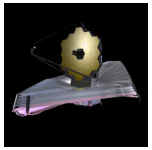

1233 - I Zw 18: Dust Life Cycle at Very Low Metallicity

Cycle: 1, Proposal Category: GTO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
MIRI I Zw 18				
	1	I Zw 18 MIRI	MIRI Imaging	(1) I-ZW-18-MIRI
NIRCam I Zw 18				

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
	2	I Zw 18 NIRCam	NIRCam Imaging	(2) I-ZW-18-NIRCAM

ABSTRACT

JWST MIRI and NIRCam will be used to study the life cycle of dust in I Zw 18, in a manner comparable to Spitzer studies of the life cycle of dust in the Large and Small Magellanic clouds (e.g., Meixner et al. 2006; Gordon et al. 2011; Meixner et al. 2013). With the spatial resolution and sensitivity afforded by JWST, we will be able to study individual objects in the galaxy I Zw 18 that has an extremely low metallicity ([Fe/H] = - 1.9) and has been the subject of an HST study that detects both post-main sequence and young stars. Conditions in this galaxy are thought to be similar to high redshift galaxies and our study will shed light on the dust life cycle in the early universe. With NIRCam and MIRI, we will be able to study dusty objects, which were not seen by HST. Of particular interest are dust producers. Unlike our galaxy where low- and intermediate mass stars provide substantial dust via mass loss during the asymptotic giant branch (AGB), high redshift galaxies with known large dust content do not have time for stars with masses below 5 solar masses to evolve onto the AGB and produce dust. Recent works show that supernova can produce substantial amount of dust but it is not clear if that will survive the passages of shocks. Hence studies of intermediate-mass and high-mass stars towards the end of their evolution may be keys to understanding dust formation in galaxies. The detection of the massive young stellar objects in I Zw 18 will provide insight into the formation of massive stars at low metallicity. Together with the star formation history determinations from HST and the dust mass measurements from the Spitzer Space Telescope and the Herschel Space Observatory, we will be able to construct a dust evolution model of this important galaxy.

OBSERVING DESCRIPTION

We plan to use the MIRI/NIRCam parallel imaging mode as follows. NIRcam prime with filters F115W/F356W and F200W/F444W (SW/LW) and MIRI parallel (F1000W, F1500W). MIRI prime with filters F770W, F1000W, F1500W and F1800W and NIRCam parallel (F115W/F356W, F200W/F277W, F150W/F444W, F140M/F335M). These MIRI filter selections are guided by our study of predicted fluxes of dusty objects (Jones et al. 2017). The NIRCam filters are selected based on prior work on stellar populations at these wavelengths. The total time for the project (6 hours) will be equally split (3 hrs each) between the MIRI European Consortium (Justtanont lead) and Meixner's US MIRI Science team allocation.

We have been informed that the next APT version out in January will have extra charges for parallel observations, so we reserve the right to change the integration times due to these extra overheads.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	I-ZW-18-MIRI	RA: 09 34 2.0000 (143.5083333d) Dec: +55 14 28.00 (55.24111d) Equinox: J2000		
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Galaxy* *Description=[Dwarf irregular galaxies]*				
(2)	I-ZW-18-NIRCAM	RA: 09 34 2.1000 (143.5087500d) Dec: +55 14 25.00 (55.24028d) Equinox: J2000		
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Galaxy* *Description=[Dwarf irregular galaxies]*				

Observation

Proposal 1233, Observation 1: I Zw 18 MIRI Wed Oct 19 18:00:30 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI 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)	I-ZW-18-MIRI	RA: 09 34 2.0000 (143.5083333d) Dec: +55 14 28.00 (55.24111d) Equinox: J2000		

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Galaxy
Description=[Dwarf irregular galaxies]

Template

Subarray
FULL

Dithers

#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size
1	CYCLING	1	4						SMALL
2	CYCLING	1	4						SMALL
3	CYCLING	1	4						SMALL
4	CYCLING	1	4						SMALL

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F770W	FASTR1	100	1	1	Dither 1	4	4	1110.016	
2	F1000W	FASTR1	200	1	1	Dither 2	4	4	2220.032	
3	F1500W	FASTR1	110	2	1	Dither 3	4	8	2453.135	
4	F1800W	FASTR1	88	6	1	Dither 4	4	24	5916.385	

Observation

Proposal 1233, Observation 2: I Zw 18 NIRCam Wed Oct 19 18:00:30 GMT 2022

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): MIRI 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)	I-ZW-18-NIRCAM	RA: 09 34 2.1000 (143.5087500d) Dec: +55 14 25.00 (55.24028d) Equinox: J2000		

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Galaxy
Description=[Dwarf irregular galaxies]

Template

NIRCam Imaging	MIRI Imaging
Module: ALL	Subarray: FULL
Subarray: FULL	

Dithers

#	Primary Dither Type	Primary Dithers	Dither Size	Subpixel Positions	Coordinated Parallel Subpixel Selector	Dither Direct Images Primes
1	NONE			1	4-POINT-WITH-MIRI-F1000W	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	F115W	F356W	SHALLOW4	6	1	4	4	1245.465	
2	F200W	F444W	SHALLOW4	6	1	4	4	1245.465	

Spectral Elements

MIRI Imaging	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F1000W	FASTR1	112	1	1		4	4	1243.218	
2	F1500W	FASTR1	112	1	1		4	4	1243.218	

Special Requirements	Offset 55.0 arcsec, 35.0 arcsec No Parallel