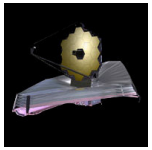

1875 - Kinetic and Chemical feedback in Radio-Quiet AGN as a driver of the Galaxy Evolution - Revealed in ESO 420-G13

Cycle: 1, Proposal Category: GO

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
ESO420-G13				
	1	Nuclear outflow	MIRI Medium Resolution Spectroscopy	(1) ESO420-G13
	2	Nuclear outflow	MIRI Medium Resolution Spectroscopy	(2) ESO420-G13-BACKGROUND

ABSTRACT

We propose JWST/MIRI medium resolution spectroscopic observations of the multi-phase outflow in ESO 420-G13 to obtain: i) the mass and the energy budget for both the ionized and the molecular wind components; ii) the first IR-based determination of the chemical abundances and the metal-loading factor in a AGN-driven outflow. The mass and the energy budget will then be compared with current AGN feedback simulations, to determine the role of the ionized wind in the acceleration and dispersion of the molecular gas and the origin of the outflowing material. IR-based metallicities in the outflow of ESO 420-G13 can provide the first direct evidence of whether AGN-driven outflows regulate the content of heavy elements in galaxies. Chemical abundances based on IR transitions are insensitive to the dust obscuration and the temperature effects that introduce serious biases in stratified and inhomogeneous nebulae, conditions that are expected when a strong galactic wind is present. This study will provide unique insight into the feedback processes in low-luminosity AGN, the most common form of activity in the nearby Universe. ESO 420-G13 represents one of the two cases where a radio-elusive jet has been revealed through its interaction with the ISM, and the only one where the ionized phase of the outflow has been revealed in the [NeII] 12.8 micron emission line, distinguishing this source as an ideal laboratory to study the supermassive black hole-ISM interaction with JWST.

OBSERVING DESCRIPTION

We propose JWST/MIRI MRS observations of the ionized and molecular gas outflow in the low-luminosity AGN ESO 420-G13, to derive the mass and the energy budget for both components and provide the first IR-based measurement of the chemical abundances and the metal-loading factor in an AGN-driven wind. Our main goal is to characterize the AGN feedback mechanism, determine the origin of the outflowing material, and probe whether AGN-driven outflows are able to regulate the content of heavy elements in galaxies. Mosaic observations of the central 6"x6" (1.5 x 1.5 kpc2) using a 4-point dither pattern are proposed for the three dichroic settings, to cover the bridge between the inner ionized outflow detected in the [NeII] 12.8 micron line with VLT/VISIR and the cold molecular gas outflow detected in CO(2-1) with ALMA. A dedicated sky acquisition is included to subtract the background contribution, to be executed next to the science acquisition. No other special requirements are requested. The total exposure time is 45 min., corresponding to a total observing time of 4.0 hours including the overheads.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	ESO420-G13	RA: 04 13 49.6990 (63.4570792d) Dec: -32 00 25.20 (-32.00700d) Equinox: J2000	Epoch of Position: 2015.5	
Comments: *Category=Galaxy* *Description=[Emission line galaxies, Galaxy jets, Infrared galaxies, Radio jets, Seyfert galaxies]* *Extended=YES*				
(2)	ESO420-G13-BACKGROUND	RA: 04 13 46.1167 (63.4421529d) Dec: -31 59 33.30 (-31.99258d) Equinox: J2000	Epoch of Position: 2015.5	
Comments: *Category=Galaxy* *Description=[Emission line galaxies, Galaxy jets, Infrared galaxies, Radio jets, Seyfert galaxies]* *Extended=YES*				

Observation

Proposal 1875, Observation 1: Nuclear outflow Mon Nov 14 23:01:15 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[Nuclear outflow (Obs 2)]

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)	ESO420-G13	RA: 04 13 49.6990 (63.4570792d) Dec: -32 00 25.20 (-32.00700d) Equinox: J2000	Epoch of Position: 2015.5	

Comments:
Category=Galaxy
Description=[Emission line galaxies, Galaxy jets, Infrared galaxies, Radio jets, Seyfert galaxies]
Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray
	ALL	YES	FULL

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift	Column shift	Tile Order
2	2	10.0	10.0	0.0	0.0	DEFAULT

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	EXTENDED SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F1000W	FASTR1	5	2	1	Dither 1	4	8	122.102	
1	LONG(C)	MRSLONG		FASTR1	15	1	1	Dither 1	4	4	166.502	
1	LONG(C)	MRSSHORT		FASTR1	15	1	1	Dither 1	4	4	166.502	
2		IMAGER	F770W	FASTR1	5	3	1	Dither 1	4	12	188.703	
2	MEDIUM(B)	MRSLONG		FASTR1	20	1	1	Dither 1	4	4	222.003	
2	MEDIUM(B)	MRSSHORT		FASTR1	20	1	1	Dither 1	4	4	222.003	
3		IMAGER	F560W	FASTR1	5	3	1	Dither 1	4	12	188.703	
3	SHORT(A)	MRSLONG		FASTR1	20	1	1	Dither 1	4	4	222.003	
3	SHORT(A)	MRSSHORT		FASTR1	20	1	1	Dither 1	4	4	222.003	

Special Requirements	Sequence Observations 1, 2, Non-interruptible

Observation

Proposal 1875, Observation 2: Nuclear outflow Mon Nov 14 23:01:15 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [Nuclear outflow (Obs 1)]

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)	ESO420-G13-BACKGROUND	RA: 04 13 46.1167 (63.4421529d) Dec: -31 59 33.30 (-31.99258d) Equinox: J2000	Epoch of Position: 2015.5	

Comments:
Category=Galaxy
Description=[Emission line galaxies, Galaxy jets, Infrared galaxies, Radio jets, Seyfert galaxies]
Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray
	ALL	YES	FULL

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F1000W	FASTR1	5	2	1	None	1	2	30.525	
1	LONG(C)	MRSLONG		FASTR1	15	1	1	None	1	1	41.626	
1	LONG(C)	MRSSHORT		FASTR1	15	1	1	None	1	1	41.626	
2		IMAGER	F770W	FASTR1	5	3	1	None	1	3	47.176	
2	MEDIUM(B)	MRSLONG		FASTR1	20	1	1	None	1	1	55.501	
2	MEDIUM(B)	MRSSHORT		FASTR1	20	1	1	None	1	1	55.501	
3		IMAGER	F560W	FASTR1	5	3	1	None	1	3	47.176	
3	SHORT(A)	MRSLONG		FASTR1	20	1	1	None	1	1	55.501	
3	SHORT(A)	MRSSHORT		FASTR1	20	1	1	None	1	1	55.501	

Special Requirements	Sequence Observations 1, 2, Non-interruptible