



5890 - JUMPS: The JWST Ultimate Medium-band Photometric Survey

Cycle: 3, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
ABELL370				
	1	Abell370	NIRCam Imaging	(1) Abell370
MACS0416				
	2	MACS0416	NIRCam Imaging	(2) MACSJ0416.1-2403
MACS1149				
	3	MACS1149	NIRCam Imaging	(3) MACSJ1149+2223

ABSTRACT

The characterization of high redshift galaxies and the sources responsible for reionization are major science goals of JWST. One of JWST’s key science results is showing that ultra-low mass, ultra-faint galaxies are likely the primary driver of Hydrogen reionization. However, an in-depth accounting of these objects is challenging, which has prevented a full understanding of the drivers of reionization. One way to select ultra-faint galaxies in the epoch of reionization is by using medium-band imaging which selects galaxies on line flux instead of continuum emission. To this end, we propose the JWST Ultimate Medium-band Photometric Survey (JUMPS), which will observe three massive galaxy clusters (Abell 370, MACS0416, and MACS1149) using four LW medium bands (F360M, F430M, F460M, and F480M) with one SW broad band (F150W). In combination with existing F410M observations, JUMPS will select ultra-faint galaxies over $5.2 < z < 9.4$ by searching for “JUMPS” in medium band colors driven by powerful emission lines. This technique is distinct from the more commonly used selections since it does not require galaxies to have strong continuum emission and can select “emission line only” sources which have little to no continuum emission. Samples selected in this way will provide a more complete picture of galaxies at $5.2 < z < 9.4$, and can be used to put robust constraints on the ultra-faint end of the UV luminosity function. Additionally, JUMPS will incorporate deep F150W imaging, which will allow us to put constraints on the UV properties of medium-band selected galaxies as well as allow us to select $z = 13 - 16$ Lyman break galaxies.

OBSERVING DESCRIPTION

We propose a NIRCam prime observations of three clusters (Abell 370, MACS0416, and MACS1149) in four LW medium bands (F360M, F430M, F460M, and F480M) with one SW broad band (F150W). These observations will reach depths of ~ 27.5 , ~ 27.5 , ~ 27.8 , ~ 28.5 and ~ 29.2 mag in F360M, F430M, F460M, F480M, and F150W, respectively.

To utilize existing NIRCam imaging of all three clusters, we match the PA of JUMPS to that of CANUCS (Canadian NIRISS Unbiased Cluster

Survey) NIRCам observations of those fields. This allows us to attach a NIRISS imaging parallel which has existing NIRISS grism observations from CANUCS. This parallel will provide NIRISS imaging in F090W, F277W, F356W, and F444W to provide supporting data to existing observations.

Proposal 5890 - Targets - JUMPS: The JWST Ultimate Medium-band Photometric Survey

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	Abell370	RA: 02 39 54.0850 (39.9753542d) Dec: -01 34 33.76 (-1.57604d) Equinox: J2000		
	Comments: Category=Clusters of Galaxies Description=[Abell clusters, Rich clusters] Extended=YES				
	(2)	MACSJ0416.1-2403	RA: 04 16 9.3700 (64.0390417d) Dec: -24 04 20.50 (-24.07236d) Equinox: J2000		
	Comments: Category=Clusters of Galaxies Description=[Rich clusters] Extended=YES				
	(3)	MACSJ1149+2223	RA: 11 49 35.8500 (177.3993750d) Dec: +22 23 53.78 (22.39827d) Equinox: J2000		
	Comments: Category=Clusters of Galaxies Description=[Rich clusters] Extended=YES				

Proposal 5890 - Observation 1 - JUMPS: The JWST Ultimate Medium-band Photometric Survey

Observation	Proposal 5890, Observation 1: Abell370										Mon Nov 04 21:00:11 GMT 2024		
	Diagnostic Status: Warning												
	Observing Template: NIRCам Imaging												
	Coordinated Parallel Template(s): NIRISS 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)	Abell370	RA: 02 39 54.0850 (39.9753542d) Dec: -01 34 33.76 (-1.57604d) Equinox: J2000										
	Comments: Category=Clusters of Galaxies Description=[Abell clusters, Rich clusters] Extended=YES												
Template	NIRCам Imaging												
	NIRISS Imaging												
	Module: ALL												
	Subarray: FULL												
Target Placement: Module Gap													
Dithers	#	Primary Dither Type		Primary Dithers		Dither Size		Subpixel Positions		Coordinated Parallel Subpixel Selector		Dither Direct Images Primes	
	1	INTRAMODULEX		8				1		NIRCам Only		NO_DITHERING	
Spectral Elements	NIRCам Imaging	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp		Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID		
	1	F150W	F360M	DEEP8	6	1		8	8	9276.569			
	2	F150W	F430M	DEEP8	6	1		8	8	9276.569			
	3	F150W	F460M	DEEP8	6	1		8	8	9276.569			
	4	F150W	F480M	DEEP8	6	1		8	8	9276.569			
Spectral Elements	NIRISS Imaging	Filter	Grism	Readout Pattern	Groups/Int	Integrations/Exp		Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID		
	1	F356W		NIS	26	1		8	8	9018.887			
	2	F444W		NIS	26	1		8	8	9018.887			
	3	F277W		NIS	26	1		8	8	9018.887			
	4	F090W		NIS	26	1		8	8	9018.887			

