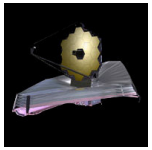

11373 - Opening the 5.6-18um Window on the Community Deep Public Frontier Field

Cycle: 5, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
Dr. Katherine E. Whitaker (PI)	**University of Massachusetts - Amherst**
Dr. Rachel Bezanson (CoI) (CoPI) (Contact)	University of Pittsburgh
Dr. Sedona H. Price (CoI) (CoPI) (Contact)	Space Telescope Science Institute
Dr. John R. Weaver (CoI)	Massachusetts Institute of Technology
Prof. Ivo Labbe (CoI)	Swinburne University of Technology
Dr. Joel Leja (CoI)	The Pennsylvania State University
Dr. Bingjie Wang (CoI)	Princeton University
Dr. Gabriel Brammer (CoI) (ESA Member)	University of Copenhagen, Niels Bohr Institute
Prof. Adi Zitrin (CoI)	Ben-Gurion University of the Negev
Dr. Lukas Jonathan Furtak (CoI)	University of Texas at Austin
Dr. Hakim Atek (CoI) (ESA Member)	CNRS, Institut d'Astrophysique de Paris
Prof. Danilo Marchesini (CoI)	Tufts University
Richard Pan (CoI)	Tufts University
Dr. Christina C Williams (CoI)	University of Arizona
Prof. Pascal Oesch (CoI) (ESA Member)	University of Geneva, Department of Astronomy
Prof. Pratika Dayal (CoI) (CSA Member)	Canadian Institute for Theoretical Astrophysics
Dr. Casey Papovich (CoI)	Texas A & M University
Dr. Dan Coe (CoI) (ESA Member)	Space Telescope Science Institute - ESA - JWST
Prof. Jenny Emma Greene (CoI)	Princeton University
Dr. Camilla Pacifici (CoI)	Space Telescope Science Institute
Dr. Susan Kassin (CoI)	Space Telescope Science Institute

Name	***Institution***
Dr. Stephanie Juneau (CoI)	NOIRLab - (AZ)
Prof. Marijn Franx (CoI) (ESA Member)	Universiteit Leiden
Prof. Pieter van Dokkum (CoI)	Yale University
Prof. Karl Glazebrook (CoI)	Swinburne University of Technology
Dr. Themiya Nanayakkara (CoI)	Swinburne University of Technology
Prof. Erica Nelson (CoI)	University of Colorado at Boulder
Dr. Katherine Suess (CoI)	University of Colorado at Boulder
Prof. Robert Feldmann (CoI) (ESA Member)	Universitat Zurich
Dr. N. M. Forster Schreiber (CoI) (ESA Member)	Max Planck Institute for Extraterrestrial Physics
Prof. Alice E. Shapley (CoI)	University of California - Los Angeles
Dr. Adam Muzzin (CoI) (CSA Member)	York University
Dr. Mauro Stefanon (CoI) (ESA Member)	Universitat de Valencia
Dr. Edward N Taylor (CoI)	Swinburne University of Technology
Lamiya Mowla (CoI)	Wellesley College
Dr. Anna G de Graaff (CoI)	Center for Astrophysics | Harvard & Smithsonian
Sam Edward Cutler (CoI)	Tufts University
Dr. Yoshinobu Fudamoto (CoI)	Chiba University
Dr. Seiji Fujimoto (CoI) (CSA Member)	University of Toronto
Dr. Gourav Khullar (CoI)	University of Washington
Prof. Mariska Kriek (CoI) (ESA Member)	Universiteit Leiden
Prof. Michael Maseda (CoI)	University of Wisconsin - Madison
Dr. Renske Smit (CoI) (ESA Member)	Liverpool John Moores University
Seth Davis Martin (CoI)	University of Massachusetts - Amherst
Dr. David Setton (CoI)	Princeton University
Ms. Iryna Chemerynska (CoI) (ESA Member)	CNRS, Institut d'Astrophysique de Paris
Mr. Andrea Weibel (CoI) (ESA Member)	University of Geneva, Department of Astronomy
Dr. Andrew Goulding (CoI)	Princeton University
Dr. Vasily Kokorev (CoI)	University of Texas at Austin
Dr. Tim Blake Miller (CoI)	Northwestern University
Dr. Desika Narayanan (CoI)	University of Florida
Dr. Karin Marie Sandstrom (CoI)	University of California - San Diego
Ms. Sarah Bodansky (CoI)	University of Massachusetts - Amherst

Name	*Institution*
Dr. Massissilia Louisa Hamadouche (CoI)	University of Massachusetts - Amherst
Dr. Stacey Alberts (CoI) (ESA Member)	Space Telescope Science Institute - ESA - JWST

OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
A2744 MIRI Mosaics				
	1	Mosaic	MIRI Imaging	(1) ABELL2744
	2	Mosaic overlaps	MIRI Imaging	(1) ABELL2744
	3	Mosaic offset 2	MIRI Imaging	(2) ABELL2744-2
	4	Mosaic offset 3	MIRI Imaging	(3) ABELL2744-3

