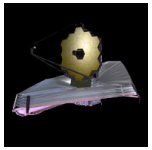

2640 - A Census to the Bottom of the IMF in Westerlund 2: Atmospheres, Disks, Accretion, and Demographics

Cycle: 1, Proposal Category: GO

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1	Faint PRISM w/ APA Dist Core Plan 2, Bright PRISM + grisms w/ APA Dist Core Plan 2	NIRSpec MultiObject Spectroscopy	(3) WESTERLUND2-DIST-CORE-FULL

ABSTRACT

Young brown dwarfs (BDs) and planetary-mass objects (PMOs) offer powerful tests of the universality of the IMF, the frequency and timescale of planet formation, and the typical atmospheric properties (and range of their variations) for analogs of directly-imaged and transiting planets, all at extremes (protostellar mass, disk mass, insolation) where models are most strained. Most known PMOs are in nearby sparse populations (including GTO targets with exquisite data), but these regions are small (with few PMOs) and spread out (limiting multiplexing). Given JWST's superb sensitivity, there is not such a premium on close and bright; value instead comes from source density. Distant, dense clusters offer more and denser targets, and HST has revealed them just in time for carefully optimized JWST follow-up.

We propose a highly multiplexed NIRSpec+NIRCam pilot program for young BDs and PMOs, targeting 1 pointing in the young (1-2 Myr), massive (30,000 members), and dense (R~8 arcmin) Westerlund 2 cluster. We propose NIRSpec/MOS spectra of known young members (prism for 94 faint BDs and PMOs and 37 brighter BDs, plus grism for 27) to measure Teff, gravity, accretion from emission lines, and disks from IR excess. We also propose parallel NIRCam imaging in 12 filters (for SEDs, water bands indicating low Teff, and emission lines) to seek the very bottom of the IMF (2 MJup) and measure Teff, accretion, and disks. In summary, our program will deliver a large and robust census of the lowest-mass objects, providing a new view of the IMF, disks, planet formation, and the atmospheres of direct analogs to the direct-imaged and transiting planets that drive much of JWST's key science.

OBSERVING DESCRIPTION

We propose a highly-multiplexed NIRSpec+NIRCam pilot program for young low-mass stars, brown dwarfs (BDs) and planetary mass objects (PMOs), targeting 1 pointing in the young (1-2 Myr), massive (30,000 members), and high-angular density (R~8 arcmin) Westerlund 2 cluster.

We propose NIRSpec/MOS spectra of candidate cluster members:
- Prism spectra for 94 BDs and PMOs and 37 brighter BDs
- G140M/F100LP and G395M/F290LP grism spectra for 27 brighter BDs

With these we will measure Teff, gravity, mass, accretion from emission lines, disks from IR excess, and constrain the IMF down to ~10 MJup.

We propose coordinated parallel NIRCam imaging of an adjacent field in Westerlund2 in 12 filters:
- F115W, F162M, F210M, F300M, F335M, F360M, F444W (for SEDs and consistency with GTO programs targeting substellar objects in nearby star-forming regions)

- F140M and F182M (centered on water absorption bands indicating low Teff
- F187N, F405N, and F466N (for accretion-driven emission lines)

With these we will seek the very bottom of the IMF (~2 MJup) and measure Teff, accretion, and disks.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(3)	WESTERLUND2-DIST-CORE-FULL	RA: 10 23 40.0286 (155.9167858d) Dec: -57 46 21.21 (-57.77256d) Equinox: J2000		

Comments:
Description=[]

Observation

Proposal 2640, Observation 1: Faint PRISM w/ APA Dist Core Plan 2, Bright PRISM + grisms w/ APA Dist Core Plan 2

Mon Jun 27 17:01:07 GMT 2022

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject Spectroscopy

Coordinated Parallel Template(s): NIRCam Imaging

Diagnostics

(Visit 1:1) Warning (Form): Data Excess over middle threshold

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(3)	WESTERLUND2-DIST-CORE-FULL	RA: 10 23 40.0286 (155.9167858d) Dec: -57 46 21.21 (-57.77256d) 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: NRSRAPID; 8 sources in 4 quads; [Reduced Accuracy]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	

Template

NIRSpec MultiObject Spectroscopy	NIRCam Imaging
TA Method: MSATA	Module: ALL
Obtain Confirmation Images: No	Subarray: FULL
Science Aperture: MSA Center	
Primary Candidate List: Bright Candidates (521 sources)	
Filler Candidate List: Bright Candidates (521 sources)	
Spectral Overlap Map: jwst-nirspec-hr	
Spectral Overlap Threshold: 1.5	

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	1253	155.946157	-57.781481	19.95	1	7216	155.888273	-57.754352	19.72
1	1465	155.971686	-57.754530	19.78	1	7250	155.901049	-57.750991	19.76
1	1482	155.967800	-57.758454	19.71	1	7315	155.865835	-57.754805	19.82
1	1755	155.955119	-57.785283	19.81	1	11869	155.906297	-57.771811	19.83

Dithers

#	Dither Type
1	3-POINT-WITH-NIRCam-SIZE1

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 (PRISM/CLEAR)	c1 : Faint PRISM w/ APA Dist Core Plan 2	3 Shutter Slitlet	155.917488 Degrees -57.764378888888 87 Degrees	275.07339421535187	0.0	0.0	9	9	2757.3
2	1 (PRISM/CLEAR)	c1 : Faint PRISM w/ APA Dist Core Plan 2	3 Shutter Slitlet	155.917488 Degrees -57.764378888888 87 Degrees	275.07339421535187	0.0	0.0	9	9	2757.3
3	1 (PRISM/CLEAR)	c1 : Faint PRISM w/ APA Dist Core Plan 2	3 Shutter Slitlet	155.917488 Degrees -57.764378888888 87 Degrees	275.07339421535187	0.0	0.0	9	9	2757.3
4	2 (PRISM/CLEAR)	c1 : Bright PRISM + grisms w/ APA Dist Core Plan 2	3 Shutter Slitlet	155.928536375 Degrees -57.764536111111 11 Degrees	275.064039575145	0.0	0.0	9	18	1313.0
5	3 (G140M/F100LP)	c1 : Bright PRISM + grisms w/ APA Dist Core Plan 2	3 Shutter Slitlet	155.928536375 Degrees -57.764536111111 11 Degrees	275.064039575145	0.0	0.0	9	9	2757.3
6	4 (G395M/F290LP)	c1 : Bright PRISM + grisms w/ APA Dist Core Plan 2	3 Shutter Slitlet	155.928536375 Degrees -57.764536111111 11 Degrees	275.064039575145	0.0	0.0	9	9	2757.3

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	F182M	F360M	SHALLOW4	5	1	9	9	2319.142	
2	F210M	F335M	SHALLOW4	5	1	9	9	2319.142	
3	F162M+F150W2	F300M	SHALLOW4	5	1	9	9	2319.142	
4	F187N	F466N+F444W	SHALLOW4	2	1	9	9	869.678	
5	F140M	F405N+F444W	SHALLOW4	5	1	9	9	2319.142	
6	F115W	F444W	SHALLOW4	5	1	9	9	2319.142	

Special Requirements

No Parallel
MSA Scheduled Aperture PA 275.07400521 to 275.07400521 Degrees (V3 136.50766 to 136.50766)