15436 - Understanding the Origin of Large Gas Reservoirs in Recently-Quenched Galaxies

Cycle: 25, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
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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) SDSSJ0912+1523	WFC3/IR	1	18-Dec-2017 16:03:42.0	yes
02	(2) SDSSJ2202-0033	WFC3/IR	1	18-Dec-2017 16:03:44.0	yes
03	(3) SDSSJ0027+0129	WFC3/IR	1	18-Dec-2017 16:03:45.0	yes

3 Total Orbits Used

ABSTRACT

The physical mechanisms that quench star formation, turning disky star-forming galaxies into quiescent elliptical galaxies, remain hotly debated. Post-starburst galaxies present a fascinating laboratory in which to study how star formation is suppressed, especially at z>~0.5 when these galaxies can be identified immediately after their primary star-forming epoch. We recently detected large molecular gas reservoirs in massive post-starburst galaxies at z~0.7 with ALMA-- much more gas than expected given their SFR. However, to fully interpret these remarkable ALMA results we must

understand the roles of highly obscured star formation and merging in these galaxies. Here, we propose to use the VLA to obtain 1.4GHz-based SFRs for our three ALMA targets; these data are essential to determine whether these objects are truly as quiescent as they appear. Non-detections would prove that these objects are among the least efficient known star-formers. We also have hints that mergers may be important in quenching these galaxies, but existing imaging does not resolve the galaxies: we therefore propose to use complementary HST imaging to study the morphology of these galaxies and search for merger signatures. Obtaining both VLA and HST data will also allow us to place these galaxies on the classical Kennicutt-Schmidt relation.

OBSERVING DESCRIPTION

For each of three z~0.6 bright post-starburst galaxy targets (i_AB ~ 15) we will perform a one-orbit observation of about 50 minutes. Each integration will be divided into five on-source integrations, plus 10 minutes for acquisition and dithers. We will take four dithers using the WFC3-IR-DITHER-BOX in order to properly sample the PSF. To maximize our dynamic range, we will use STEP50 with NSAMP=15. We take an additional exposure using STEP50 and NSAMP=15 at our last dither position to fill the orbit. The 10.6 min of overheads are divided into 6 min of acquisition, 0.3 x 4 for dithers, and 0.8 min of readout per exposure. We will observe with the WFC3-IR/F110W filter.

For the given exposure time, we will reach a surface brightness in F110W_AB of 25.9 (at 5sigma) in an aperture of 5 by 5 pixels. Given an average total magnitude of 19 and an approximate scale length of 0.4", we derive that we will observe the galaxies out to 3-4 scale lengths. With radial binning we will reach ~2 magnitudes deeper.

Visit

Proposal 15436, Visit 01, implementation Mon Dec 18 21:03:45 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=1.420 Line Spacing=0.919	Coordinate Frame=POS-TARG Pattern Orientation=17.370 Angle Between Sides=76.301 Center Pattern=false		(1)

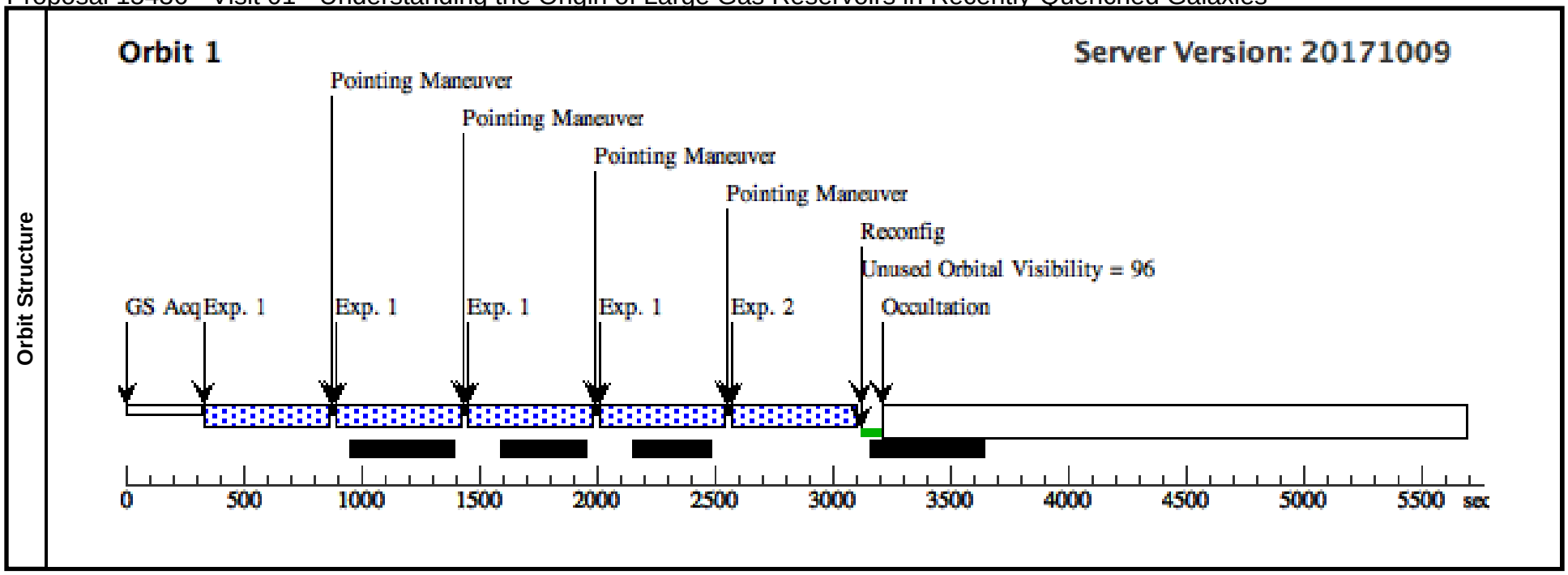
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SDSSJ0912+1523	RA: 09 12 42.7704 (138.1782100d) Dec: +15 23 5.25 (15.38479d) Equinox: J2000	Redshift: 0.747	V=(?) u_AB = 20.91 +/- 0.09, g_AB = 20.37 +/- 0.03, r_AB = 19.59 +/- 0.02, i_AB = 18.64 +/- 0.01, z_AB = 18.40 +/- 0.03	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[ELLIPTICAL, LENTICULAR, STARBURST, UNDESIGNATED]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SDSSJ0912+1523	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=15; SAMP-SEQ=STEP50		Pattern 1, Exps 1-1 in Visit 01 (1)	499.234285 Secs (1996.937 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(1) SDSSJ0912+1523	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=STEP50; NSAMP=15			499.234285 Secs (499.234 Secs) *[==>]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20171009
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Reconfig
Unused Orbital Visibility = 96
GS Acq
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 2
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 15436, Visit 02, implementation Mon Dec 18 21:03:46 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=1.420 Line Spacing=0.919	Coordinate Frame=POS-TARG Pattern Orientation=17.370 Angle Between Sides=76.301 Center Pattern=false		(1)

