



9105 - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Cycle: 4, Proposal Category: GO

INVESTIGATORS

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Prof. Alex V. Filippenko (CoI)	University of California - Berkeley

OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
Phase 5				
	1	NIRSPEC	NIRSpec Fixed Slit Spectroscopy	(1) 2024ahv
	2	MIRI/LRS	MIRI Low Resolution Spectroscopy	(1) 2024ahv
	3	MIRI/Imaging	MIRI Imaging	(1) 2024ahv
Phase 6				
	4	NIRSPEC	NIRSpec Fixed Slit Spectroscopy	(1) 2024ahv
	5	MIRI/LRS	MIRI Low Resolution Spectroscopy	(1) 2024ahv
	6	MIRI/Imaging	MIRI Imaging	(1) 2024ahv

ABSTRACT

The rarity of nearby stripped-envelope supernovae (SESNe) presents an exceptional opportunity to study dust formation and evolution in the early Universe. SN 2024ahv, a rare Type Ib SESN (SN Ib) just 20 Mpc away, presents an unparalleled opportunity to study dust formation and evolution. As the closest SN Ib likely to explode during JWST's lifespan, it offers a unique chance to build a multi-wavelength legacy dataset, providing insights into massive star deaths and cosmic dust formation. JWST has already delivered remarkable early detections of CO and SiO in SN 2024ahv, making this supernova a critical probe for dust formation processes. While dust production in hydrogen-rich SNe II has been the primary focus until now, SESNe, born from short-lived, massive stars, are likely key contributors to early dust in the cosmos. Monitoring SN 2024ahv across NIR and MIR wavelengths will allow us to trace molecular evolution, dust formation, and composition in exquisite detail, offering insights never before captured for an SESN.

OBSERVING DESCRIPTION

We request 27.2 hours of charged time across four epochs over Cycles 4 and 5 (13.4 hrs in Cycle 4 and 13.8 hrs in Cycle 5) to obtain NIR+MIR time series of SN2024ahv between 500–1100 days. These observations will track molecular evolution and dust formation at key stages, with spectra at approximately 550, 800, 950, and 1100 days to monitor CO and SiO, as well as distinguish between O-rich and C-rich dust features.

Proposal 9105 - Targets - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	2024ahv	RA: 16 18 46.3190 (244.6929958d) Dec: +07 24 44.77 (7.41244d) Equinox: J2000	Proper Motion RA: 0 Proper Motion Dec: 0 Epoch of Position: 2000	
<i>Comments:</i> Category=Star Description=[Supernovae] Extended=NO					
Generic Targets	#	Name	Criteria	Description	
	(2)	SNI Ib	Next bright, nearby, Type Ib supernova		
	(3)	SNIc-BL	Next bright, nearby, Type Ic-BL supernova		
	(4)	SNIc	Next bright, nearby, Type Ic supernova		
	(5)	SESN-pec	Next bright, nearby, peculiar stripped envelope supernova		

Proposal 9105 - Observation 1 - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Tue Nov 25 18:07:08 GMT 2025

Observation	Proposal 9105, Observation 1: NIRSPEC Diagnostic Status: Warning Observing Template: NIRSpec Fixed Slit Spectroscopy										
	(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)	2024ahv	RA: 16 18 46.3190 (244.6929958d) Dec: +07 24 44.77 (7.41244d) Equinox: J2000			Proper Motion RA: 0 Proper Motion Dec: 0 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	227508.2
Template	HFF Readout Mode				Slit			Subarray			
	false				S400A1			SUBS400A1			
Dithers	#	Primary Dither Positions						Sub-Pixel Pattern			
	1	2						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	2	2	314.757	227508.4
	2	G395M/F290LP	S400A1	NRSRAPID	100	2	NONE	2	4	629.514	227508.6

Proposal 9105 - Observation 1 - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Special Requirements

Between Dates 30-JUN-2025:00:00:00 and 30-AUG-2025:00:00:00

Group Observations 1, 2, 3 within 1 Days

Proposal 9105 - Observation 2 - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Tue Nov 25 18:07:08 GMT 2025

Observation	<p>Proposal 9105, Observation 2: MIRI/LRS</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: MIRI Low Resolution Spectroscopy</p>									
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			
	(1)	2024ahv	RA: 16 18 46.3190 (244.6929958d) Dec: +07 24 44.77 (7.41244d) Equinox: J2000	Proper Motion RA: 0 Proper Motion Dec: 0 Epoch of Position: 2000						
	<p>Comments: Category=Star Description=[Supernovae] Extended=NO</p>									
Acquisition	#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID	
	1	SAME	F560W	FAST	10	1	1	27.75	227508.1	
Template	Subarray				Obtain Verification Image?					
	FULL				true					
Dithers	#	Dither Type	No. Spectral Steps	Spectral Step Offset	No. Spatial Steps	Spatial Step Offset				
	1	ALONG SLIT NOD								
Pointing Verification	#	PV Readout Pattern	PV Groups/Int	PV Integrations/Exp	PV Total Integrations	PV Exposures/Dith	PV Total Dithers	PV Total Exposure Time	Optional ETC ID	Filter
	1	FASTR1	10	1	1	1	1	27.75		F560W

Proposal 9105 - Observation 2 - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Spectral Elements	#	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Exposures/Dith	Total Dithers	Total Exposure Time	Optional ETC ID
	1	FASTR1	100	8	16	1	2	4478.915	227508.3
Special Requirements	<p>Between Dates 30-JUN-2025:00:00:00 and 30-AUG-2025:00:00:00</p> <p>Group Observations 1, 2, 3 within 1 Days</p>								

Proposal 9105 - Observation 3 - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Tue Nov 25 18:07:08 GMT 2025

Observation	<p>Proposal 9105, Observation 3: MIRI/Imaging</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: MIRI Imaging</p>										
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		
	(1)	2024ahv	RA: 16 18 46.3190 (244.6929958d) Dec: +07 24 44.77 (7.41244d) Equinox: J2000			Proper Motion RA: 0 Proper Motion Dec: 0 Epoch of Position: 2000					
	<p><i>Comments:</i> <i>Category=Star</i> <i>Description=[Supernovae]</i> <i>Extended=NO</i></p>										
Template	<p>Subarray</p> <p>BRIGHTSKY</p>										
Dithers	#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size	
	1	4-Point-Sets				1	1	POINT 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	F1280W	FASTR1	50	4	1	Dither 1	4	16	702.607	227508.7
	2	F1500W	FASTR1	50	4	1	Dither 1	4	16	702.607	227508.9
	3	F1800W	FASTR1	100	4	1	Dither 1	4	16	1394.831	227508.10
	4	F2100W	FASTR1	70	8	1	Dither 1	4	32	1962.455	227508.11
	5	F2550W	FASTR1	50	20	1	Dither 1	4	80	3526.881	227508.12
Special Requirements	<p>Between Dates 30-JUN-2025:00:00:00 and 30-AUG-2025:00:00:00</p> <p>Group Observations 1, 2, 3 within 1 Days</p>										

Proposal 9105 - Observation 4 - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Tue Nov 25 18:07:08 GMT 2025

Observation	<p>Proposal 9105, Observation 4: NIRSPEC</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSpec Fixed Slit Spectroscopy</p>										
Diagnostics	<p>(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(Visit 4:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.</p>										
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous		
	(1)	2024ahv	RA: 16 18 46.3190 (244.6929958d) Dec: +07 24 44.77 (7.41244d) Equinox: J2000			Proper Motion RA: 0 Proper Motion Dec: 0 Epoch of Position: 2000					
	<p><i>Comments:</i> Category=Star Description=[Supernovae] Extended=NO</p>										
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	227508.2
Template	HFF Readout Mode				Slit			Subarray			
	false				S400A1			SUBS400A1			
Dithers	#	Primary Dither Positions						Sub-Pixel Pattern			
	1	2						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	2	2	314.757	227508.4
	2	G395M/F290LP	S400A1	NRSRAPID	100	2	NONE	2	4	629.514	227508.6

Proposal 9105 - Observation 4 - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Special Requirements

Between Dates 10-FEB-2026:00:00:00 and 20-APR-2026:00:00:00

Sequence Observations 4, 5, 6 within 1 Days

Proposal 9105 - Observation 5 - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Tue Nov 25 18:07:08 GMT 2025

