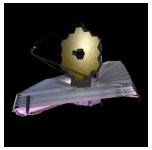

1626 - A Revolutionary Panchromatic View of Early Galaxy Growth via NIRSpec/IFU Observations of 12 Massive z>6.5 Galaxies with ALMA-derived [CII] redshifts

Cycle: 1, Proposal Category: GO

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1		NIRSpec IFU Spectroscopy	(1) REBELS-05
	2		NIRSpec IFU Spectroscopy	(2) REBELS-08
	3		NIRSpec IFU Spectroscopy	(3) REBELS-12
	4		NIRSpec IFU Spectroscopy	(4) REBELS-14
	5		NIRSpec IFU Spectroscopy	(5) REBELS-15
	7		NIRSpec IFU Spectroscopy	(7) REBELS-25
	8		NIRSpec IFU Spectroscopy	(8) REBELS-29
	9		NIRSpec IFU Spectroscopy	(9) REBELS-32
	10		NIRSpec IFU Spectroscopy	(10) REBELS-34
	11		NIRSpec IFU Spectroscopy	(11) REBELS-38
	12		NIRSpec IFU Spectroscopy	(12) REBELS-39
	52		NIRSpec IFU Spectroscopy	(12) REBELS-39
	54		NIRSpec IFU Spectroscopy	(4) REBELS-14

ABSTRACT

One of the most significant longstanding questions is how rapidly the most massive galaxies build up in the early universe. Addressing this question directly has not been possible due to a lack of a sizeable sample of spectroscopically-confirmed, especially high-mass galaxies in the early Universe on which to execute physical studies. Excitingly enough, we are now on the brink of making significant progress thanks to identification of a large sample of massive galaxies in the z>6.5 universe from ongoing ALMA large program observations. Galaxies have spectroscopic redshifts from [CII] and show prominent emission in the far-IR. We propose to obtain NIRSpec IFU R100 observations for 12 of the brightest [CII]-detected sources from this sample. Our IFU observations will provide us with a unique high spatial resolution view of both the stellar mass and unobscured star formation rates in these high-mass sources, as well as the metallicity and radiation fields. Thanks to the size of our sample, we will be able to evaluate the efficiency of star formation in galaxies at early times, determine the impact of merger-driven star formation on stellar mass growth in

z>6 galaxies, and explore correlations between a wide variety of different physical properties deriveable from the joint JWST+ALMA data set. The significantly higher mass/SFRs of sources in our sample as compared to JADES and CEERS program will allow us to uniquely explore the properties of galaxies to very high masses. The resulting JWST+ALMA dataset will establish a reference sample of reionization epoch galaxies with unique panchromatic information for the JWST era and beyond.

OBSERVING DESCRIPTION

This program targets 12 exceptionally bright (mH~24.5-25) star-forming galaxies spectroscopically confirmed to lie at z~7 based on the detection of [CII]158um line with ALMA, which also provides dust continuum detection for 9 of them. The purpose of our proposed JWST NIRSpec/IFU R100 Prism observations is to obtain both integrated and spatially resolved constraints on the stellar mass, unobscured star formation rates, and radiation fields for significant sample of especially massive [CII]-detected galaxies at z>6.5. Our proposed IFU data would allow us to characterize the extent to which star formation in high-redshift galaxies is especially efficient at early times, determine the impact of merger-driven star formation on stellar mass growth in z>6 galaxies, and characterize the ionization fields. To execute our scientific goals efficiently, we propose to observe each source with an on-source integration time of 1730sec. Given we expect our sources could be composed by two or more clumps (~1arcsec apart), we adopt a 4-point dither, providing sub-pixel sampling to improve the spatial resolution of our observations.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	REBELS-05	RA: 02 18 11.5100 (34.5479583d) Dec: -05 00 59.30 (-5.01647d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-break galaxies]*				
(2)	REBELS-08	RA: 02 19 35.1300 (34.8963750d) Dec: -05 23 19.20 (-5.38867d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-break galaxies]*				
(3)	REBELS-12	RA: 02 25 7.9400 (36.2830833d) Dec: -05 06 40.70 (-5.11131d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-break galaxies]*				
(4)	REBELS-14	RA: 02 26 46.1900 (36.6924583d) Dec: -04 59 53.50 (-4.99819d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-break galaxies]*				
(5)	REBELS-15	RA: 02 27 13.1100 (36.8046250d) Dec: -04 17 59.20 (-4.29978d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-break galaxies]*				
(7)	REBELS-25	RA: 10 00 32.3200 (150.1346667d) Dec: +01 44 31.30 (1.74203d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-break galaxies]*				
(8)	REBELS-29	RA: 10 01 36.8500 (150.4035417d) Dec: +02 37 49.10 (2.63031d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-break galaxies]*				
(9)	REBELS-32	RA: 10 01 59.0700 (150.4961250d) Dec: +01 53 27.50 (1.89097d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-break galaxies]*				