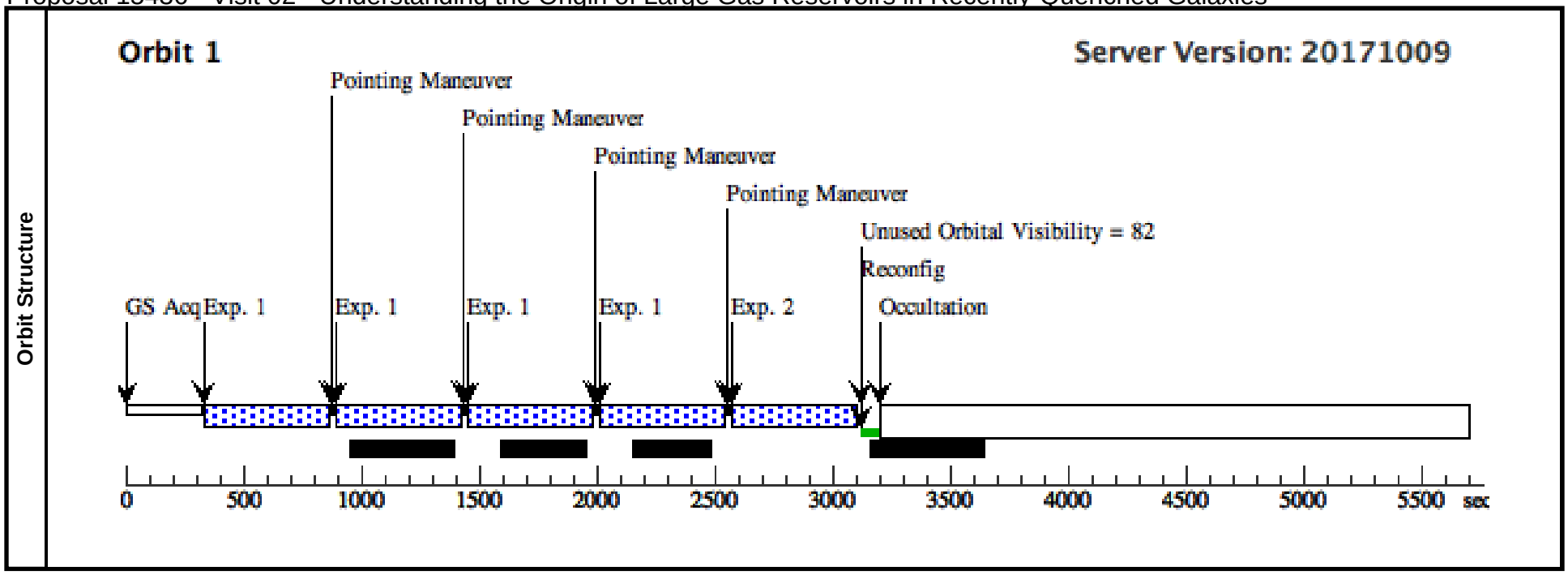
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SDSSJ2202-0033	RA: 22 02 24.2904 (330.6012100d) Dec: -00 33 34.39 (-.55955d) Equinox: J2000	Redshift: 0.657	V=(?) u_AB = 21.99 +/- 0.19, g_AB = 20.75 +/- 0.03, r_AB = 19.38 +/- 0.02, i_AB = 18.54 +/- 0.01, z_AB = 18.25 +/- 0.03	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[ELLIPTICAL, LENTICULAR, STARBURST, UNDESIGNATED]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) SDSSJ2202-0033	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=15; SAMP-SEQ=STEP50	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in Visit 02 (1)	499.234285 Secs (1996.937 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(2) SDSSJ2202-0033	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=STEP50; NSAMP=15			499.234285 Secs (499.234 Secs) *[==>]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20171009
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Unused Orbital Visibility = 82
Reconfig
GS Acq
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 2
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 15436, Visit 03, implementation Mon Dec 18 21:03:46 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=1.420 Line Spacing=0.919	Coordinate Frame=POS-TARG Pattern Orientation=17.370 Angle Between Sides=76.301 Center Pattern=false		(1)

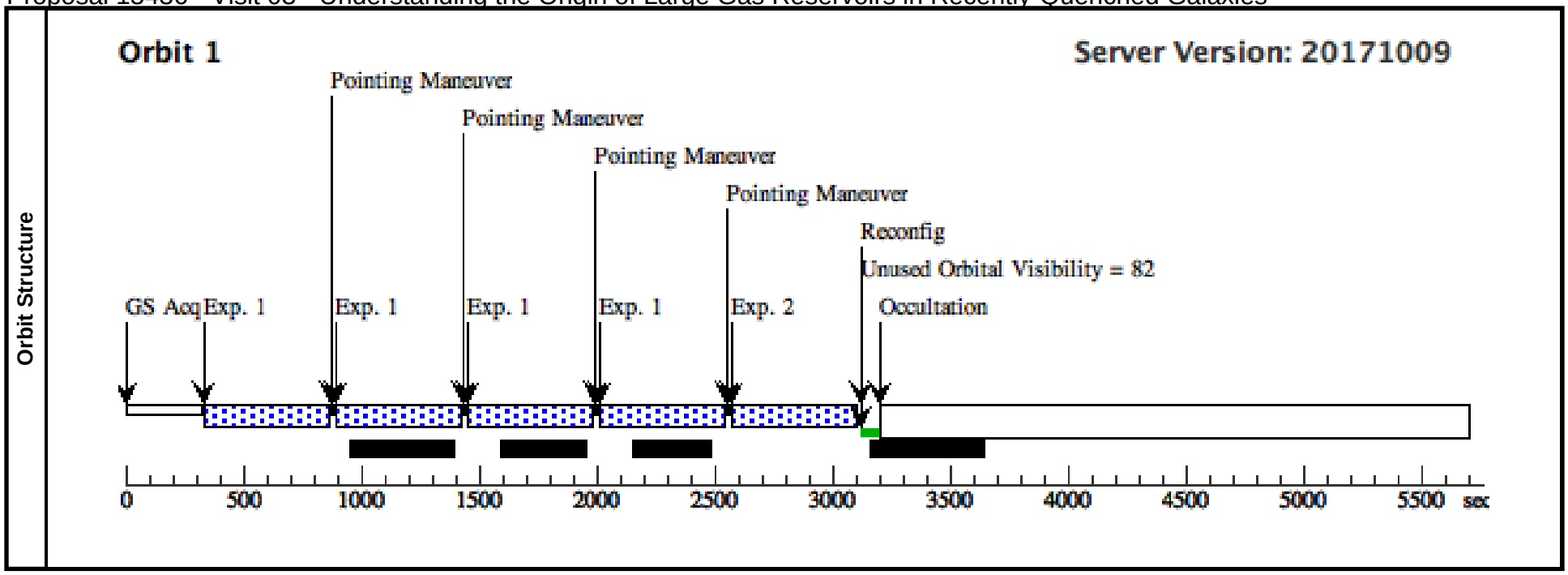
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	SDSSJ0027+0129	RA: 00 27 25.4406 (6.8560025d) Dec: +01 29 57.90 (1.49942d) Equinox: J2000	Redshift: 0.585	V=(?) u_AB = 22.01 +/- 0.28, g_AB = 20.95 +/- 0.05, r_AB = 19.26 +/- 0.02, i_AB = 18.57 +/- 0.01, z_AB = 18.32 +/- 0.04	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[ELLIPTICAL, LENTICULAR, STARBURST, UNDESIGNATED]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) SDSSJ0027+0129	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=15; SAMP-SEQ=STEP50		Pattern 1, Exps 1-1 in Visit 03 (1)	499.234285 Secs (1996.937 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(3) SDSSJ0027+0129	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=15; SAMP-SEQ=STEP50			499.234285 Secs (499.234 Secs) *[==>]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20171009
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Reconfig
Unused Orbital Visibility = 82
GS Acq
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 2
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec