15958 - A global view of the UV rest-frame properties of a star-forming galaxy at z~6: the absorption lines, the lyman-alpha emission and the continuum.

Cycle: 27, 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) GRB-130606A	WFC3/IR	2	29-Aug-2019 19:00:35.0	yes
02	(1) GRB-130606A	WFC3/IR	2	29-Aug-2019 19:00:37.0	yes

4 Total Orbits Used

ABSTRACT

The characterization of star-forming galaxies impacting cosmic reionization is one of the primary scientific drivers of future space and ground missions. With the help of deep fields, currently we can study routinely their ultraviolet (UV) continuum and Lyman-alpha emission. However, to access the properties of their interstellar medium (ISM) absorbing gas is extremely difficult.

The host galaxy of the long gamma-ray burst GRB130606A at z~6 is the only very high-redshift galaxy for which the Lyman-alpha emission, the continuum and the ISM gas absorption are detected. Thanks to the absorption lines present in the GRB afterglow spectrum, it was possible to determine the neutral hydrogen content, the metallicity and dust depletion of the host galaxy ISM along the GRB line of sight.

At high redshift, long GRBs are thought to be associated with the bulk of star-forming galaxies. Therefore GRB130606A provides a unique global view on the UV properties of a typical faint high-redshift star forming galaxy. Indeed its Lyman-alpha luminosity is representative of Lyman-alpha emitters at these redshifts. Nonetheless we do not have enough information on its continuum properties to assess GRB130606A host place among the high-redshift galaxy population.

We ask here for 4 orbits of HST time to obtain WFC3/F105W and F160W observations, so as to be able to determine the UV spectral slope of the galaxy and compare it to that of lyman-break galaxies at the same redshift and having similar absolute magnitudes.

In addition to the characterization of the galaxy itself, these data will also be used to study for the first time of the counterparts of strong MgII absorbers at z>3.

OBSERVING DESCRIPTION

The host galaxy of GRB 130606A has been detected in the F140W filter of WFC3 with a magnitude of 26.34 (AB), and is compact (only marginally resolved). The aim of these observations is to determine the colours (in particular the rest-frame UV spectral slope 'beta') through observations in F105W and F160W. We therefore do not know the precise expected magnitudes in these bands, but can estimate extrema by assuming that F_lambda is proportional to lambda^beta, and -1 < beta < -3. In 7200s exposure time in F105W we then obtain a signal to noise in the range S/N=13-23 and in F160W we find a S/N=6-8 (note that because this is for varying spectral slope a minimum in one band corresponds to a maximum in the other, which offsets error introduced because of the uncertainty in this slope). This will enable us to measure beta to an accuracy of +/-0.3.

To dither we will use a 2-points line pattern with a 3-point line sub-pattern, optimizing the exposure time.

Visit

Proposal 15958, Visit 01, implementation Thu Aug 29 23:00:37 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 100%

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(1)	Pattern Type=LINE	Coordinate Frame=POS-TARG	Pattern Type=WFC3-IR-DITHER-LINE-3PT	Coordinate Frame=POS-TARG	(1)
	Purpose=DITHER	Pattern Orientation=41.859	Purpose=DITHER	Pattern Orientation=41.788	
	Number Of Points=2	Angle Between Sides=	Number Of Points=3	Angle Between Sides=	
	Point Spacing=5.183	Center Pattern=false	Point Spacing=0.605	Center Pattern=false	
	Line Spacing=		Line Spacing=		

