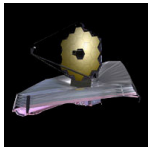

2674 - Environmental effects on galaxy evolution in a z=5.2 proto-cluster

Cycle: 1, Proposal Category: GO

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
NIRSpec MOS				
	1	P1_final_MSATA_0x0_0.01	NIRSpec MultiObject Spectroscopy	(1) P1-GO-2674-FINAL-CAT
	2	P2_final_MSATA_0x0_0.01	NIRSpec MultiObject Spectroscopy	(2) P2-GO-2674-FINAL-CAT
	3	P3_final_MSATA_0x0_0.01	NIRSpec MultiObject Spectroscopy	(3) P3-GO-2674-FINAL-CAT
	4	P4_final_MSATA_0x0_0.01	NIRSpec MultiObject Spectroscopy	(4) P4-GO-2674-FINAL-CAT

ABSTRACT

Galaxy clusters are the most massive gravitationally bound structures in the Universe and they play a key role in our understanding of structure formation and galaxy evolution. The particular conditions of these high density environments can have a significant effect on the evolution of galaxies. Previous studies have reported systematic differences in SFR, age and mass between field galaxies and galaxies in large clusters at z<2.5. However, we know little about how overdense environments affect the evolution of galaxies at z > 3.

We propose to use 15 h of NIRSpec and NIRCam parallel observations to measure optical nebular line emission properties for a well-defined sample of proto-cluster galaxies at z=5.2. Our target sample contains 11 spectroscopically confirmed members of the proto-cluster and 15 new candidates with accurate photometric redshifts, as well as 66 other field galaxies at similar redshifts, in order to: 1) use emission line diagnostics and stellar population modeling to directly compare properties of galaxies in high- and lower-density environments for the first time at this early cosmic epoch; 2) substantially increase the number of confirmed proto-cluster members, allowing a detailed characterization of the dynamical state of the overdensity, the identification of internal sub-structures through the analysis of the velocity dispersion, and application of cluster evolution formalism to trace the expected evolution of this large proto-cluster with redshift, and its eventual end as a Coma-like cluster at z=0; and 3) compare the Ly-alpha escape fraction for z~5 galaxies in and out of the proto-cluster environment.

OBSERVING DESCRIPTION

The main goal of our observation is the detection of [OIII]4959,5007 and H-alpha for a well-defined sample of members of aproto-cluster at z~5.2, with the expectancy of also detecting H-beta, [NII]6548,6583 and/or [SII]6716,6731 in some of the brightest targets.

Using APT and the MSA Preparation Tool (MPT), we tested all the different possible aperture position angles (APAs) and found an optimal orientation of 330 deg.
This optimization is specially relevant for the two first MSA configurations of our program. For the other two pointings, we can obtain similar yields with different APAs. Nevertheless, since the yields of these last two pointings are good for an APA of 330 deg, we decided to keep the same angle for all the MSA configurations to avoid splitting the available observing dates and to reduce overheads during the observations.

With the observing strategy here proposed, we will observe a total of 92 high-z galaxies: 15 new proto-cluster candidates at z~5.2; 11 spectroscopically confirmed proto-cluster members; 23 field galaxies at z=4.9-6.48 for which we will observe both H-beta, [OIII]4959,5007 and H-alpha and 43 additional field "fillers" at z>3.4 for which we can observe H-alpha.

The requested exposure times guarantees that we will observe H-alpha at SNR>5 with the G395M/290LP NIRSpec configuration for all the proto-cluster objects.

Additionally, the parallel use of F405N and F410M NIRCam imaging will appropriately sample H-alpha at z=5.14-5.21, allowing the identification of yet more possible proto-cluster members in the vicinity of the overdensity. On the short wavelenght filter, we will use a combination of F187N and F182M to tangentially target [OII]3726,3729 at z~4.05, corresponding with the redshift of another known galaxy overdensity in GOODS-N.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	P1-GO-2674-FINAL-CAT	RA: 12 37 4.3684 (189.2682017d) Dec: +62 15 20.49 (62.25569d) Equinox: J2000		
Comments: *Description=[]*				
(2)	P2-GO-2674-FINAL-CAT	RA: 12 37 10.7634 (189.2948475d) Dec: +62 12 17.34 (62.20482d) Equinox: J2000		
Comments: *Description=[]*				
(3)	P3-GO-2674-FINAL-CAT	RA: 12 36 50.9880 (189.2124500d) Dec: +62 11 34.14 (62.19282d) Equinox: J2000		
Comments: *Description=[]*				
(4)	P4-GO-2674-FINAL-CAT	RA: 12 36 12.9936 (189.0541400d) Dec: +62 12 0.65 (62.20018d) Equinox: J2000		
Comments: *Description=[]*				

Observation

Proposal 2674, Observation 1: P1_final_MSATA_0x0_0.01 Tue Feb 14 22:01:19 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject Spectroscopy

Coordinated Parallel Template(s): NIRCam Imaging

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)	P1-GO-2674-FINAL-CAT	RA: 12 37 4.3684 (189.2682017d) Dec: +62 15 20.49 (62.25569d) Equinox: J2000		

Comments:
Description=[]

Acquisition

NIRSpec MultiObject Spectroscopy	Reference Star Bin	Target	Filter	MSA Configuration	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	Filter: F110W; Readout: NRSRAPIDD6; 8 sources in 4 quads; [Optimal TA Accuracy]	SAME	F110W	Auto Acq MSA Config	NRSRAPIDD6	3	1	4	687.153	

Template

NIRSpec MultiObject Spectroscopy	NIRCam Imaging
TA Method: MSATA	Module: ALL
Obtain Confirmation Images: No	Subarray: FULL
Science Aperture: MSA Center	
Primary Candidate List: Primary_p1 (197 sources)	
Filler Candidate List: Fillers_p1 (6783 sources)	
Spectral Overlap Map: jwst-nirspec-g395m	
Spectral Overlap Threshold: 1.5	

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	15116	189.231828	62.267229	23.49950367856311	1	20781	189.232819	62.259493	23.20374935746533
1	15585	189.262177	62.241055	22.59650715774233	1	22029	189.308371	62.256664	22.30421873123856
1	16408	189.336416	62.242996	22.82444731753636	1	23825	189.269849	62.278326	23.34114568132633
1	18908	189.299221	62.293305	22.04372379106113 3	1	28764	189.230848	62.266320	22.73039079541421 6

Dithers

#	Dither Type
1	NONE

Spectral Elements

NIRSpec MultiObject Spectroscopy	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
1	1 (G395M/F290LP)	c1	3 Shutter Slitlet	189.27157916666667 Degrees 62.2574 Degrees	334.0029868605517			3	3	3545.1
2	1 (G395M/F290LP)	c1	3 Shutter Slitlet	189.27157916666667 Degrees 62.2574 Degrees	334.0029868605517			3	3	3545.1

Spectral Elements

NIRCam Imaging	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F187N	F405N+F444W	MEDIUM8	10	1	3	3	3156.61	
2	F182M	F410M	MEDIUM8	10	1	3	3	3156.61	

Special Requirements

Aperture PA Range 334 to 334 Degrees (V3 195.4254303 to 195.4254303)
No Parallel Attachments
MSA Scheduled Aperture PA 333.9999997 to 333.9999997 Degrees (V3 195.42543 to 195.42543)

Observation

Proposal 2674, Observation 2: P2_final_MSATA_0x0_0.01 Tue Feb 14 22:01:19 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject Spectroscopy

Coordinated Parallel Template(s): NIRCam Imaging

Diagnostics

(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Visit 2:1) Warning (Form): The recommended value is 8 Reference Stars for this template.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	P2-GO-2674-FINAL-CAT	RA: 12 37 10.7634 (189.2948475d) Dec: +62 12 17.34 (62.20482d) Equinox: J2000		

Comments:
Description=[]

Acquisition

NIRSpec MultiObject Spectroscopy	Reference Star Bin	Target	Filter	MSA Configuration	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	Filter: F140X; Readout: NRSRAPIDD6; 7 sources in 4 quads; [Optimal TA Accuracy]	SAME	F140X	Auto Acq MSA Config	NRSRAPIDD6	3	1	4	687.153	

Template

NIRSpec MultiObject Spectroscopy	NIRCam Imaging
TA Method: MSATA	Module: ALL
Obtain Confirmation Images: No	Subarray: FULL
Science Aperture: MSA Center	
Primary Candidate List: Primary_p2 (179 sources)	
Filler Candidate List: Fillers_p2 (6933 sources)	
Spectral Overlap Map: jwst-nirspec-g395m	
Spectral Overlap Threshold: 1.5	

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	418	189.230688	62.203707	23.974071164806382	1	20417	189.383769	62.194344	22.398728521193128
1	16515	189.316284	62.183278	22.803209615429232	1	28299	189.252333	62.214315	24.414982786035743
1	18063	189.345515	62.197188	23.25557267217946	1	28877	189.308220	62.214762	22.84899968925341
1	19401	189.274204	62.210189	22.699858065899896					

Dithers

#	Dither Type
1	NONE

Spectral Elements

NIRSpec MultiObject Spectroscopy	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
1	1 (G395M/F290LP)	c1	3 Shutter Slitlet	189.30312 Degrees 62.203430555555 556 Degrees	331.08930948301 156			3	3	3545.1
2	1 (G395M/F290LP)	c1	3 Shutter Slitlet	189.30312 Degrees 62.203430555555 556 Degrees	331.08930948301 156			3	3	3545.1

Spectral Elements

NIRCam Imaging	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F187N	F405N+F444W	MEDIUM8	10	1	3	3	3156.61	
2	F182M	F410M	MEDIUM8	10	1	3	3	3156.61	

Special Requirements

No Parallel Attachments
MSA Scheduled Aperture PA 331.0819997 to 331.0819997 Degrees (V3 192.50743 to 192.50743)

Observation

Proposal 2674, Observation 3: P3_final_MSATA_0x0_0.01 Tue Feb 14 22:01:19 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject Spectroscopy

Coordinated Parallel Template(s): NIRCam Imaging

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)	P3-GO-2674-FINAL-CAT	RA: 12 36 50.9880 (189.2124500d) Dec: +62 11 34.14 (62.19282d) Equinox: J2000		

Comments:
Description=[]

Acquisition

NIRSpec MultiObject Spectroscopy	Reference Star Bin	Target	Filter	MSA Configuration	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	Filter: F140X; Readout: NRSRAPIDD6; 8 sources in 4 quads; [Optimal TA Accuracy]	SAME	F140X	Auto Acq MSA Config	NRSRAPIDD6	3	1	4	687.153	

Template

NIRSpec MultiObject Spectroscopy	NIRCam Imaging
TA Method: MSATA	Module: ALL
Obtain Confirmation Images: No	Subarray: FULL
Science Aperture: MSA Center	
Primary Candidate List: Primary_p3 (213 sources)	
Filler Candidate List: Fillers_p3 (6865 sources)	
Spectral Overlap Map: jwst-nirspec-g395m	
Spectral Overlap Threshold: 1.5	

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	418	189.230688	62.203707	23.974071164806382	1	16796	189.164320	62.203269	22.43249262869264
1	7853	189.169722	62.169706	23.22338780666316	1	18074	189.187216	62.169825	22.68320927320176
1	8709	189.273560	62.187144	22.67913584166731	1	28075	189.218921	62.200427	23.22043322908357
1	16587	189.208094	62.207086	23.346070257845945	1	28227	189.191532	62.213996	23.99196516470624

Dithers

#	Dither Type
1	NONE

Spectral Elements

NIRSpec MultiObject Spectroscopy	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
1	1 (G395M/F290LP)	c1	3 Shutter Slitlet	189.20539208333332 Degrees 62.19004444444444 Degrees	331.0757627012983			3	3	3545.1
2	1 (G395M/F290LP)	c1	3 Shutter Slitlet	189.20539208333332 Degrees 62.19004444444444 Degrees	331.0757627012983			3	3	3545.1

Spectral Elements

NIRCam Imaging	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F187N	F405N+F444W	MEDIUM8	10	1	3	3	3156.61	
2	F182M	F410M	MEDIUM8	10	1	3	3	3156.61	

Special Requirements

No Parallel Attachments
MSA Scheduled Aperture PA 331.0819997 to 331.0819997 Degrees (V3 192.50743 to 192.50743)

Observation

Proposal 2674, Observation 4: P4_final_MSATA_0x0_0.01 Tue Feb 14 22:01:19 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject Spectroscopy

Coordinated Parallel Template(s): NIRCam Imaging

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)	P4-GO-2674-FINAL-CAT	RA: 12 36 12.9936 (189.0541400d) Dec: +62 12 0.65 (62.20018d) Equinox: J2000		

Comments:
Description=[]

Acquisition

NIRSpec MultiObject Spectroscopy	Reference Star Bin	Target	Filter	MSA Configuration	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	Filter: F140X; Readout: NRSRAPIDD6; 8 sources in 4 quads; [Optimal TA Accuracy]	SAME	F140X	Auto Acq MSA Config	NRSRAPIDD6	3	1	4	687.153	

Template

NIRSpec MultiObject Spectroscopy	NIRCam Imaging
TA Method: MSATA	Module: ALL
Obtain Confirmation Images: No	Subarray: FULL
Science Aperture: MSA Center	
Primary Candidate List: Primary_p4 (127 sources)	
Filler Candidate List: Fillers_p4 (5045 sources)	
Spectral Overlap Map: jwst-nirspec-g395m	
Spectral Overlap Threshold: 1.5	

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	12181	189.057613	62.175604	22.779840275186096	1	21851	189.051219	62.231971	23.136702078196684
1	13918	189.054018	62.174843	22.655383147933	1	24102	189.038505	62.179780	22.9493727126654
1	14100	189.024900	62.205489	23.06052147576492	1	25608	189.020878	62.207139	23.140951723307616
1	18710	189.086779	62.188127	22.855509796931564	1	27694	189.050297	62.187153	22.59715010457709

Dithers

#	Dither Type
1	NONE

Spectral Elements

NIRSpec MultiObject Spectroscopy	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
1	1 (G395M/F290LP)	c1	3 Shutter Slitlet	189.04604791666665 Degrees 62.198699999999995 Degrees	331.07484904934654			3	3	3545.1
2	1 (G395M/F290LP)	c1	3 Shutter Slitlet	189.04604791666665 Degrees 62.198699999999995 Degrees	331.07484904934654			3	3	3545.1

Spectral Elements

NIRCam Imaging	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F187N	F405N+F444W	MEDIUM8	10	1	3	3	3156.61	
2	F182M	F410M	MEDIUM8	10	1	3	3	3156.61	

Special Requirements

No Parallel Attachments
MSA Scheduled Aperture PA 331.0819997 to 331.0819997 Degrees (V3 192.50743 to 192.50743)