	(10)	REBELS-34	RA: 10 02 6.4700 (150.5269583d) Dec: +02 13 24.20 (2.22339d) Equinox: J2000
	Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-break galaxies]*		
	(11)	REBELS-38	RA: 10 02 54.0500 (150.7252083d) Dec: +02 42 12.00 (2.70333d) Equinox: J2000
	Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-break galaxies]*		
	(12)	REBELS-39	RA: 10 03 5.2500 (150.7718750d) Dec: +02 18 42.70 (2.31186d) Equinox: J2000
	Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-break galaxies]*		

Observation

Proposal 1626, Observation 1

Mon Jul 07 21:00:12 GMT 2025

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)	REBELS-05	RA: 02 18 11.5100 (34.5479583d) Dec: -05 00 59.30 (-5.01647d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	

Observation

Proposal 1626, Observation 2

Mon Jul 07 21:00:12 GMT 2025

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)	REBELS-08	RA: 02 19 35.1300 (34.8963750d) Dec: -05 23 19.20 (-5.38867d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	

Observation

Proposal 1626, Observation 3

Mon Jul 07 21:00:12 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(3)	REBELS-12	RA: 02 25 7.9400 (36.2830833d) Dec: -05 06 40.70 (-5.11131d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	

Observation

Proposal 1626, Observation 4

Mon Jul 07 21:00:12 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(4)	REBELS-14	RA: 02 26 46.1900 (36.6924583d) Dec: -04 59 53.50 (-4.99819d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	

Observation

Proposal 1626, Observation 5

Mon Jul 07 21:00:12 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(5)	REBELS-15	RA: 02 27 13.1100 (36.8046250d) Dec: -04 17 59.20 (-4.29978d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	

Observation

Proposal 1626, Observation 7

Mon Jul 07 21:00:12 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(7)	REBELS-25	RA: 10 00 32.3200 (150.1346667d) Dec: +01 44 31.30 (1.74203d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	

Observation

Proposal 1626, Observation 8

Mon Jul 07 21:00:12 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 8:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(8)	REBELS-29	RA: 10 01 36.8500 (150.4035417d) Dec: +02 37 49.10 (2.63031d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	

Observation

Proposal 1626, Observation 9

Mon Jul 07 21:00:12 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(9)	REBELS-32	RA: 10 01 59.0700 (150.4961250d) Dec: +01 53 27.50 (1.89097d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	31	1	false	true	NONE	4	4	1867.378	

Observation

Proposal 1626, Observation 10

Mon Jul 07 21:00:12 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 10:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(10)	REBELS-34	RA: 10 02 6.4700 (150.5269583d) Dec: +02 13 24.20 (2.22339d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	

Observation

Proposal 1626, Observation 11

Mon Jul 07 21:00:12 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 11:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(11)	REBELS-38	RA: 10 02 54.0500 (150.7252083d) Dec: +02 42 12.00 (2.70333d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	

Observation

Proposal 1626, Observation 12

Mon Jul 07 21:00:12 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 12:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(12)	REBELS-39	RA: 10 03 5.2500 (150.7718750d) Dec: +02 18 42.70 (2.31186d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	

Observation

Proposal 1626, Observation 52

Mon Jul 07 21:00:12 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Comments: This is a repeat of skipped observation 12.

Diagnostics

(Visit 52:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(12)	REBELS-39	RA: 10 03 5.2500 (150.7718750d) Dec: +02 18 42.70 (2.31186d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	

Observation

Proposal 1626, Observation 54

Mon Jul 07 21:00:12 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Comments: Repeat of skipped observation 4

Diagnostics

(Visit 54:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(4)	REBELS-14	RA: 02 26 46.1900 (36.6924583d) Dec: -04 59 53.50 (-4.99819d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-break galaxies]

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	29	1	false	true	NONE	4	4	1750.667	