Fixed Targets

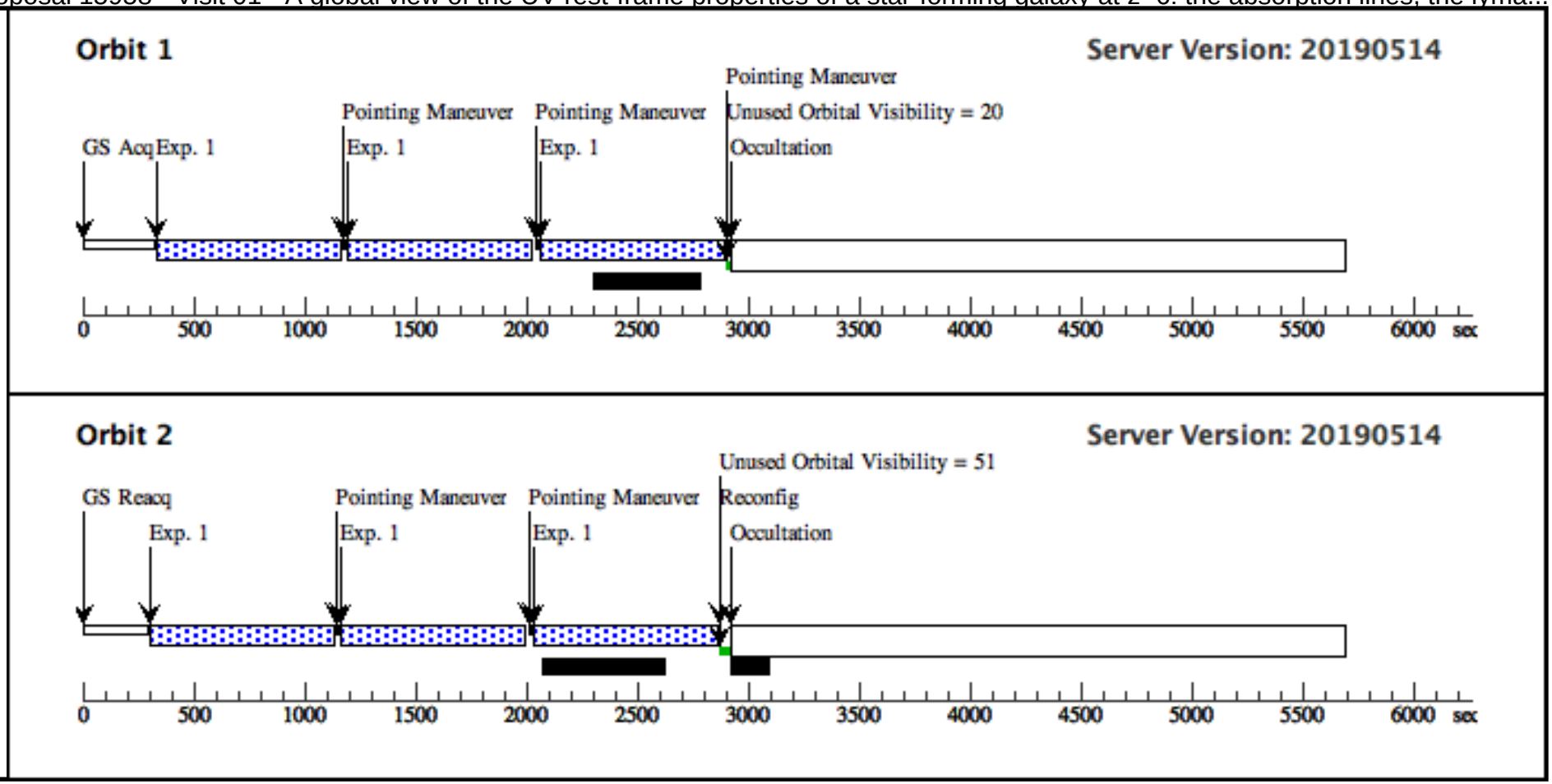
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB-130606A	RA: 16 37 35.1200 (249.3963333d)	Epoch of Position: 2015.5	V=(?)	Reference Frame: SIMBAD
		Dec: +29 47 46.40 (29.79622d)		WFC/F140W AB magnitude: 26.34	
		Equinox: J2000			

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[HIGH REDSHIFT GALAXY]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) GRB-130606A	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=9; SAMP-SEQ=SPARS100		Pattern 1, Exps 1-1 in Visit 01 (1)	802.934875 Secs (4817.609 Secs)	
								[==>(Pattern 1,1)]	***[1]***
								[==>(Pattern 1,2)]	
								[==>(Pattern 1,3)]	
								[==>(Pattern 2,1)]	***[2]***
								[==>(Pattern 2,2)]	
								[==>(Pattern 2,3)]	

Orbit Structure



Visit

Proposal 15958, Visit 02, implementation Thu Aug 29 23:00:37 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 80%

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(2)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true	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)	GRB-130606A	RA: 16 37 35.1200 (249.3963333d) Dec: +29 47 46.40 (29.79622d) Equinox: J2000	Epoch of Position: 2015.5	V=(?) WFC/F140W AB magnitude: 26.34	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[HIGH REDSHIFT GALAXY]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) GRB-130606A	WFC3/IR, MULTIACCUM, IR	F105W	NSAMP=13; SAMP-SEQ=SPARS50		Pattern 2, Exps 1-1 in Visit 02 (2)	602.937703 Secs (4823.502 Secs)	
								[==>(Pattern 1,1)] *[==>(Pattern 1,2)]* *[==>(Pattern 1,3)]* *[==>(Pattern 1,4)]*	***[1]***
								[==>(Pattern 2,1)] *[==>(Pattern 2,2)]* *[==>(Pattern 2,3)]* *[==>(Pattern 2,4)]*	***[2]***

Orbit Structure