Observation	Proposal 9105, Observation 5: MIRI/LRS Diagnostic Status: Warning Observing Template: MIRI Low Resolution Spectroscopy																												
	(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. (Visit 5:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.																												
Diagnosics																													
Fixed Targets	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>2024ahv</td> <td>RA: 16 18 46.3190 (244.6929958d) Dec: +07 24 44.77 (7.41244d) Equinox: J2000</td> <td>Proper Motion RA: 0 Proper Motion Dec: 0 Epoch of Position: 2000</td> <td></td> </tr> </tbody> </table>	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous	(1)	2024ahv	RA: 16 18 46.3190 (244.6929958d) Dec: +07 24 44.77 (7.41244d) Equinox: J2000	Proper Motion RA: 0 Proper Motion Dec: 0 Epoch of Position: 2000		<i>Comments:</i> <i>Category=Star</i> <i>Description=[Supernovae]</i> <i>Extended=NO</i>																	
	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous																								
(1)	2024ahv	RA: 16 18 46.3190 (244.6929958d) Dec: +07 24 44.77 (7.41244d) Equinox: J2000	Proper Motion RA: 0 Proper Motion Dec: 0 Epoch of Position: 2000																										
Acquisition	<table border="1"> <thead> <tr> <th>#</th> <th>Target</th> <th>Filter</th> <th>Readout Pattern</th> <th>Groups/Int</th> <th>Integrations/Exp</th> <th>Total Integrations</th> <th>Total Exposure Time</th> <th>Optional ETC ID</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>SAME</td> <td>F560W</td> <td>FAST</td> <td>10</td> <td>1</td> <td>1</td> <td>27.75</td> <td>227508.1</td> </tr> </tbody> </table>	#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID	1	SAME	F560W	FAST	10	1	1	27.75	227508.1										
	#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID																				
1	SAME	F560W	FAST	10	1	1	27.75	227508.1																					
Template	Subarray				Obtain Verification Image?																								
	FULL				true																								
Dithers	<table border="1"> <thead> <tr> <th>#</th> <th>Dither Type</th> <th>No. Spectral Steps</th> <th>Spectral Step Offset</th> <th>No. Spatial Steps</th> <th>Spatial Step Offset</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>ALONG SLIT NOD</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	#	Dither Type	No. Spectral Steps	Spectral Step Offset	No. Spatial Steps	Spatial Step Offset	1	ALONG SLIT NOD																				
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Pointing Verification	<table border="1"> <thead> <tr> <th>#</th> <th>PV Readout Pattern</th> <th>PV Groups/Int</th> <th>PV Integrations/Exp</th> <th>PV Total Integrations</th> <th>PV Exposures/Dith</th> <th>PV Total Dithers</th> <th>PV Total Exposure Time</th> <th>Optional ETC ID</th> <th>Filter</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>FASTR1</td> <td>10</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>27.75</td> <td></td> <td>F560W</td> </tr> </tbody> </table>	#	PV Readout Pattern	PV Groups/Int	PV Integrations/Exp	PV Total Integrations	PV Exposures/Dith	PV Total Dithers	PV Total Exposure Time	Optional ETC ID	Filter	1	FASTR1	10	1	1	1	1	27.75		F560W								
	#	PV Readout Pattern	PV Groups/Int	PV Integrations/Exp	PV Total Integrations	PV Exposures/Dith	PV Total Dithers	PV Total Exposure Time	Optional ETC ID	Filter																			
1	FASTR1	10	1	1	1	1	27.75		F560W																				

Proposal 9105 - Observation 5 - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Spectral Elements	#	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Exposures/Dith	Total Dithers	Total Exposure Time	Optional ETC ID
	1	FASTR1	100	10	20	1	2	5600.031	227508.3
Special Requirements	Between Dates 10-FEB-2026:00:00:00 and 20-APR-2026:00:00:00								
	Sequence Observations 4, 5, 6 within 1 Days								

Proposal 9105 - Observation 6 - Pioneering Supernova Dust Studies with JWST: Detection of Dust Precursors in SN 2024ahv

Tue Nov 25 18:07:08 GMT 2025

Observation	<p>Proposal 9105, Observation 6: MIRI/Imaging</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: MIRI Imaging</p>										
Diagnostics	<p>(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(Visit 6:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.</p>										
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous		
	(1)	2024ahv	RA: 16 18 46.3190 (244.6929958d) Dec: +07 24 44.77 (7.41244d) Equinox: J2000			Proper Motion RA: 0 Proper Motion Dec: 0 Epoch of Position: 2000					
	<p><i>Comments:</i> <i>Category=Star</i> <i>Description=[Supernovae]</i> <i>Extended=NO</i></p>										
Template	<p>Subarray</p> <p>BRIGHTSKY</p>										
Dithers	#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size	
	1	4-Point-Sets				1	1	POINT 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	F1280W	FASTR1	50	4	1	Dither 1	4	16	702.607	227508.7
	2	F1500W	FASTR1	50	4	1	Dither 1	4	16	702.607	227508.9
	3	F1800W	FASTR1	100	4	1	Dither 1	4	16	1394.831	227508.10
	4	F2100W	FASTR1	70	8	1	Dither 1	4	32	1962.455	227508.11
	5	F2550W	FASTR1	50	20	1	Dither 1	4	80	3526.881	227508.12
Special Requirements	<p>Between Dates 10-FEB-2026:00:00:00 and 20-APR-2026:00:00:00</p> <p>Sequence Observations 4, 5, 6 within 1 Days</p>										