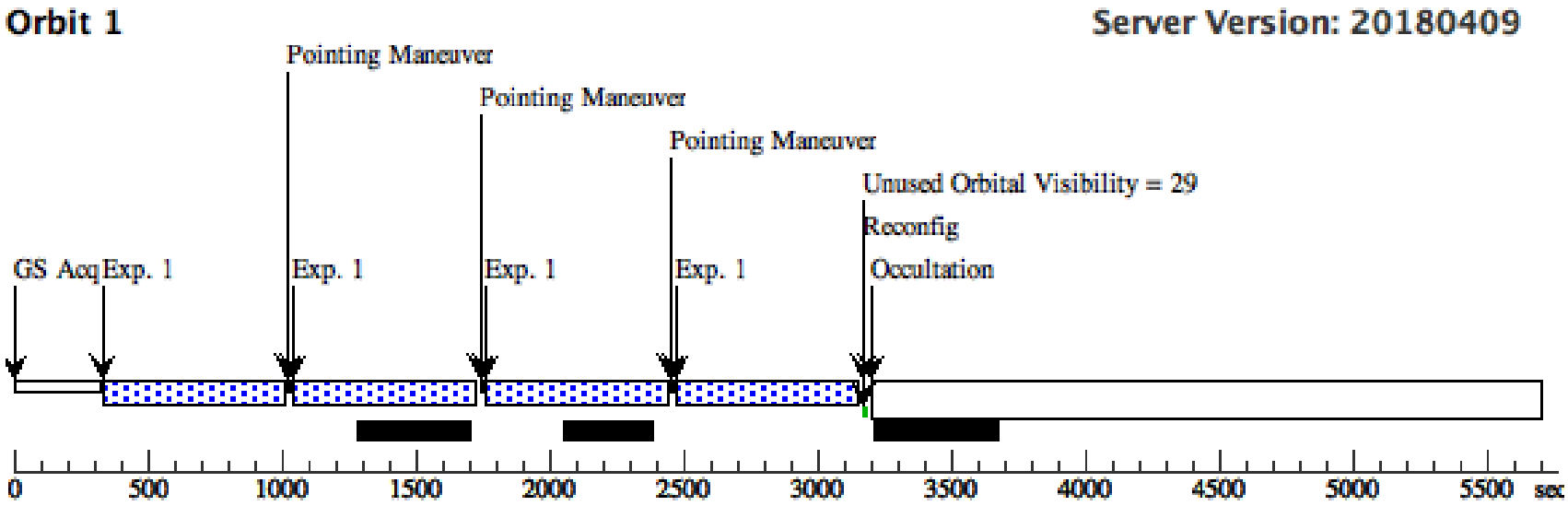
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(9)	SMG4-COPY	RA: 00 27 37.3680 (6.9057000d) Dec: -02 07 58.63 (-2.13295d) Equinox: J2000	Redshift: 3.798	V=(?) 19.6 (AB; IRAC CH1)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[HIGH REDSHIFT GALAXY, PROTOGALAXY]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(9) SMG4-COPY	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 1, Exps 1-1 in Visit 09 (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15464, Visit 05, completed Tue Sep 18 16:02:39 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

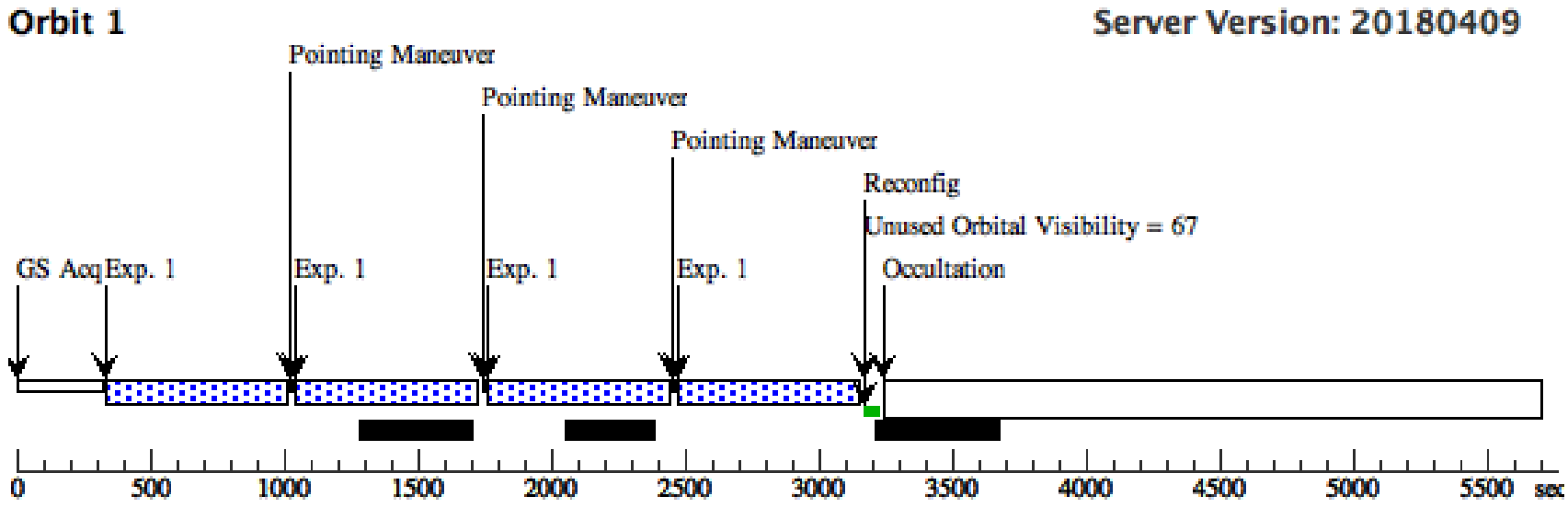
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(5)	SMG5	RA: 00 42 23.5100 (10.5979583d) Dec: -33 43 23.27 (-33.72313d) Equinox: J2000	Redshift: 4.002	V=(?) 22.6 (AB; IRAC CH1)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[HIGH REDSHIFT GALAXY, INTERACTING GALAXY, STARBURST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(5) SMG5	