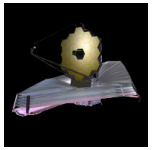

3807 - Deep grism spectroscopy of the complex environment around an extremely red quasar within an ultramassive host at z=3

Cycle: 2, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1	F150W	NIRISS Wide Field Slitless Spectroscopy	(1) J1652
	2	F200W	NIRISS Wide Field Slitless Spectroscopy	(1) J1652

ABSTRACT

Extremely red quasars (ERQs) are a fascinating high-redshift population characterised by high luminosities (exceeding 10^47 erg/s), powerful and rapid outflows and massive hosts. We propose to obtain NIRISS wide field grism observations of the field of

J1652, an ERQ at z~3 residing within an ultramassive host galaxy (log M > 11.4). Using these data, we will test the picture emerging from newly published JWST/NIRSpec observations which suggest that J1652 may be located in one of the densest protocluster environments at z~3 representing a merger of two or more dark matter halos. In more detail, NIRSpec observations have revealed a morphologically and kinematically complex environment within the 3"x3" field of view, containing extended structures and several close interacting companion galaxies which span a large spread in velocities (~1000 km/s). The proposed slitless grism spectroscopy will enable us to spectroscopically confirm cluster members on large scales and characterise their ages, masses and ionisation states probing AGN activity. In particular, the program will achieve the depth required to spectroscopically identify quiescent galaxies to study the evolutionary state of the protocluster/overdensity.

OBSERVING DESCRIPTION

We will use NIRISS WFSS to follow-up the field around J1652, a powerful extremely red quasar located within an overdense structure. As usual for grism observations, accompanying photometric images are also required for calibration purposes (one before and after observations with each orthogonal grism).

Our scientific goals require ~2.7h of total observing time, divided into 1.74h of grism observations with the F150W filter and 0.78h with F200W, as well as 0.2h of photometric images.
In detail, we choose 9 groups per integration and 1 integration per exposure in F150W, per grism. The readout pattern of choice is NIS, since the individual exposures are longer than 300 seconds. For F200W, we select 4 groups per integration and 1 integration per exposure for each of the two orthogonal grisms.
For dithering, we choose an 8-point MEDIUM pattern in both filters, suitable for extragalactic studies at moderate-to-high redshift.

As usual for the Wide Field Slitless Spectroscopy (WFSS) mode, we take a direct image for calibration purposes before and after each grism exposure. Each direct image is taken over ~97s, corresponding to 2 groups per integration and 1 integration per exposure.

Our grism observations will be sensitive at the 3-sigma level to an AB magnitude of 25 in HST/F160W for spatially resolved sources with an effective radius of 2 kpc. The direct images will be sensitive to magnitudes of 25.7, 26.6 for F150W and F200W, respectively.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	J1652	RA: 16 52 2.6400 (253.0110000d) Dec: +17 28 52.28 (17.48119d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[Quasars]
Extended=YES

Observation

Proposal 3807, Observation 1: F150W

Tue Aug 01 18:01:44 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRISS Wide Field Slitless Spectroscopy

Diagnostics

(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	J1652	RA: 16 52 2.6400 (253.0110000d) Dec: +17 28 52.28 (17.48119d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[Quasars]
Extended=YES

Dithers

#	Image Dithers	Pattern Size
1	8	MEDIUM

Direct Image

#	Exposure Type	Filter	Grism	Readout Pattern	Groups/Int	Integrations/Exp	Two Extra Dithers	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	DIRECT	F150W		NISRAPID	8	1	NO	1	1	96.631	
2	DIRECT	F150W		NISRAPID	8	1	NO	2	2	193.262	
3	DIRECT	F150W		NISRAPID	8	1	NO	1	1	96.631	

Spectral Elements

#	Exposure Type	Filter	Grism	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	GRISM	F150W	GR150R	NIS	9	1	8	8	3178.084	
2	GRISM	F150W	GR150C	NIS	9	1	8	8	3178.084	

Special Requirements

Aperture PA Range 0.56126717 to 33.56126717 Degrees (V3 0.0 to 33.0)
Aperture PA Range 40.36126717 to 121.56126717 Degrees (V3 39.8 to 121.0)
Aperture PA Range 131.06126717 to 210.06126717 Degrees (V3 130.5 to 209.5)
Aperture PA Range 213.26126717 to 263.36126717 Degrees (V3 212.7 to 262.8)
Aperture PA Range 264.76126717 to 301.26126717 Degrees (V3 264.2 to 300.7)
Aperture PA Range 305.66126717 to 350.56126717 Degrees (V3 305.1 to 350.0)
Aperture PA Range 354.36126717 to 0.46126717 Degrees (V3 353.8 to 359.9)

Observation

Proposal 3807, Observation 2: F200W

Tue Aug 01 18:01:44 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRISS Wide Field Slitless Spectroscopy

Diagnostics

(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	J1652	RA: 16 52 2.6400 (253.0110000d) Dec: +17 28 52.28 (17.48119d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[Quasars]
Extended=YES

Dithers

#	Image Dithers	Pattern Size
1	8	MEDIUM

Direct Image

#	Exposure Type	Filter	Grism	Readout Pattern	Groups/Int	Integrations/Exp	Two Extra Dithers	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	DIRECT	F200W		NISRAPID	8	1	NO	1	1	96.631	
2	DIRECT	F200W		NISRAPID	8	1	NO	2	2	193.262	
3	DIRECT	F200W		NISRAPID	8	1	NO	1	1	96.631	

Spectral Elements

#	Exposure Type	Filter	Grism	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	GRISM	F200W	GR150R	NISRAPID	16	1	8	8	1460.201	
2	GRISM	F200W	GR150C	NISRAPID	16	1	8	8	1460.201	

Special Requirements

Aperture PA Range 0.56126717 to 33.56126717 Degrees (V3 0.0 to 33.0)
Aperture PA Range 40.36126717 to 121.56126717 Degrees (V3 39.8 to 121.0)
Aperture PA Range 131.06126717 to 210.06126717 Degrees (V3 130.5 to 209.5)
Aperture PA Range 213.26126717 to 263.36126717 Degrees (V3 212.7 to 262.8)
Aperture PA Range 264.76126717 to 301.26126717 Degrees (V3 264.2 to 300.7)
Aperture PA Range 305.66126717 to 350.56126717 Degrees (V3 305.1 to 350.0)
Aperture PA Range 354.36126717 to 0.46126717 Degrees (V3 353.8 to 359.9)