



16891 - Galaxy Formation in the Extreme: Molecular Gas in Enormous Ly α Nebulae at $z \sim 2$

Cycle: 29, 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) Q2123-0050	WFC3/IR	1	28-Feb-2022 18:00:11.0	yes

1 Total Orbits Used

ABSTRACT

Massive galaxies at high- z are known to co-evolve with their circumgalactic medium (CGM), generally detected in Ly- α . The most extreme environments are Enormous Ly- α Nebulae (ELANe), found in the cores of proto-clusters. We propose to use the VLA to observe CO(1-0) in two spectacular ELANe from an ALMA survey at $z \sim 2$. Q1416+2649 shows gas across 100 kpc with an extremely broad FWHM (~ 1000 km/s), while Q2123-0050 shows companions with widely varying CO/CI line ratios and cold gas in the CGM. The CO(1-0) observations will give the most reliable estimates of the mass of the cold gas and trace the most extended molecular reservoirs. Together with the CO(4-3), [CI], and Ly α , the crucial CO(1-0) data will allow us to probe the physical conditions of the multi-phase gas in the various regions of these nebulae. We will compare this to similar studies done on the enigmatic Spiderweb and MAMMOTH-I nebulae. This will start to give us a handle on the statistical properties of the

various

molecular tracers in ELANe, and allow us to study massive galaxies.

OBSERVING DESCRIPTION

Our project contains 1 orbit. In this project, we have 1 target: Q2123-0050 and we will use WFC3/F105W filter to detect and resolve the small galaxies that occupy these nebulae, reveal their morphological details, and identify any stellar light outside the main body of these galaxies.

For cosmic ray rejection, we use 5 different exposures to populate this orbit. We checked the HST instrumentation handbook and we found that it suggests a 5 different exposures to populate a ~2600 sec exposure for a complete rejection of cosmic rays. Specifically, we use a wide 5-point pattern. We think these arrangements enables us to reject cosmic ray, and provide a half-pixel subsampling of the point-spread function (PSF) for each pointing.

We use a 1 visits to populate this orbit. We first use NSAMP= 12, SPARS=50 for the four exposures, and then a NSAMP=6, SPARS=50 exposure for the another exposure. We use IR-FIX to center each pointing, enabling to perfectly center the pointing in the detector. Our galaxies are randomly distributed in this field.

Proposal 16891 - Visit 01 - Galaxy Formation in the Extreme: Molecular Gas in Enormous Lya Nebulae at z~2

Mon Feb 28 23:00:12 GMT 2022

Visit	Proposal 16891, Visit 01, implementation				
	Diagnostic Status: No Diagnostics				
	Scientific Instruments: WFC3/IR				
	Special Requirements: (none)				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	Q2123-0050	RA: 21 23 29.4600 (320.8727500d) Dec: -00 50 52.90 (-.84803d) Equinox: J2000		V=16.34+/-0.01	Reference Frame: ICRS
	<i>Comments:</i> Category=GALAXY Description=[QSO]					

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) Q2123-0050	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=12	POS TARG 0.000,0 000			552.937252 Secs (552.937 Secs) [==>]	[1]
	2	(1) Q2123-0050	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=12	POS TARG 0.704,0 051			552.937252 Secs (552.937 Secs) [==>]	[1]
	3	(1) Q2123-0050	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=6	POS TARG 1.409,0 101			252.934546 Secs (252.935 Secs) [==>]	[1]
	4	(1) Q2123-0050	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=12	POS TARG 0.352,0 630			552.937252 Secs (552.937 Secs) [==>]	[1]
	5	(1) Q2123-0050	WFC3/IR, MULTIACCUM, IR-FIX	F105W	SAMP-SEQ=SPARS 50; NSAMP=12	POS TARG 1.057,0 681			552.937252 Secs (552.937 Secs) [==>]	[1]

