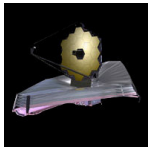

3295 - Is there enough? Cosmic dust formation in normal core-collapse supernovae in the first ~5 years post-explosion

Cycle: 2, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
MIRI SN observations				
	1	SN2022acko	MIRI Imaging	(1) SN-2022ACKO
	3	SN2022wsp	MIRI Imaging	(8) SN2022WSP
	4	SN2022jox	MIRI Imaging	(9) SN2022JOX
	5	SN2021yja	MIRI Imaging	(2) SN-2021YJA
	6	SN2021gmj	MIRI Imaging	(3) SN-2021GMJ
	7	SN2020jfo	MIRI Imaging	(4) SN-2020JFO
	8	SN2018cuf	MIRI Imaging	(5) SN-2018CUF
	9	SN2017gmr	MIRI Imaging	(6) SN-2017GMR
	10	SN2017eaw	MIRI Imaging	(7) SN-2017EAW

ABSTRACT

Dust is abundant in the early universe, and core collapse supernovae (CC SNe) are a likely source. However, existing observations of CC SNe in the near- and short mid-infrared yield dust masses ~2-3 orders of magnitude lower than expected. One possible solution is that this dust is hiding deep in the mid-infrared, at temperatures of ~100-200K, or that it is created over a longer time span than some models predict. JWST+MIRI is able to probe both warm (~300-500K) and cold (~100-200K) dust with unprecedented sensitivity. The goal of this proposal is to provide a snapshot of dust formation and evolution in normal CC SNe at three different phases: 1-2, 2-5, and 5+ years after explosion. We will obtain MIRI imaging of a sample of nine normal CC SNe, three in each age range, chosen based on their comprehensive ground-based data sets and observational properties, and not for any dust signatures, which will provide an unbiased look at typical dust production. With JWST spectral energy distributions out to ~25 microns, we will be able to quantify and characterize the amount of cold and warm dust associated with normal CC SNe as a function of time since explosion, explore links between dust formation and other SN properties, and address the issue of cosmic dust formation in the early universe.

OBSERVING DESCRIPTION

This proposal will image a sample of nine normal core collapse supernovae with MIRI. The sample was specially chosen to span three age ranges: 1-2 yrs, 2-5 yrs and 5+ yrs. This time corresponds to possible dust creation in the supernova environment.

Each observation will consist of imaging in all the primary MIRI filters: F560W, F770W, F1000W, F1130W, F1280W, F1500W, F1800W, F2100W, and F2550W. The full suite of MIRI imaging is necessary to characterize both cold and warm dust components (down to ~100-200K) and to have sensitivity to PAH and SiO dust-related features. Standard 4-point dithers will be applied.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	SN-2022ACKO	RA: 03 19 38.9900 (49.9124583d) Dec: -19 23 42.68 (-19.39519d) Equinox: J2000	Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Supernovae]* *Extended=NO*				
(2)	SN-2021YJA	RA: 03 24 21.1800 (51.0882500d) Dec: -21 33 56.20 (-21.56561d) Equinox: J2000	Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Supernovae]*				
(3)	SN-2021GMJ	RA: 10 38 47.2700 (159.6969583d) Dec: +53 30 30.31 (53.50842d) Equinox: J2000	Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Supernovae]*				
(4)	SN-2020JFO	RA: 12 21 50.4800 (185.4603333d) Dec: +04 28 54.05 (4.48168d) Equinox: J2000	Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Supernovae]* *Extended=NO*				
(5)	SN-2018CUF	RA: 21 16 11.5800 (319.0482500d) Dec: -64 28 57.26 (-64.48257d) Equinox: J2000	Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Supernovae]* *Extended=NO*				
(6)	SN-2017GMR	RA: 02 35 30.1500 (38.8756250d) Dec: -09 21 15.00 (-9.35417d) Equinox: J2000	Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Supernovae]* *Extended=NO*				
(7)	SN-2017EAW	RA: 20 34 44.2380 (308.6843250d) Dec: +60 11 36.00 (60.19333d) Equinox: J2000	Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Star* *Description=[Supernovae]* *Extended=NO*				

	(8)	SN2022WSP	RA: 23 00 3.5600 (345.0148333d) Dec: +15 58 43.90 (15.97886d) Equinox: J2000
	Comments: *Category=Star* *Description=[Supernovae]* *Extended=NO*		
	(9)	SN2022JOX	RA: 09 57 44.4900 (149.4353750d) Dec: -28 30 56.50 (-28.51569d) Equinox: J2000
	Comments: *Category=Star* *Description=[Supernovae]* *Extended=NO*		

Observation

Proposal 3295, Observation 1: SN2022acko

Thu May 11 00:08:44 GMT 2023

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)	SN-2022ACKO	RA: 03 19 38.9900 (49.9124583d) Dec: -19 23 42.68 (-19.39519d) Equinox: J2000	Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Supernovae]
Extended=NO

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	EXTENDED SOURCE	POSITIVE	DEFAULT

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	10	1	1	Dither 1	4	4	111.002	
2	F770W	FASTR1	10	1	1	Dither 1	4	4	111.002	
3	F1000W	FASTR1	10	1	1	Dither 1	4	4	111.002	
4	F1130W	FASTR1	10	1	1	Dither 1	4	4	111.002	
5	F1280W	FASTR1	10	1	1	Dither 1	4	4	111.002	
6	F1500W	FASTR1	10	1	1	Dither 1	4	4	111.002	
7	F1800W	FASTR1	10	1	1	Dither 1	4	4	111.002	
8	F2100W	FASTR1	10	1	1	Dither 1	4	4	111.002	
9	F2550W	FASTR1	10	1	1	Dither 1	4	4	111.002	

Observation

Proposal 3295, Observation 3: SN2022wsp Thu May 11 00:08:44 GMT 2023

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
(8)	SN2022WSP	RA: 23 00 3.5600 (345.0148333d) Dec: +15 58 43.90 (15.97886d) Equinox: J2000		

Comments:
Category=Star
Description=[Supernovae]
Extended=NO

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	EXTENDED SOURCE	POSITIVE	DEFAULT

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	10	1	1	Dither 1	4	4	111.002	
2	F770W	FASTR1	10	1	1	Dither 1	4	4	111.002	
3	F1000W	FASTR1	10	1	1	Dither 1	4	4	111.002	
4	F1130W	FASTR1	10	1	1	Dither 1	4	4	111.002	
5	F1280W	FASTR1	10	1	1	Dither 1	4	4	111.002	
6	F1500W	FASTR1	10	1	1	Dither 1	4	4	111.002	
7	F1800W	FASTR1	10	1	1	Dither 1	4	4	111.002	
8	F2100W	FASTR1	10	1	1	Dither 1	4	4	111.002	
9	F2550W	FASTR1	10	1	1	Dither 1	4	4	111.002	

Observation

Proposal 3295, Observation 4: SN2022jox

Thu May 11 00:08:44 GMT 2023

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
(9)	SN2022JOX	RA: 09 57 44.4900 (149.4353750d) Dec: -28 30 56.50 (-28.51569d) Equinox: J2000		

Comments:
Category=Star
Description=[Supernovae]
Extended=NO

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	EXTENDED SOURCE	POSITIVE	DEFAULT

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	10	1	1	Dither 1	4	4	111.002	
2	F770W	FASTR1	10	1	1	Dither 1	4	4	111.002	
3	F1000W	FASTR1	10	1	1	Dither 1	4	4	111.002	
4	F1130W	FASTR1	10	1	1	Dither 1	4	4	111.002	
5	F1280W	FASTR1	10	1	1	Dither 1	4	4	111.002	
6	F1500W	FASTR1	10	1	1	Dither 1	4	4	111.002	
7	F1800W	FASTR1	10	1	1	Dither 1	4	4	111.002	
8	F2100W	FASTR1	10	1	1	Dither 1	4	4	111.002	
9	F2550W	FASTR1	10	1	1	Dither 1	4	4	111.002	

Observation

Proposal 3295, Observation 5: SN2021yja Thu May 11 00:08:44 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Diagnostics

(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	SN-2021YJA	RA: 03 24 21.1800 (51.0882500d) Dec: -21 33 56.20 (-21.56561d) Equinox: J2000	Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Supernovae]

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	EXTENDED SOURCE	POSITIVE	DEFAULT

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	10	1	1	Dither 1	4	4	111.002	
2	F770W	FASTR1	10	1	1	Dither 1	4	4	111.002	
3	F1000W	FASTR1	10	1	1	Dither 1	4	4	111.002	
4	F1130W	FASTR1	10	1	1	Dither 1	4	4	111.002	
5	F1280W	FASTR1	10	1	1	Dither 1	4	4	111.002	
6	F1500W	FASTR1	10	1	1	Dither 1	4	4	111.002	
7	F1800W	FASTR1	10	1	1	Dither 1	4	4	111.002	
8	F2100W	FASTR1	10	1	1	Dither 1	4	4	111.002	
9	F2550W	FASTR1	10	1	1	Dither 1	4	4	111.002	

Observation

Proposal 3295, Observation 6: SN2021gmj Thu May 11 00:08:44 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Diagnostics

(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(3)	SN-2021GMJ	RA: 10 38 47.2700 (159.6969583d) Dec: +53 30 30.31 (53.50842d) Equinox: J2000	Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Supernovae]

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	EXTENDED SOURCE	POSITIVE	DEFAULT

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	10	1	1	Dither 1	4	4	111.002	
2	F770W	FASTR1	10	1	1	Dither 1	4	4	111.002	
3	F1000W	FASTR1	10	1	1	Dither 1	4	4	111.002	
4	F1130W	FASTR1	10	1	1	Dither 1	4	4	111.002	
5	F1280W	FASTR1	10	1	1	Dither 1	4	4	111.002	
6	F1500W	FASTR1	10	1	1	Dither 1	4	4	111.002	
7	F1800W	FASTR1	10	1	1	Dither 1	4	4	111.002	
8	F2100W	FASTR1	10	1	1	Dither 1	4	4	111.002	
9	F2550W	FASTR1	10	1	1	Dither 1	4	4	111.002	

Observation

Proposal 3295, Observation 7: SN2020jfo Thu May 11 00:08:44 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Diagnostics

(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(4)	SN-2020JFO	RA: 12 21 50.4800 (185.4603333d) Dec: +04 28 54.05 (4.48168d) Equinox: J2000	Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Supernovae]
Extended=NO

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	EXTENDED SOURCE	POSITIVE	DEFAULT

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	10	1	1	Dither 1	4	4	111.002	
2	F770W	FASTR1	10	1	1	Dither 1	4	4	111.002	
3	F1000W	FASTR1	10	1	1	Dither 1	4	4	111.002	
4	F1130W	FASTR1	10	1	1	Dither 1	4	4	111.002	
5	F1280W	FASTR1	10	1	1	Dither 1	4	4	111.002	
6	F1500W	FASTR1	10	1	1	Dither 1	4	4	111.002	
7	F1800W	FASTR1	10	1	1	Dither 1	4	4	111.002	
8	F2100W	FASTR1	10	1	1	Dither 1	4	4	111.002	
9	F2550W	FASTR1	10	1	1	Dither 1	4	4	111.002	

Observation

Proposal 3295, Observation 8: SN2018cuf

Thu May 11 00:08:44 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Diagnostics

(Visit 8:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(5)	SN-2018CUF	RA: 21 16 11.5800 (319.0482500d) Dec: -64 28 57.26 (-64.48257d) Equinox: J2000	Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Supernovae]
Extended=NO

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	EXTENDED SOURCE	POSITIVE	DEFAULT

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	10	1	1	Dither 1	4	4	111.002	
2	F770W	FASTR1	10	1	1	Dither 1	4	4	111.002	
3	F1000W	FASTR1	10	1	1	Dither 1	4	4	111.002	
4	F1130W	FASTR1	10	1	1	Dither 1	4	4	111.002	
5	F1280W	FASTR1	10	1	1	Dither 1	4	4	111.002	
6	F1500W	FASTR1	10	1	1	Dither 1	4	4	111.002	
7	F1800W	FASTR1	10	1	1	Dither 1	4	4	111.002	
8	F2100W	FASTR1	10	1	1	Dither 1	4	4	111.002	
9	F2550W	FASTR1	10	1	1	Dither 1	4	4	111.002	

Observation

Proposal 3295, Observation 9: SN2017gmr Thu May 11 00:08:44 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Diagnostics

(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(6)	SN-2017GMR	RA: 02 35 30.1500 (38.8756250d) Dec: -09 21 15.00 (-9.35417d) Equinox: J2000	Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Supernovae]
Extended=NO

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	EXTENDED SOURCE	POSITIVE	DEFAULT

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	10	1	1	Dither 1	4	4	111.002	
2	F770W	FASTR1	10	1	1	Dither 1	4	4	111.002	
3	F1000W	FASTR1	10	1	1	Dither 1	4	4	111.002	
4	F1130W	FASTR1	10	1	1	Dither 1	4	4	111.002	
5	F1280W	FASTR1	10	1	1	Dither 1	4	4	111.002	
6	F1500W	FASTR1	10	1	1	Dither 1	4	4	111.002	
7	F1800W	FASTR1	10	1	1	Dither 1	4	4	111.002	
8	F2100W	FASTR1	10	1	1	Dither 1	4	4	111.002	
9	F2550W	FASTR1	10	1	1	Dither 1	4	4	111.002	

Observation

Proposal 3295, Observation 10: SN2017eaw Thu May 11 00:08:44 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Diagnostics

(Visit 10:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(7)	SN-2017EAW	RA: 20 34 44.2380 (308.6843250d) Dec: +60 11 36.00 (60.19333d) Equinox: J2000	Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Supernovae]
Extended=NO

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	EXTENDED SOURCE	POSITIVE	DEFAULT

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	10	1	1	Dither 1	4	4	111.002	
2	F770W	FASTR1	10	1	1	Dither 1	4	4	111.002	
3	F1000W	FASTR1	10	1	1	Dither 1	4	4	111.002	
4	F1130W	FASTR1	10	1	1	Dither 1	4	4	111.002	
5	F1280W	FASTR1	10	1	1	Dither 1	4	4	111.002	
6	F1500W	FASTR1	10	1	1	Dither 1	4	4	111.002	
7	F1800W	FASTR1	10	1	1	Dither 1	4	4	111.002	
8	F2100W	FASTR1	10	1	1	Dither 1	4	4	111.002	
9	F2550W	FASTR1	10	1	1	Dither 1	4	4	111.002	