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 1, Exps 1-1 in Visit 05 (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15464, Visit 06, completed Tue Sep 18 16:02:39 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

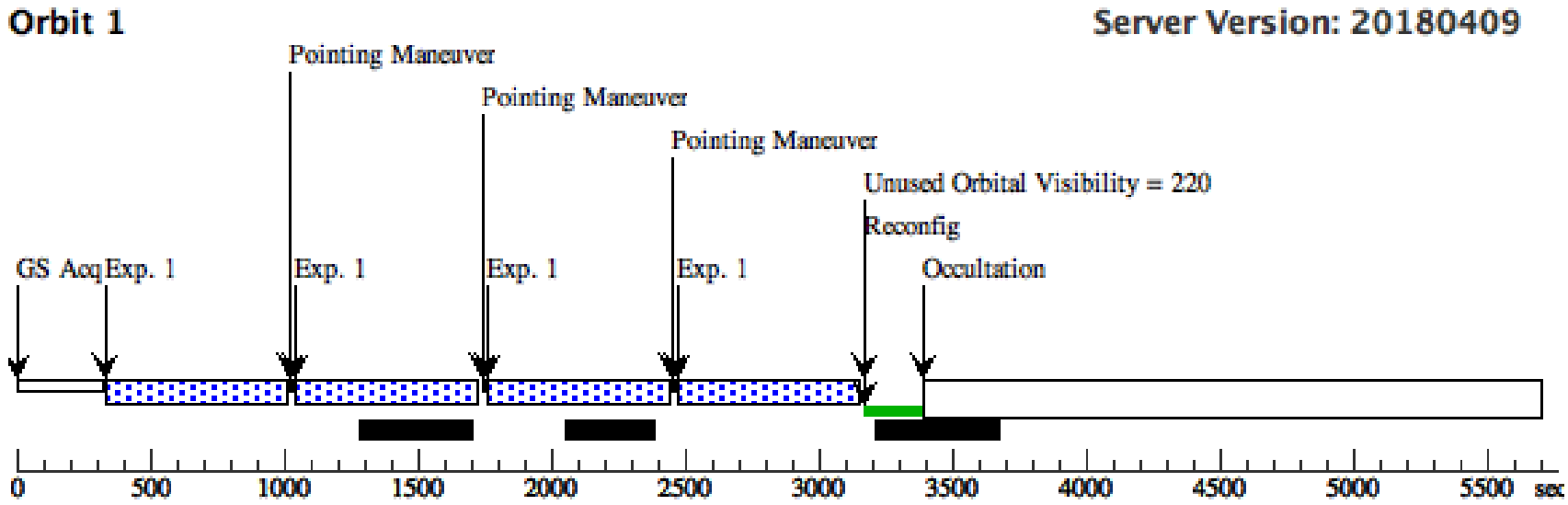
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	SMG6	RA: 04 36 57.0148 (69.2375617d) Dec: -54 38 9.08 (-54.63586d) Equinox: J2000	Redshift: 5.655	V=(?) 19.6 (AB; IRAC CH1)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[HIGH REDSHIFT GALAXY, INTERACTING GALAXY, STARBURST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(6) SMG6	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 1, Exps 1-1 in Visit 06 (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15464, Visit 07, scheduling Tue Sep 18 16:02:39 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

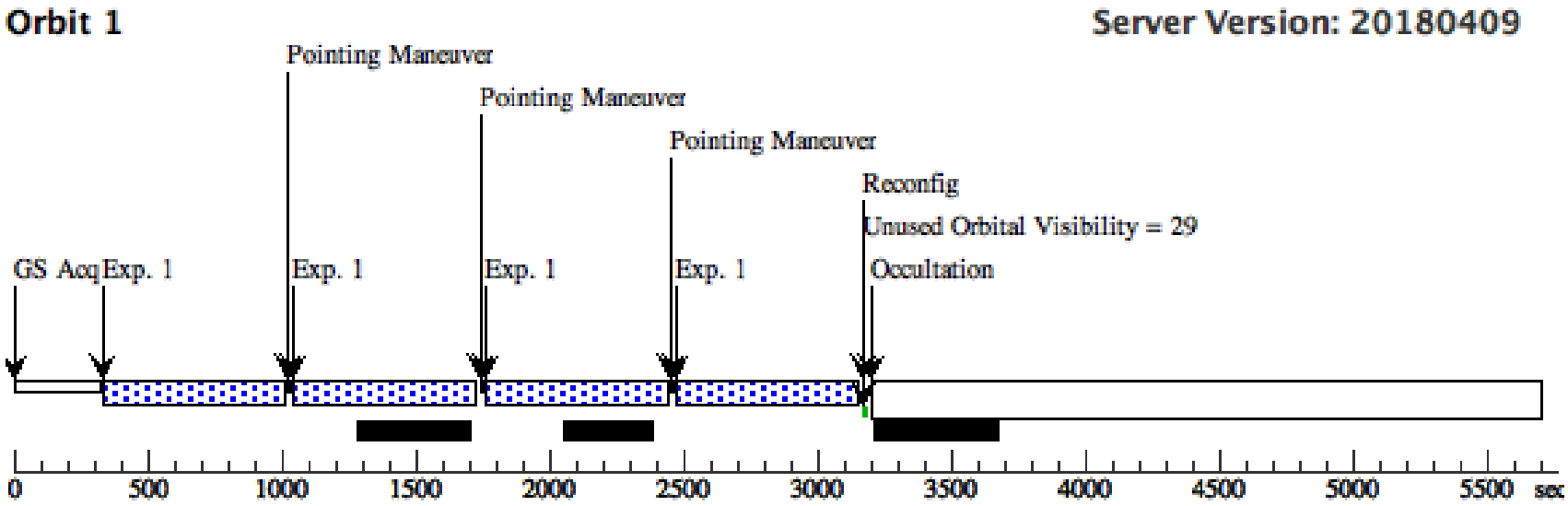
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(7)	SMG7	RA: 08 49 36.7972 (132.4033217d) Dec: +00 14 54.47 (.24846d) Equinox: J2000	Redshift: 4.53	V=(?) 22.7 (AB; IRAC CH1)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[HIGH REDSHIFT GALAXY, STARBURST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(7) SMG7	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 1, Exps 1-1 in Visit 07 (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15464, Visit 08, scheduling Tue Sep 18 16:02:39 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(8)	SMG8	RA: 09 00 45.8318 (135.1909658d) Dec: +00 41 23.16 (.68977d) Equinox: J2000	Redshift: 6.027	V=(?) 18.5 (AB; IRAC CH1)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[GRAVITATIONAL LENS, HIGH REDSHIFT GALAXY, STARBURST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(8) SMG8	WFC3/IR, MULTIACCUM, IR	F125W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 1, Exps 1-1 in Visit 08 (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure