



9258 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Cycle: 4, Proposal Category: DD

INVESTIGATORS

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OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
Phase 3 - SNIc				
	5	NIRSPEC	NIRSpec Fixed Slit Spectroscopy	(2) 24aecx
	6	MIRI/MRS	MIRI Medium Resolution Spectroscopy	(2) 24aecx
	9	NIRSPEC - Repeat of Obs 5	NIRSpec Fixed Slit Spectroscopy	(2) 24aecx
	10	MIRI/MRS - Repeat of Obs 6	MIRI Medium Resolution Spectroscopy	(2) 24aecx
Phase 4 - SNIc				
	13	MIRI_ON_NGC3521	MIRI Imaging	(3) NGC3521
	14	NIRCAM_ON_NGC3521	NIRCam Imaging	(2) 24aecx

ABSTRACT

This past week brought the discovery of SN 2024aecx, one of the closest stripped-envelope supernovae (SESNe) ever found, located just 11 Mpc away in NGC 3521. What makes this supernova truly extraordinary is its pre-explosion imaging, available from not only HST but also JWST, offering an unprecedented opportunity to study its progenitor system and environment in remarkable detail. Its rapid spectral evolution suggests it may be an ultra-stripped SN or a peculiar Type Ic, making it an ideal target to study progenitor systems, binary interactions, and dust formation. A carefully timed multi-epoch campaign with JWST will capture the formation of dust precursors, monitor dust evolution, and differentiate between freshly formed and pre-existing dust. These observations will also enable direct detection of the progenitor and any surviving companion, addressing key questions about mass-loss mechanisms, binary systems, and the contribution of SESNe to cosmic dust production. SN 2024aecx represents a rare and time-sensitive opportunity to construct a legacy dataset with transformative implications for stellar evolution and cosmic dust enrichment.

OBSERVING DESCRIPTION

We request a total of 32.5 hours charged time to obtain 3 sets of NIR+MIR spectral time-series and 1 set of photometric observations of SN 2024aecx between 30–500 days post-explosion.

Proposal 9258 - Targets - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	24aecx	RA: 11 05 49.5500 (166.4564583d) Dec: -00 02 5.50 (-.03486d) Equinox: J2000	Epoch of Position: 2000	
<i>Comments:</i> <i>Category=Star</i> <i>Description=[Supernovae]</i> <i>Extended=NO</i>				
(3)	NGC3521	RA: 11 05 48.5736 (166.4523900d) Dec: -00 02 9.42 (-.03595d) Equinox: J2000		
<i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Spiral galaxies]</i> <i>Extended=YES</i>				

Proposal 9258 - Observation 5 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Mon Apr 06 16:00:28 GMT 2026

Observation	Proposal 9258, Observation 5: NIRSPEC Diagnostic Status: Warning Observing Template: NIRSPEC Fixed Slit Spectroscopy										
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)	24aecx	RA: 11 05 49.5500 (166.4564583d) Dec: -00 02 5.50 (-.03486d) Equinox: J2000			Epoch of Position: 2000					
	<i>Comments:</i> Category=Star Description=[Supernovae] Extended=NO										
Acquisition	#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID
	1	SAME	WATA	SUB2048	CLEAR	NRSRAPIDD6	3	1	1	14.452	227468.2
Template	HFF Readout Mode				Slit			Subarray			
	false				S400A1			SUBS400A1			
Dithers	#	Primary Dither Positions					Sub-Pixel Pattern				
	1	3					NONE				
Spectral Elements	#	Grating/Filter	Slit	Readout Pattern	Groups/Int	Integrations/Exp #	Autocal	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1	G235M/F170LP	S400A1	NRSRAPID	100	1	NONE	3	3	472.135	227468.4
	2	G395M/F290LP	S400A1	NRSRAPID	100	1	NONE	3	3	472.135	227468.6

Proposal 9258 - Observation 5 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Special Requirements

Between Dates 04-DEC-2025 and 22-JAN-2026

Sequence Observations 5, 6 within 0.5 Days

Proposal 9258 - Observation 6 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Mon Apr 06 16:00:28 GMT 2026

