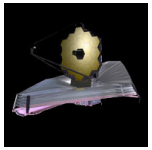

1964 - The role of radio AGN feedback in massive galaxies at z = 4 - 6

Cycle: 1, Proposal Category: GO

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
	1	G235H/G395H observations of TNJ1338-1942	NIRSpec IFU Spectroscopy	(4) Group TNJ1338-1942-GRP
	2	G395H observations of TGSS1530+1049	NIRSpec IFU Spectroscopy	(2) TGSSJ1530+1049

ABSTRACT

The evolution in the mass accretion rate and density of supermassive black holes (SMBHs) shows that the SMBHs in today's most massive galaxies formed in a relatively short time after the Big Bang. This biased growth of massive galaxies and SMBHs requires rapid accretion in the early Universe, coupled with a strong influence of SMBH activity on the hosts through powerful radio jets and radiation-driven winds. Luminous radio galaxies offer ideal laboratories for studying both modes of AGN ‘feedback’ and where the AGN does not outshine its host galaxy (unlike for quasars). With the NIRSpec/IFU it is now possible for the first time to spatially resolve the impact of AGN radio jets on their host galaxies in the rest-frame optical at $z > 4$.

We will target the rest-frame optical emission of two of the most distant, prototypical radio galaxies, TN J1338- 1942 (z=4.11) and TGSS J1530+1049 (z=5.72). We will spatially resolve the ionization state, kinematics and metallicity of the gas to constrain how AGN with large-scale radio jets inject energy and modify star-formation in the presence of infall and AGN- and starburst-driven winds. The data will also constrain the stellar populations, delineate the host galaxy morphologies, and detect broad emission lines in scattered light to derive black hole masses. Both objects will be observed with NIRCam in GTO to study their larger Mpc-scale environments. Together these programs will allow us to derive a complete picture of the evolution of some of the most massive and powerful radio AGN known in the early universe, from their energetic cores to their wider cosmic environments.

OBSERVING DESCRIPTION

NIRspec/IFU observations of two high redshift targets. Target TNJ1338-1942 will be observed with two dispersers (G235H and G395H) and by nodding off the source for background subtraction. Target TGSS J1530+1049 will be observed with one disperser (G395H) and by nodding on the source.

We use the readout pattern NRSIRS2 with 16 groups per integration, 2 integrations and 4 dither points for the target group TN J1338-1942-GRP which includes the target and the nod off-scene background pointing. We use the readout pattern NRSIRS2 with 19 groups per integration, 5 integrations and 4 dithers for the target TGSS J1530+1049, which will have nod in-scene background subtraction using the 4-point nod.

We do not require target acquisition as TN J1338-1942 has available deep HST as well as high-resolution radio imaging, and TGSS J1530+1049 has Very Long Baseline Interferometry (VLBI) radio imaging available with sub-arcsecond resolution.

NOTE: ROLL ANGLE CONSTRAINTS ADDED IN ORDER TO AVOID LEAKAGE DUE TO A RELATIVELY BRIGHT IR OBJECT FALLING ON THE MSA

Proposal 1964 - Targets - The role of radio AGN feedback in massive galaxies at z = 4 - 6

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	TNJ1338-1942	RA: 13 38 26.0600 (204.6085833d) Dec: -19 42 30.40 (-19.70844d) Equinox: J2000		
Comments: This radio galaxy is at z = 4.11. HST imaging shows that the galaxy is clumpy and extended, therefore, we use a dedicated background observation off-scene for accurate sky estimation. *Category=Galaxy* *Description=[Radio galaxies]* *Extended=YES*				
(2)	TGSSJ1530+1049	RA: 15 30 49.9000 (232.7079167d) Dec: +10 49 30.68 (10.82519d) Equinox: J2000		
Comments: This target is a radio galaxy at z = 5.72. Owing to its compact size, nodding in scene is sufficient to subtract the background. *Category=Galaxy* *Description=[Radio galaxies]* *Extended=YES*				
(3)	TNJ1338-1942-BACKGROUND	RA: 13 38 26.0682 (204.6086175d) Dec: -19 42 34.92 (-19.70970d) Equinox: J2000		
Comments: This target is the background subtraction pointing for TN J1338-1942. *Category=Calibration* *Description=[Telescope/sky background]*				
(4)	Group TNJ1338-1942-GRP			
Comments: *Target Selection=[1 TNJ1338-1942, 3 TNJ1338-1942-BACKGROUND]*				

Observation

Proposal 1964, Observation 1: G235H/G395H observations of TNJ1338-1942 Mon Nov 21 20:01:25 GMT 2022

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Background Observations:[]

Diagnostics

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

(Visit 1:1) Warning (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(4)	Group TNJ1338-1942-GRP			

Comments:
Target Selection=[1 TNJ1338-1942, 3 TNJ1338-1942-BACKGROUND]

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	G235H/F170LP	NRSIRS2	16	2	false	true	NONE	4	8	9453.601	55697.1
2	G395H/F290LP	NRSIRS2	16	2	false	true	NONE	4	8	9453.601	55697.3

Special Requirements

Aperture PA Range 76.89297485 to 85.89297485 Degrees (V3 297.92044067 to 306.92044067)

Observation

Proposal 1964, Observation 2: G395H observations of TGSS1530+1049 Mon Nov 21 20:01:25 GMT 2022

Diagnostic Status: Warning

Observing Template: NIRSpec IFU 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
(2)	TGSSJ1530+1049	RA: 15 30 49.9000 (232.7079167d) Dec: +10 49 30.68 (10.82519d) Equinox: J2000		

Comments: This target is a radio galaxy at z = 5.72. Owing to its compact size, nodding in scene is sufficient to subtract the background.
Category=Galaxy
Description=[Radio galaxies]
Extended=YES

Template

TA Method
NONE

Dithers

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

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	NRSIRS2	19	5	false	true	NONE	4	20	28010.669	55697.2

Special Requirements

Aperture PA Range 227.89297485 to 321.89297485 Degrees (V3 88.92044067 to 182.92044067)