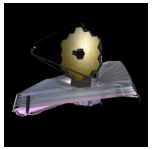

5328 - Measuring the Form of the IMF in Passive Galaxies at z=1.2

Cycle: 3, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1	NIRC Imaging	NIRCam Imaging	(2) MOO-J1142+1527-NIRCAM
	4	71, 72	NIRSpec MultiObject Spectroscopy	(5) science+ref-full-unique-05mar25

ABSTRACT

We propose a direct measurement of the low mass slope of the initial mass function (IMF) close to cosmic noon. We will use gravity-sensitive absorption features in the spectra of massive, passively evolving galaxies at z=1.2 to determine whether the IMF is bottom-heavy in these galaxies, and to quantify the dependence of the IMF on velocity dispersion for these elliptical galaxies. Derived galaxy properties such as stellar mass, age, and star formation history fundamentally depend on the IMF, with most studies assuming a single, universal form. However, evidence for massive ellipticals in the local Universe indicates velocity dispersion-dependent variation in the shape of the IMF with the most massive galaxies having the

most bottom-heavy IMF. Our observations will yield the first statistical measurements of the low mass slope of the IMF in the distant Universe, and also its dependence on galaxy mass. At the same time, these IMF measurements provide a new means of directly connecting passive galaxies with their progenitor populations across cosmic time.

OBSERVING DESCRIPTION

We will obtain two-band NIRCam pre-imaging of the galaxy cluster MOO J1142+1527 using the SHALLOW4 readout pattern with a FULLBOX 8NIRSPEC primary dither pattern and two subpixel positions. Data will be obtained with three groups per integration and a single integration.

The NIRSpec observations will consist of data taken in two separate grating/filter combinations using a single slit configuration per grating. The grating/filter combinations include a short PRISM/CLEAR observation to map the spectral energy distributions and much longer G235H/F170LP observations to measure the relevant absorption features. The PRISM observations consist of a single exposure specification, while the NIRSpec data are comprised of three repeated observations of the same exposure specification. The slit configurations use 3 shutter long slits and are designed to maximize the number of bright elliptical galaxies from the cluster. We use the NRSIRS2RAPID readout pattern for the PRISM data, but NRSIRS2 for G235H to reduce the data excess. We employ a 3 shutter nod, but do not include a dither to cover the gap in spectral coverage because doing so leads to reduction in the number of primary targets in our configuration.

The final NIRSpec configurations will be designed based on the NIRCam pre-imaging. Once the G235H configuration is designed, then we will use that configuration as the starting point for the prism configuration so that all of the primary and secondary targets are included. We will then add filler targets, based on e.g. phot-z membership probability, to create a new, unique prism configuration that more effectively uses the available shutter areas since the prism spectra are shorter.

Proposal 5328 - Targets - Measuring the Form of the IMF in Passive Galaxies at z=1.2

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	MOO-J1142+1527-NIRCAM	RA: 11 42 43.0000 (175.6791667d) Dec: +15 26 49.00 (15.44694d) Equinox: J2000	Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Clusters of Galaxies* *Description=[High-redshift clusters, Rich clusters]*				
(5)	science+ref-full-unique-05mar25	RA: 11 42 43.7285 (175.6822021d) Dec: +15 27 0.40 (15.45011d) Equinox: J2000		
Comments: *Description=[]*				

Observation

Proposal 5328, Observation 1: NIRC Imaging

Wed Mar 12 00:00:19 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Diagnostics

(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:3) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:4) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	MOO-J1142+1527-NIRCAM	RA: 11 42 43.0000 (175.6791667d) Dec: +15 26 49.00 (15.44694d) Equinox: J2000	Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Clusters of Galaxies
Description=[High-redshift clusters, Rich clusters]

Template

Module	Subarray	Target Placement
ALL	FULL	Module Gap

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
1	FULLBOX	8NIRSPEC	STANDARD		2

Spectral Elements

#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F070W	F277W	BRIGHT2	7	1	16	16	2405.036	

Special Requirements

Group Visits within 53.0 Days
Visits Same PA

Observation

Proposal 5328, Observation 4: 71, 72

Wed Mar 12 00:00:19 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject 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
(5)	science+ref-full-unique-05mar25	RA: 11 42 43.7285 (175.6822021d) Dec: +15 27 0.40 (15.45011d) Equinox: J2000		

Comments:
Description=[]

Acquisition

#	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: NRSRAPID; 8 sources in 3 quads; [Optimal TA Accuracy]	SAME	F140X	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	

Template

TA Method	HFF Readout Mode	Obtain Confirmation Images	Science Aperture	Primary Candidate List	Filler Candidate List	Spectral Overlap Map	Spectral Overlap Threshold
MSATA	false	After Target ACQ and New MSA Config	MSA Center	primary (9 sources)	secondary (7163 sources)	jwst-nirspec-hr	1.5

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	102000	175.705939	15.458979	21.06999969482422	1	104150	175.673016	15.441091	22.030000686645508
1	102921	175.675772	15.406405	22.450000762939453	1	104346	175.660358	15.422525	20.809999465942383
1	103158	175.689623	15.451397	22.510000228881836	1	104721	175.660017	15.436811	22.200000762939453
1	103511	175.686909	15.452880	21.8799991607666	1	105216	175.655262	15.441629	21.440000534057617

Confirmation

#	Confirmation Type	Conf. Readout Pattern	Conf. Groups/Int	Conf. Integrations/Exp	Conf. Total Integrations	Conf. Total Exposure Time
1	c1 : 72	NRSIRS2RAPID	10	1	1	160.478
2	c1 : 71	NRSIRS2RAPID	10	1	1	160.478

Spectral Elements

#	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
1	2 (PRISM/CLEAR)	c1 : 72	5 Shutter Slitlet With Gaps	175.68222083333 333 Degrees 15.435302777777 778 Degrees	257.69003261508 215			3	3	962.867
2	1 (G235H/F170LP)	c1 : 71	5 Shutter Slitlet With Gaps	175.68222083333 333 Degrees 15.435302777777 778 Degrees	257.69003261508 215			3	12	17681.735
3	1 (G235H/F170LP)	c1 : 71	5 Shutter Slitlet With Gaps	175.68222083333 333 Degrees 15.435302777777 778 Degrees	257.69003261508 215			3	12	17681.735
4	1 (G235H/F170LP)	c1 : 71	5 Shutter Slitlet With Gaps	175.68222083333 333 Degrees 15.435302777777 778 Degrees	257.69003261508 215			3	12	17681.735

Special Requirements

Aperture PA Range 257.69 to 257.69 Degrees (V3 119.1154303 to 119.1154303) [MSA Selected]
MSA Scheduled Aperture PA 257.6900 to 257.6900 Degrees (V3 119.1154303 to 119.1154303)