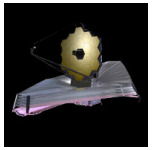

6576 - Did Radio AGN Feedback Quench the First Massive Galaxies?

Cycle: 3, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
COS-87259				
	6	IFU	NIRSpec IFU Spectroscopy	(1) COS-87259

ABSTRACT

Joint with Proposal VLA/24B-346: JWST is revealing an astonishing number of obscured AGN at z>6, as well as far more massive quiescent galaxies at z~4-5 than expected. Given the extreme rarity of unobscured quasars at z>6, these findings beg the question of whether radio-mode feedback from obscured AGN are driving the rapid quenching of early massive galaxies. Here, we propose to place the first empirical constraints on how efficiently obscured radio-loud z>6 AGN heat and expel gas from the ISM reservoirs of their massive host galaxies. This study is now made possible thanks to the new spectroscopic confirmation of a bright obscured radio AGN at z=6.853. Following established techniques applied at lower redshift, we will 1) conduct deep, high-resolution VLA continuum observations to precisely constrain where the AGN plasma jet is interacting with the interstellar gas that fuels star formation; 2) measure the 2D spatial and velocity profiles of warm ionized gas with JWST IFU observations to test for fast and broad gas emission spatially coincident with the radio jet, a clear signature of jet-gas interactions; and 3) quantify the mass outflow rate of ionized gas and constrain how efficiently mechanical jet energy couples to interstellar gas at z>6.

OBSERVING DESCRIPTION

To most efficiently achieve our science goals, we will utilize MIRI imaging and NIRSpec IFU spectroscopy. We design our observing strategy in accordance with the ETC to ensure all requisite sensitivities are achieved, as well as with the recommended observing strategies provided on the JWST User Documentation webpages.

We will conduct the MIRI imaging in F2100W, the most optimal filter for sensitivity and angular resolution in the far-red (>20 micron) where the host dust emission from the AGN completely dominates over the starlight. Our MIRI observations are conducted with the 4-POINT-SETS dither pattern with the 11 groups/integration and FASTR1 readout pattern needed to reach the requisite sensitivity while also avoiding saturation.

For the NIRSpec IFU observations, we will use the high spectral-resolution (R~2700) G395H grating to simultaneously cover several nebular ISM lines including [OII], [OIII], H-beta, and H-alpha. With this setup, we will obtain spatially-resolved constraints of gas kinematics, electron density, ionization parameter, and dust attenuation, enabling us to infer the mass outflow rate of warm ionized gas. We adopt a 4-point dither pattern to obtain sufficient background sampling and to improve spatial and spectral sampling. Following Cycle 1 GTO programs (e.g., program IDs 1215 and 1264) we utilize a single leakcal exposure for our target object to mitigate contaminating light from failed open MSA shutters. A single leakcal exposure is sufficient since our target does not lie in a crowded field. We reach our requisite sensitivity with 75 groups/int and 2 integrations/exposure using the NRSIRS2RAPID readout pattern.

Proposal 6576 - Targets - Did Radio AGN Feedback Quench the First Massive Galaxies?

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	COS-87259	RA: 09 58 58.2720 (149.7428000d) Dec: +01 39 20.00 (1.65556d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[Active galactic nuclei, High-redshift galaxies, Radio galaxies, Ultraluminous infrared galaxies]

Observation

Proposal 6576, Observation 6: IFU

Tue May 21 20:00:18 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 6:1) Warning (Form): Data Excess over lower threshold

(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	COS-87259	RA: 09 58 58.2720 (149.7428000d) Dec: +01 39 20.00 (1.65556d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[Active galactic nuclei, High-redshift galaxies, Radio galaxies, Ultraluminous infrared galaxies]

Template

TA Method
NONE

Dithers

#	Dither Type	Size	Starting Point	Number of Points	Points
1	4-POINT-DITHER				

Spectral Elements

#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	G395H/F290LP	NRSIRS2RAPID	75	2	false	true	NONE	4	8	8870.045	
2	G395H/F290LP	NRSIRS2RAPID	75	1	true	false	NONE	1	1	1108.756	