Proposal 5890 - Observation 1 - JUMPS: The JWST Ultimate Medium-band Photometric Survey

Special Requirements	Aperture PA Range 63.88084060211464 to 63.88084060211464 Degrees (V3 63.95541754211464 to 63.95541754211464) Offset 84.0 arcsec, -3.0 arcsec No Parallel Attachments Background Limited. Background no more than 20th percentile above minimum
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Proposal 5890 - Observation 2 - JUMPS: The JWST Ultimate Medium-band Photometric Survey

Observation	Proposal 5890, Observation 2: MACS0416										Mon Nov 04 21:00:11 GMT 2024
	Diagnostic Status: Warning										
	Observing Template: NIRCам Imaging										
	Coordinated Parallel Template(s): NIRISS Imaging										
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)	MACSJ0416.1-2403	RA: 04 16 9.3700 (64.0390417d) Dec: -24 04 20.50 (-24.07236d) Equinox: J2000								
	Comments: Category=Clusters of Galaxies Description=[Rich clusters] Extended=YES										
Template	NIRCam Imaging										
	NIRISS Imaging										
	Module: ALL										
	Subarray: FULL										
	Target Placement: Module Gap										
Dithers	#	Primary Dither Type		Primary Dithers		Dither Size		Subpixel Positions		Coordinated Parallel Subpixel Selector	Dither Direct Images Primes
	1	INTRAMODULEX		8				1		NIRCам Only	NO_DITHERING
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	F150W	F360M	DEEP8	6	1		8	8	9276.569	
	2	F150W	F430M	DEEP8	6	1		8	8	9276.569	
	3	F150W	F460M	DEEP8	6	1		8	8	9276.569	
	4	F150W	F480M	DEEP8	6	1		8	8	9276.569	
Spectral Elements	NIRISS Imaging	Filter	Grism	Readout Pattern	Groups/Int	Integrations/Exp		Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	F356W		NIS	26	1		8	8	9018.887	
	2	F444W		NIS	26	1		8	8	9018.887	
	3	F277W		NIS	26	1		8	8	9018.887	
	4	F090W		NIS	26	1		8	8	9018.887	

Proposal 5890 - Observation 2 - JUMPS: The JWST Ultimate Medium-band Photometric Survey

Special Requirements	Aperture PA Range 48.43109624456923 to 48.43109624456923 Degrees (V3 48.50567318456923 to 48.50567318456923) Offset 84.0 arcsec, -3.0 arcsec No Parallel Attachments Background Limited. Background no more than 20th percentile above minimum
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Proposal 5890 - Observation 3 - JUMPS: The JWST Ultimate Medium-band Photometric Survey

Observation	Proposal 5890, Observation 3: MACS1149										Mon Nov 04 21:00:11 GMT 2024		
	Diagnostic Status: Warning												
	Observing Template: NIRCам Imaging												
	Coordinated Parallel Template(s): NIRISS 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)	MACSJ1149+2223	RA: 11 49 35.8500 (177.3993750d) Dec: +22 23 53.78 (22.39827d) Equinox: J2000										
	Comments: Category=Clusters of Galaxies Description=[Rich clusters] Extended=YES												
Template	NIRCam Imaging												
	NIRISS Imaging												
	Module: ALL												
	Subarray: FULL												
Target Placement: Module Gap													
Dithers	#	Primary Dither Type		Primary Dithers		Dither Size		Subpixel Positions		Coordinated Parallel Subpixel Selector		Dither Direct Images Primes	
	1	INTRAMODULEX		8				1		NIRCam Only		NO_DITHERING	
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	F150W	F360M	DEEP8	6	1		8	8	9276.569			
	2	F150W	F430M	DEEP8	6	1		8	8	9276.569			
	3	F150W	F460M	DEEP8	6	1		8	8	9276.569			
	4	F150W	F480M	DEEP8	6	1		8	8	9276.569			
Spectral Elements	NIRISS Imaging	Filter	Grism	Readout Pattern	Groups/Int	Integrations/Exp		Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID		
	1	F356W		NIS	26	1		8	8	9018.887			
	2	F444W		NIS	26	1		8	8	9018.887			
	3	F277W		NIS	26	1		8	8	9018.887			
	4	F090W		NIS	26	1		8	8	9018.887			

Proposal 5890 - Observation 3 - JUMPS: The JWST Ultimate Medium-band Photometric Survey

Special Requirements	Aperture PA Range 121.92711810664645 to 121.92711810664645 Degrees (V3 122.00169504664645 to 122.00169504664645) Offset 84.0 arcsec, -3.0 arcsec No Parallel Attachments Background Limited. Background no more than 20th percentile above minimum
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