Observation	Proposal 9258, Observation 6: MIRI/MRS Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy												
	(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous				
	(2)	24aecx	RA: 11 05 49.5500 (166.4564583d) Dec: -00 02 5.50 (-.03486d) Equinox: J2000			Epoch of Position: 2000							
Comments: Category=Star Description=[Supernovae] Extended=NO													
Acquisition	#	Target											
	1	NONE											
Template	AcqFilter	Primary Channel			Simultaneous Imaging			Imager Subarray		Grating Wheel Direction			
	F560W	All MRS			YES			FULL		Allow Auto Reorder			
Dithers	#	Dither Type			Optimized For			Direction					
	1	4-Point			POINT SOURCE			NEGATIVE					
Spectral Elements	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1		IMAGER	F560W	FASTR1	5	1	1	Dither 1	4	4	55.501	
	1	SHORT(A)	MRSLONG		SLOWR1	20	3	1	Dither 1	4	12	5924.7	234905.14
	1	SHORT(A)	MRSSHORT		SLOWR1	20	3	1	Dither 1	4	12	5924.7	234905.14
	2		IMAGER	F770W	FASTR1	7	1	1	Dither 1	4	4	77.701	
	2	MEDIUM(B)	MRSLONG		SLOWR1	25	3	1	Dither 1	4	12	7358.095	234905.15
	2	MEDIUM(B)	MRSSHORT		SLOWR1	25	3	1	Dither 1	4	12	7358.095	234905.15
	3		IMAGER	F1000W	FASTR1	10	1	1	Dither 1	4	4	111.002	
	3	LONG(C)	MRSLONG		SLOWR1	30	4	1	Dither 1	4	16	11753.841	234905.16
	3	LONG(C)	MRSSHORT		SLOWR1	30	4	1	Dither 1	4	16	11753.841	234905.16

Proposal 9258 - Observation 6 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Special Requirements

Between Dates 04-DEC-2025 and 22-JAN-2026

Sequence Observations 5, 6 within 0.5 Days

Proposal 9258 - Observation 9 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Mon Apr 06 16:00:28 GMT 2026

Observation	Proposal 9258, Observation 9: NIRSPEC - Repeat of Obs 5 Diagnostic Status: Warning Observing Template: NIRSPEC Fixed Slit Spectroscopy										
	(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous		
	(2)	24aecx	RA: 11 05 49.5500 (166.4564583d) Dec: -00 02 5.50 (-.03486d) Equinox: J2000			Epoch of Position: 2000					
Comments: Category=Star Description=[Supernovae] Extended=NO											
Acquisition	#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID
	1	SAME	WATA	SUB2048	CLEAR	NRSRAPIDD6	3	1	1	14.452	227468.2
Template	HFF Readout Mode				Slit			Subarray			
	false				S400A1			SUBS400A1			
Dithers	#	Primary Dither Positions					Sub-Pixel Pattern				
	1	3					NONE				
Spectral Elements	#	Grating/Filter	Slit	Readout Pattern	Groups/Int	Integrations/Ex #	Autocal	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1	G235M/F170LP	S400A1	NRSRAPID	100	1	NONE	3	3	472.135	227468.4
	2	G395M/F290LP	S400A1	NRSRAPID	100	1	NONE	3	3	472.135	227468.6

Proposal 9258 - Observation 9 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Special Requirements

Between Dates 04-DEC-2025 and 22-JAN-2026

Sequence Observations 9, 10 within 0.5 Days

Proposal 9258 - Observation 10 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Mon Apr 06 16:00:28 GMT 2026

Observation	Proposal 9258, Observation 10: MIRI/MRS - Rpeat of Obs 6 Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy												
	(Visit 10:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous				
	(2)	24aecx	RA: 11 05 49.5500 (166.4564583d) Dec: -00 02 5.50 (-.03486d) Equinox: J2000			Epoch of Position: 2000							
Comments: Category=Star Description=[Supernovae] Extended=NO													
Acquisition	#	Target											
	1	NONE											
Template	AcqFilter	Primary Channel			Simultaneous Imaging			Imager Subarray		Grating Wheel Direction			
	F560W	All MRS			YES			FULL		Allow Auto Reorder			
Dithers	#	Dither Type			Optimized For			Direction					
	1	4-Point			POINT SOURCE			NEGATIVE					
Spectral Elements	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1		IMAGER	F560W	FASTR1	5	1	1	Dither 1	4	4	55.501	
	1	SHORT(A)	MRSLONG		SLOWR1	20	3	1	Dither 1	4	12	5924.7	234905.14
	1	SHORT(A)	MRSSHORT		SLOWR1	20	3	1	Dither 1	4	12	5924.7	234905.14
	2		IMAGER	F770W	FASTR1	7	1	1	Dither 1	4	4	77.701	
	2	MEDIUM(B)	MRSLONG		SLOWR1	25	3	1	Dither 1	4	12	7358.095	234905.15
	2	MEDIUM(B)	MRSSHORT		SLOWR1	25	3	1	Dither 1	4	12	7358.095	234905.15
	3		IMAGER	F1000W	FASTR1	10	1	1	Dither 1	4	4	111.002	
	3	LONG(C)	MRSLONG		SLOWR1	30	4	1	Dither 1	4	16	11753.841	234905.16
	3	LONG(C)	MRSSHORT		SLOWR1	30	4	1	Dither 1	4	16	11753.841	234905.16

Proposal 9258 - Observation 10 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Special Requirements

Between Dates 04-DEC-2025 and 22-JAN-2026

Sequence Observations 9, 10 within 0.5 Days

Proposal 9258 - Observation 13 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Mon Apr 06 16:00:28 GMT 2026

Observation	Proposal 9258, Observation 13: MIRI_ON_NGC3521 Diagnostic Status: Warning Observing Template: MIRI Imaging										
Diagnostics	(Visit 13:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 13:2) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 13:3) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 13:4) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Miscellaneous				
(3)	NGC3521	RA: 11 05 48.5736 (166.4523900d) Dec: -00 02 9.42 (-.03595d) Equinox: J2000									
Comments: Category=Galaxy Description=[Spiral galaxies] Extended=YES											
Template	Subarray FULL										
Mosaic	Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order				
2	2	10.0	10.0	31.0	0.0	DEFAULT					
Dithers	#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size	
1	4-Point-Sets				6	1	EXTENDED SOURCE	POSITIVE	DEFAULT		
Spectral Elements	#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
1	F770W	FASTR1	8	1	1	Dither 1	4	4	88.801		
2	F1500W	FASTR1	8	1	1	Dither 1	4	4	88.801		
3	F2100W	FASTR1	13	2	1	Dither 1	4	8	299.704		

Proposal 9258 - Observation 13 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Special Requirements

Group Visits within 53 Days
Aperture PA Range 105 to 120 Degrees (V3 100.16455103 to 115.16455103)
Visits Same PA

Sequence Observations 13, 14 within 1 Days

Proposal 9258 - Observation 14 - SN 2024aecx: A Gateway to Understanding Massive Star Deaths, Cosmic Dust, and Binary Systems

Mon Apr 06 16:00:28 GMT 2026

Observation	<p>Proposal 9258, Observation 14: NIRCAM_ON_NGC3521</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCAM Imaging</p>									
Diagnostics	(Visit 14:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Miscellaneous		
	(2)	24aecx	RA: 11 05 49.5500 (166.4564583d) Dec: -00 02 5.50 (-.03486d) Equinox: J2000		Epoch of Position: 2000					
	<p><i>Comments:</i> <i>Category=Star</i> <i>Description=[Supernovae]</i> <i>Extended=NO</i></p>									
Template	Module					Subarray				
	B					FULLP				
Dithers	#	Primary Dither Type		Primary Dithers		Subpixel Dither Type		Dither Size		Subpixel Positions
	1	NONE				STANDARD				4
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	Optional ETC ID
	1	F187N	F335M	BRIGHT1	5	1	4	4	386.524	
	2	F115W	F250M	BRIGHT2	3	1	4	4	257.682	
	3	F150W	F300M	BRIGHT2	3	1	4	4	257.682	
	4	F090W	F444W	BRIGHT2	4	1	4	4	343.577	
	5	F070W	F356W	BRIGHT2	4	1	4	4	343.577	
Special Requirements	Sequence Observations 13, 14 within 1 Days									