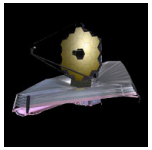

3084 - First spatially resolved characterization of a radio-driven outflow at z~6

Cycle: 2, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
P352 NIRSPEC IFU				
	1	NIRSPEC IFU	NIRSpec IFU Spectroscopy	(1) P352-15

ABSTRACT

The interactions between radio jets and the interstellar medium play a defining role in the co-evolution of supermassive black holes and stellar masses in galaxies. However, observations of such feedback processes are currently limited to cosmic noon (z~2-3) and non-existent at earlier cosmic

epochs. The lack of constraints on kinetic feedback from high-redshift (z~6) quasars leaves great uncertainty in theoretical models of early galaxy and black hole growth. Here we propose NIRSpec IFU observations to finally investigate this frontier, targeting the z~6 quasar hosting the largest galactic-scale (~1.7 kpc) radio jet known at this cosmic epoch. ALMA observations revealed that the jet is co-spatial with an outflow traced by [CII] gas. Through our observations, we will probe the morphology and kinematics of the warm ionized gas in [OIII] (as well as other key outflow tracers such as H-alpha and H-beta). We will test whether the gas shows signs of interaction with the radio jets and the [CII] outflow. If the [OIII] is radio-driven, we can set novel constraints on the apparent striking absence of giant radio jets at z>4. We will establish whether these jets exist, but the CMB quenches their radio emission or if the ISM conditions in the early Universe prevent their existence. Finally, this program will provide the first spatially resolved multi-phase characterization of AGN feedback processes underway during the formation of a massive galaxy in the Universe's first billion years.

OBSERVING DESCRIPTION

The target of this proposal is the only quasar at z~6 with a kpc-scale radio jet known. Moreover, it has an associated [CII] outflow. We propose one pointing of NIRSpec IFU with the G395H/F290L setup. The main goal is to map the morphology and dynamics of the warm ionized gas of the host galaxy.

We do not require target acquisition as we have very accurate coordinates and the entire system is contained within 1 arcsec^2.

Proposal 3084 - Targets - First spatially resolved characterization of a radio-driven outflow at z~6

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	P352-15	RA: 23 29 36.8363 (352.4034846d) Dec: -15 20 14.46 (-15.33735d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[Quasars, Radio jets, Radio loud quasars]
Extended=YES

Observation

Proposal 3084, Observation 1: NIRSPEC IFU

Wed May 10 23:15:40 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec IFU 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)	P352-15	RA: 23 29 36.8363 (352.4034846d) Dec: -15 20 14.46 (-15.33735d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[Quasars, Radio jets, Radio loud quasars]
Extended=YES

Template

TA Method
NONE

Dithers

#	Dither Type	Size	Starting Point	Number of Points	Points
1	CYCLING	SMALL	1	9	

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	20	3	false	true	NONE	9	27	39783.903	142962