15702 - Is bright galaxy formation different in the epoch of reionization? Confirmation of the brightest candidates at redshift z>8

Cycle: 26, 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) 1715+0455-186	WFC3/IR	1	17-Apr-2019 18:00:14.0	yes
02	(2) 1142+2647-113	WFC3/IR	1	17-Apr-2019 18:00:15.0	yes
03	(3) 2229-0945-380	WFC3/IR	1	17-Apr-2019 18:00:16.0	yes
04	(4) 1152+5434-32	WFC3/IR	1	17-Apr-2019 18:00:17.0	yes

4 Total Orbits Used

ABSTRACT

How did bright galaxies evolve in the early universe? How much did they contribute to cosmic reionization? These questions have been intensively asked in the modern astronomy. Studying galaxy luminosity functions (LFs) over the cosmic time is a key approach for progress before JWST. Recent studies at z>7 reported a possible evidence of deviation from the Schechter form LF, with an excess at the bright end. Indeed, previous

spectroscopic confirmation of two very luminous galaxies at z=8.68 and z=11.09 seems to support the argument, and dramatically changed our understanding of the universe and galaxy evolution in the early universe.

In this program, we aim at confirmation of 4, very bright, galaxy candidates at z>8, just identified from the Brightest of Reionizing Galaxies (BoRG), a pure-parallel HST observing program, which is acquiring 1000 pure-parallel orbits with WFC3 in cycles 22 and 25. Among all photometric sources collected in 106 independent HST line-of-sights, the four high-quality photometric sources are exceptionally bright (m125=24.1-25.3, or MUV~-23 to -22 if confirmed at z>8). Addition of a single orbit WFC3IR/F098M imaging for each field will significantly improve their photometric redshift estimate, efficiently differentiating if they are genuine high-z galaxies or low-z interlopers. With the redshift confirmation, we will gain insight into the early evolution of galaxy from the shape of refined LFs, as well as construct a promising high-z sample for future spectroscopic observations by JWST.

OBSERVING DESCRIPTION

The observations consist of four 1-orbit visits of F098M imaging (4 exposures times 4 fields).
We selected 4 13-NSAMP SPARS50 exposures to fill the orbit in each field, using a 4-point minimum box with optimal half-pixel sampling in both x and y.
The field centers are matched to previous observations with the same instrument, and so as orientations but are flexible among every 90 degree.

Visit

Proposal 15702, Visit 01, implementation

Wed Apr 17 22:00:17 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 184D TO 194 D

Comments: Orientation and position are specified to match previous observations in each field, but orientation is flexible between every 90 degree.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1)

Fixed Targets

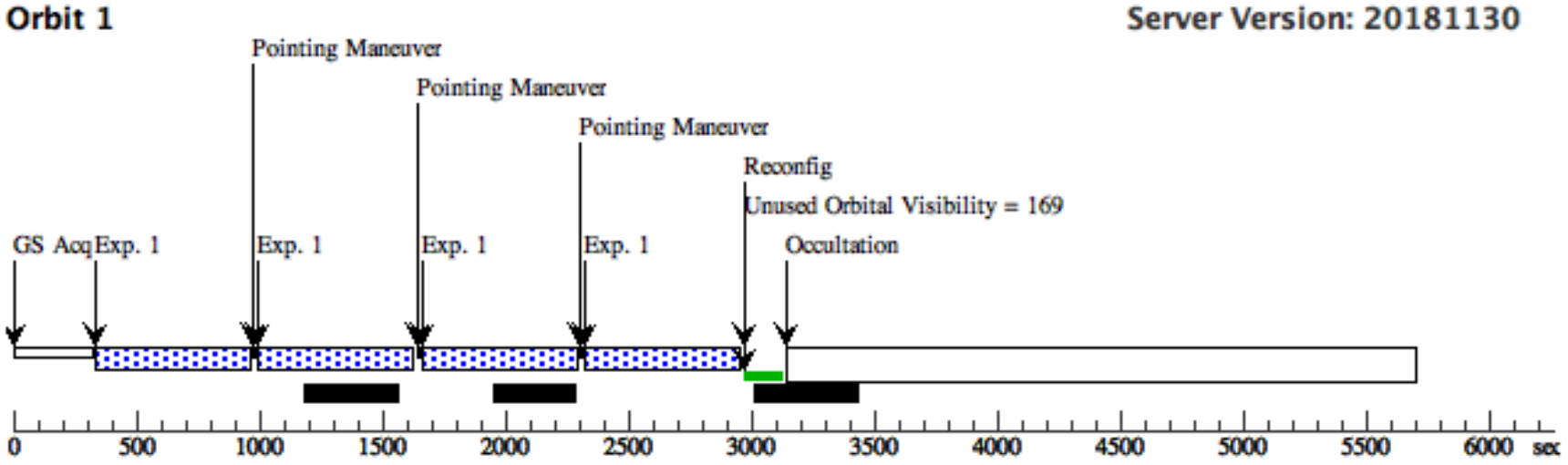
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	1715+0455-186	RA: 17 15 0.2250 (258.7509375d) Dec: +04 54 55.25 (4.91535d) Equinox: J2000		V=35 m125=25.3 (ABmag)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[STARBURST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) 1715+0455-186	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=13; SAMP-SEQ=SPARS50		Pattern 1, Exps 1-1 in Visit 01 (1)	602.937703 Secs (2411.751 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15702, Visit 02, implementation Wed Apr 17 22:00:17 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 103D TO 113 D

Comments: Orientation and position are specified to match previous observations in each field, but orientation is flexible between every 90 degree.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1)

Fixed Targets

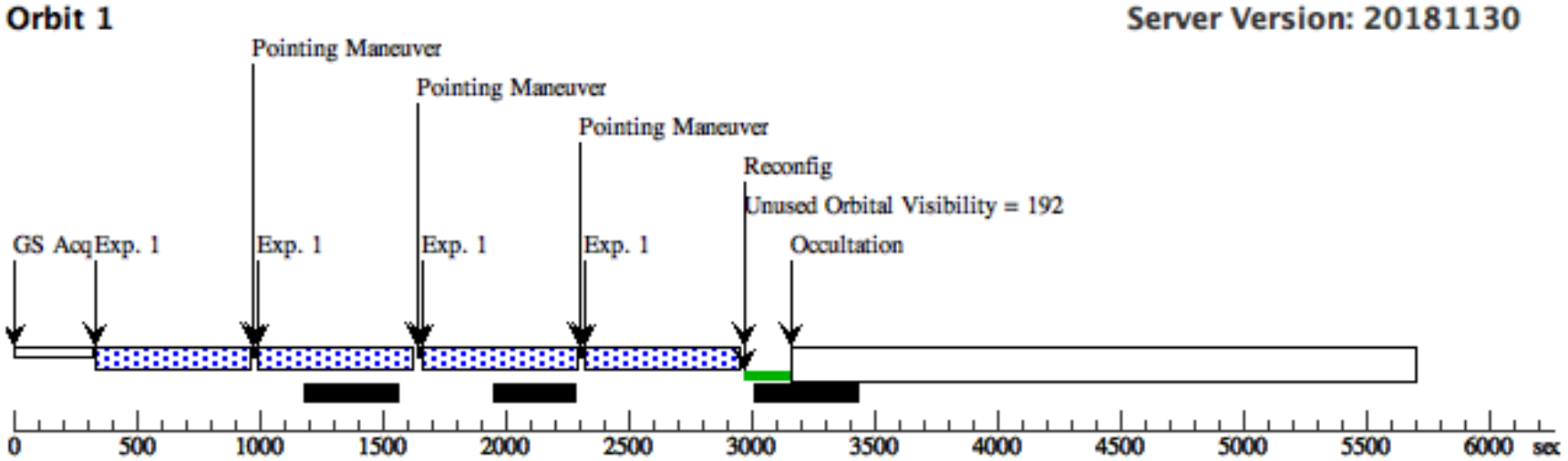
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	1142+2647-113	RA: 11 42 1.2440 (175.5051833d) Dec: +26 46 45.52 (26.77931d) Equinox: J2000		V=35 m125=24.1 (ABmag)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[STARBURST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) 1142+2647-113	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=13; SAMP-SEQ=SPARS50		Pattern 1, Exps 1-1 in Visit 02 (1)	602.937703 Secs (2411.751 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15702, Visit 03, implementation Wed Apr 17 22:00:17 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 243D TO 253 D

Comments: Orientation and position are specified to match previous observations in each field, but orientation is flexible between every 90 degree.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1)

Fixed Targets

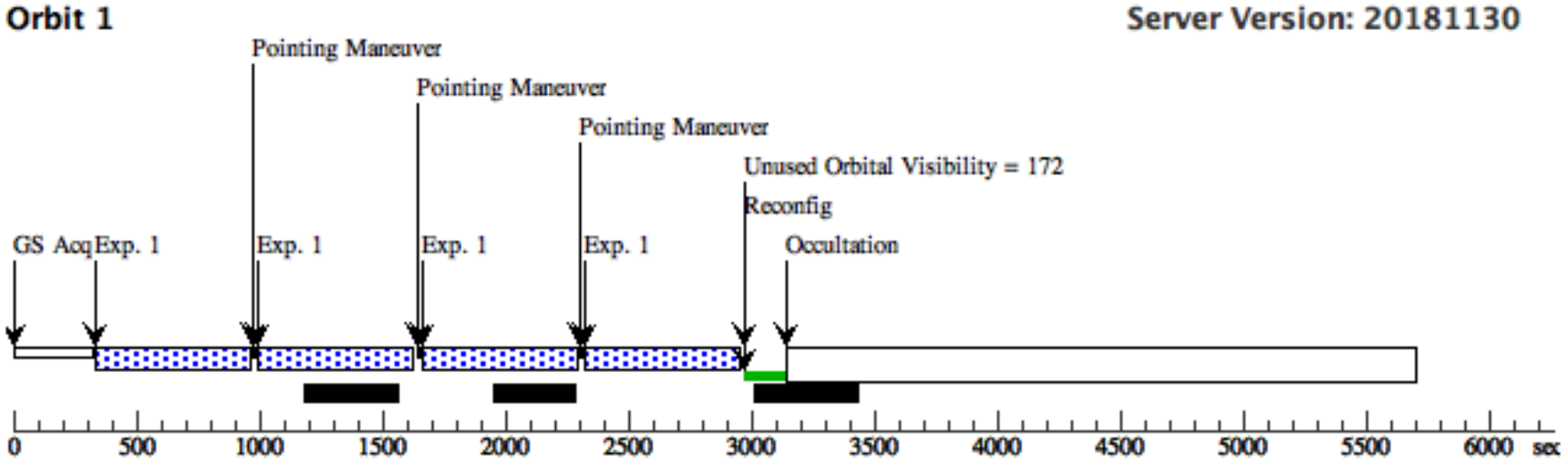
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	2229-0945-380	RA: 22 28 45.6880 (337.1903667d) Dec: -09 45 7.69 (-9.75214d) Equinox: J2000		V=35 m125=24.9 (ABmag)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[STARBURST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) 2229-0945-380	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=13; SAMP-SEQ=SPARS50		Pattern 1, Exps 1-1 in Visit 03 (1)	602.937703 Secs (2411.751 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15702, Visit 04, implementation Wed Apr 17 22:00:17 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 356D TO 6 D; ORIENT 86D TO 96 D

Comments: Orientation and position are specified to match previous observations in each field, but orientation is flexible between every 90 degree.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	1152+5434-32	RA: 11 51 49.1110 (177.9546292d) Dec: +54 33 50.10 (54.56392d) Equinox: J2000		V=35 m125=24.2 (ABmag)	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[STARBURST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(4) 1152+5434-32	WFC3/IR, MULTIACCUM, IR	F098M	NSAMP=14; SAMP-SEQ=SPARS50	GS ACQ SCENARIO BASE1B3	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