ABSTRACT

Abell 2744 is one of the most powerful known gravitational lensing clusters, with the largest high magnification area amongst the Hubble Frontier Fields. Already >300 hours of JWST imaging and spectroscopy exists in Abell 2744, constituting one of the mission's deepest and fully public extragalactic datasets. With ~30 arcmin2 of NIRCam imaging reaching 28-30AB in 20 filters (not counting the extra lensing boost), ultra-deep NIRISS+NIRSpec+WFSS spectroscopy, plus deep HST UV, ALMA dust continuum, MUSE, and Chandra Xray observations, Abell 2744 is a peerless legacy field.

Given this treasure trove, it is striking that our understanding of dust-obscuration in the galaxies and black holes therein remains fundamentally biased. Only with the addition of well-sampled mid-IR imaging, uniquely possible with JWST/MIRI, can we answer pressing questions about the role of dust in the distant Universe. Here, we propose a public ultra-deep 7-band 5.6-18um MIRI imaging survey over a 5x wider area with 4x more filters than currently available, matching the full cluster footprint. The proposed data enable the decomposition of dust-obscured AGN from the variable PAH features from star formation, thus revealing the mass at which AGN feedback becomes important. Above z>4, these data will capture the full rest-optical-to-NIR and improve constraints on stellar masses by ~0.4 dex; mitigating a critical systematic that otherwise challenges scaling relations at these redshifts. The legacy value of the proposed dataset is wide-reaching, also providing new information about nearby Brown Dwarfs, the nature of dusty quiescent galaxies, and even the possibility of discovering LRDs at z>10.

OBSERVING DESCRIPTION

This proposal aims to obtain deep 0.3-1 hour exposures for MIRI/560W, F770W, F1000W, F1130W, F1280W, F1500W and F1800W over the the Abell 2744 cluster, with 5 sigma point source depths ranging from 26.0 to 23.6 ABmag over an area of 28 arcmin^2 with an 14-tile mosaic. Depths

are scaled from the SMILES program, which report on-sky improvements over the ETC v3.0 & v4.0 values. The mosaic footprint includes the entire moderate magnification (>2x) region of the cluster, with mild magnification (>1.3x) in the remaining area, and is matched to the existing NIRCam and HST/F336W deep imaging.

A 4-point point source dither pattern is selected, following SMILES (GTO-1207). This pattern will ensure sufficient sampling of the MIRI PSF, and enables homogenizing and removing background (Alberts+2024, Perez-Gonzalez+2024). The dither amplitude provides a balance between the need to mitigate the impact of cosmic rays with maximizing the region with full depth coverage.

We request V3PA limits between 31.0-43.0 deg to ensure maximum overlap of the MIRI pointings with the existing JWST/NIRCam imaging. To ensure continuity of the mosaic given the multiple visits (to accommodate the two tiles at the NW edge, and the separate filter set required for two tiles to avoid duplications), the same V3PA is requested for visits 1, 2, 3, 4. The exact centers of each visit will depend on the allocated PA (to ensure mosaic continuity). This V3PA range, and not a range ~180deg off, was selected to fall within the “Meteoroid-safe” window for A2744.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	ABELL2744	RA: 00 14 21.3196 (3.5888317d) Dec: -30 23 14.10 (-30.38725d) Equinox: J2000		
Comments: *Category=Clusters of Galaxies* *Description=[Abell clusters]*				
(2)	ABELL2744-2	RA: 00 14 13.2463 (3.5551929d) Dec: -30 20 51.79 (-30.34772d) Equinox: J2000		
Comments: *Category=Clusters of Galaxies* *Description=[Abell clusters]*				
(3)	ABELL2744-3	RA: 00 14 7.5079 (3.5312829d) Dec: -30 22 14.97 (-30.37083d) Equinox: J2000		
Comments: *Category=Clusters of Galaxies* *Description=[Abell clusters]*				

Observation

Proposal 11373, Observation 1: Mosaic

Fri Mar 13 21:05:16 GMT 2026

Diagnostic Status: Warning

Observing Template: MIRI 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.
(Visit 1:5) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:6) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:7) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:8) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:9) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:10) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	ABELL2744	RA: 00 14 21.3196 (3.5888317d) Dec: -30 23 14.10 (-30.38725d) Equinox: J2000		

Comments:
Category=Clusters of Galaxies
Description=[Abell clusters]

Template

Subarray
FULL

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order
3	4	32.0	10.0	0.0	0.0	HILBERT_CURVE

Dithers

#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size
1	4-Point-Sets				5	1	POINT SOURCE	POSITIVE	MEDIUM

