



# 12405 - Illuminating the origins of extreme OVI emission in the Circumgalactic Medium of J1156 with JWST/MIRI

Cycle: 5, Proposal Category: GO

## INVESTIGATORS

<i>Name</i>	<i>Institution</i>
<b>Dr. Alberto Saldana-Lopez (PI) (ESA Member)</b>	<b>Stockholm University</b>
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Dr. Kate Rubin (CoI) (US Admin CoI)	San Diego State University
Dr. Alison L. Coil (CoI)	University of California - San Diego
Prof. Jay Christopher Howk (CoI)	University of Notre Dame
Dr. Matilde Mingozzi (CoI) (ESA Member)	Space Telescope Science Institute - ESA - JWST
Dr. Macarena Garcia del Valle-Espinosa (CoI)	Space Telescope Science Institute
Prof. Claudia Scarlata (CoI)	University of Minnesota - Twin Cities

## OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
Observation Folder				
	1	J1156+50	MIRI Medium Resolution Spectroscopy	(1) J1156+50
	2	J1156+50-BKG	MIRI Medium Resolution Spectroscopy	(2) J1156+50-BKG

## ABSTRACT

The galaxy J115630.63+500822.1 (J1156) hosts the first resolved detection of an OVI-emitting halo extending up to 25 kpc into the circumgalactic medium (CGM). This warm-hot phase, traced by highly ionized oxygen (IP = 138 eV), reveals a critical yet poorly understood stage of the Baryon Cycle, where feedback, cooling, and metal recycling converge. HST imaging uncovered an asymmetric OVI hotspot devoid of optical counterparts, while new Keck/KCWI data show elevated gas velocity dispersions coincident with the same region, suggesting the presence of shocked or entrained

gas at the wind–CGM interface.

We propose JWST MIRI/MRS observations to determine the physical origin of this extreme ionization in the CGM of J1156 . By mapping mid-IR transitions ([Ne II], [Ne III], [Ne V], [Ne VI]) across the starburst and the OVI halo, we will distinguish between stellar, shock-driven, or AGN-related excitation mechanisms through established diagnostic ratios. These data will provide the first unobscured view of the multiphase CGM in emission, directly connecting ionization conditions to galactic feedback processes. Beyond tracing the O VI phase, MIRI will also probe warm dust, PAHs, and molecular H<sub>2</sub> emission, offering unprecedented insight into how starburst-driven winds shape the gaseous halos of low-mass galaxies.

### **OBSERVING DESCRIPTION**

We request a single pointing with MIRI-MRS to map the mid-IR SED of J1156. Observations of the three MIRI-MRS gratings, SHORT (a), MEDIUM (b) and LONG (c), are needed to provide the wavelength coverage (from 4.9  $\mu\text{m}$  to 28  $\mu\text{m}$ ) necessary for the detection of the targeted lines [NeII], [NeIII], [NeV], [NeVI], [SIII] and [SIV], among others. We use the default readout pattern FASTR1, which better samples the ramps. We choose a 4-dither pattern to properly sample the PSF. With 100 groups and 4 integrations, we reach a  $S/N > 5$  in the faint emission line [NeV]. Dedicated background observations are requested as well, and place in a non-interruptable sequence.

Proposal 12405 - Targets - Illuminating the origins of extreme OVI emission in the Circumgalactic Medium of J1156 with JWST/MIRI

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	J1156+50	RA: 11 56 30.6200 (179.1275833d) Dec: +50 08 22.10 (50.13947d) Equinox: J2000		
<i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Starburst galaxies]</i> <i>Extended=YES</i>				
(2)	J1156+50-BKG	RA: 11 56 30.7906 (179.1282942d) Dec: +50 08 37.18 (50.14366d) Equinox: J2000		
<i>Comments:</i> <i>Category=Calibration</i> <i>Description=[Telescope/sky background]</i> <i>Extended=YES</i>				

Proposal 12405 - Observation 1 - Illuminating the origins of extreme OVI emission in the Circumgalactic Medium of J1156 with JWST/...

Fri Mar 13 23:04:08 GMT 2026

<b>Observation</b>	<b>Proposal 12405, Observation 1: J1156+50</b> <b>Diagnostic Status: Warning</b> Observing Template: MIRI Medium Resolution Spectroscopy Background Observations:[J1156+50-BKG (Obs 2)]																																																																																																																																													
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Special Requirements

Group Observations 1, 2, Non-interruptible

Proposal 12405 - Observation 2 - Illuminating the origins of extreme OVI emission in the Circumgalactic Medium of J1156 with JWST/...

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