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
1	F560W	FASTR1	77	2	1	Dither 1	4	8	1720.525	225055.1
2	F770W	FASTR1	91	2	1	Dither 1	4	8	2031.329	225055.2
3	F1000W	FASTR1	55	2	1	Dither 1	4	8	1232.118	225055.3
4	F1130W	FASTR1	80	4	1	Dither 1	4	16	3585.352	225055.4
5	F1280W	FASTR1	60	2	1	Dither 1	4	8	1343.119	225055.5
6	F1500W	FASTR1	62	3	1	Dither 1	4	12	2086.83	225055.6
7	F1800W	FASTR1	51	3	1	Dither 1	4	12	1720.525	225055.7

Special Requirements	
	Group Visits within 53.0 Days Aperture PA Range 35.83544897 to 47.83544897 Degrees (V3 31.0 to 43.0) Visits Same PA Same V3 PA 1, 2, 3, 4

Observation

Proposal 11373, Observation 2: Mosaic overlaps

Fri Mar 13 21:05:16 GMT 2026

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Diagnostics

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

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	ABELL2744	RA: 00 14 21.3196 (3.5888317d) Dec: -30 23 14.10 (-30.38725d) Equinox: J2000		

Comments:
Category=Clusters of Galaxies
Description=[Abell clusters]

Template

Subarray
FULL

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order
3	4	32.0	10.0	0.0	0.0	HILBERT_CURVE

Dithers

#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size
1	4-Point-Sets				5	1	POINT SOURCE	POSITIVE	MEDIUM

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
1	F560W	FASTR1	77	2	1	Dither 1	4	8	1720.525	225055.1
2	F1130W	FASTR1	80	4	1	Dither 1	4	16	3585.352	225055.4
3	F1280W	FASTR1	60	2	1	Dither 1	4	8	1343.119	225055.5
4	F1500W	FASTR1	62	3	1	Dither 1	4	12	2086.83	225055.6
5	F1800W	FASTR1	51	3	1	Dither 1	4	12	1720.525	225055.7

Special Requirements

Group Visits within 53.0 Days
Aperture PA Range 35.83544897 to 47.83544897 Degrees (V3 31.0 to 43.0)
Visits Same PA

Same V3 PA 1, 2, 3, 4

Observation

Proposal 11373, Observation 3: Mosaic offset 2

Fri Mar 13 21:05:16 GMT 2026

Diagnostic Status: Warning

Observing Template: MIRI 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
(2)	ABELL2744-2	RA: 00 14 13.2463 (3.5551929d) Dec: -30 20 51.79 (-30.34772d) Equinox: J2000		

Comments:
Category=Clusters of Galaxies
Description=[Abell clusters]

Template

Subarray
FULL

Dithers

#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size
1	4-Point-Sets				5	1	POINT SOURCE	POSITIVE	MEDIUM

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
1	F560W	FASTR1	77	2	1	Dither 1	4	8	1720.525	225055.1
2	F770W	FASTR1	91	2	1	Dither 1	4	8	2031.329	225055.2
3	F1000W	FASTR1	55	2	1	Dither 1	4	8	1232.118	225055.3
4	F1130W	FASTR1	80	4	1	Dither 1	4	16	3585.352	225055.4
5	F1280W	FASTR1	60	2	1	Dither 1	4	8	1343.119	225055.5
6	F1500W	FASTR1	62	3	1	Dither 1	4	12	2086.83	225055.6
7	F1800W	FASTR1	51	3	1	Dither 1	4	12	1720.525	225055.7

Special Requirements

Aperture PA Range 35.83544897 to 47.83544897 Degrees (V3 31.0 to 43.0)

Same V3 PA 1, 2, 3, 4

Observation

Proposal 11373, Observation 4: Mosaic offset 3

Fri Mar 13 21:05:16 GMT 2026

Diagnostic Status: Warning

Observing Template: MIRI 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
(3)	ABELL2744-3	RA: 00 14 7.5079 (3.5312829d) Dec: -30 22 14.97 (-30.37083d) Equinox: J2000		

Comments:
Category=Clusters of Galaxies
Description=[Abell clusters]

Template

Subarray
FULL

Dithers

#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size
1	4-Point-Sets				5	1	POINT SOURCE	POSITIVE	MEDIUM

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
1	F560W	FASTR1	77	2	1	Dither 1	4	8	1720.525	225055.1
2	F770W	FASTR1	91	2	1	Dither 1	4	8	2031.329	225055.2
3	F1000W	FASTR1	55	2	1	Dither 1	4	8	1232.118	225055.3
4	F1130W	FASTR1	80	4	1	Dither 1	4	16	3585.352	225055.4
5	F1280W	FASTR1	60	2	1	Dither 1	4	8	1343.119	225055.5
6	F1500W	FASTR1	62	3	1	Dither 1	4	12	2086.83	225055.6
7	F1800W	FASTR1	51	3	1	Dither 1	4	12	1720.525	225055.7

Special Requirements

Aperture PA Range 35.83544897 to 47.83544897 Degrees (V3 31.0 to 43.0)

Same V3 PA 1, 2, 3, 4