



8525 - Evolutionary Snapshots of Massive Star Formation in NGC 6822

Cycle: 4, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
MIRI				
	1	Hubble V MIRI	MIRI Imaging	(1) NGC-6822-HUBBLE-V
	2	Hubble X MIRI	MIRI Imaging	(2) NGC-6822-HUBBLE-X
	6	Hubble IV MIRI	MIRI Imaging	(3) NGC-6822-HUBBLE-IV
	9	Hubble I/III MIRI	MIRI Imaging	(4) NGC-6822-HUBBLE-I-III
NIRCam				
	7	Hubble V NIRCam	NIRCam Imaging	(1) NGC-6822-HUBBLE-V
	8	Hubble X NIRCam	NIRCam Imaging	(2) NGC-6822-HUBBLE-X
	10	Hubble I/III NIRCam	NIRCam Imaging	(4) NGC-6822-HUBBLE-I-III

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
	13	Hubble IV NIRCcam	NIRCcam Imaging	(3) NGC-6822-HUBBLE-IV

ABSTRACT

We propose to image the massive Hubble star-forming (SF) regions (Hubble I/III, Hubble IV, Hubble V, and Hubble X) in the nearby dwarf irregular galaxy NGC 6822. With high-quality photometric data utilizing NIRCcam and MIRI in near- and mid-IR, we will separate, identify, and categorize the young embedded and dusty evolved stars with color-magnitude diagram (CMD) and spectral energy distribution (SED) analyses. This will allow for the characterization of star formation and dust evolution in metal-poor environments analogous to conditions at higher redshift. We will detect massive young stellar objects (YSOs) emerging from obscuration in these HII regions, providing insight into the formation of massive stars at low metallicities. In addition, we will conduct a census of asymptotic giant branch (AGB) stars, and differentiate their chemistries in effort to quantify their dust producing capabilities and characteristics. At this early epoch, however, the dust-producing mechanisms of slowly evolving AGB star progenitors are not well understood. With high-quality observational data of four massive SF regions at different stages in their evolution inhabiting the same metal-poor galaxy, combined with existing JWST observations of equivalent quality made of the massive, young, embedded SF region Spitzer I, we will tremendously improve our understanding of massive star formation and the life cycle of dust.

OBSERVING DESCRIPTION

We are imaging four metal-poor star-forming (SF) regions (Hubble I/III, Hubble IV, Hubble V, and Hubble X) with four NIRCcam filters (F115W, F200W, F356W, and F444W) and four MIRI filters (F770W, F1000W, F1500W, and F2100W). The MIRI observations will be performed with FULL subarrays and four-point dithers, while the NIRCcam observations will be performed with FULL subarrays but only Module B. Exposure times were computed with the JWST Exposure Time Calculator (ETC) to reach an estimated signal-to-noise ratio (S/N) for sources relevant to the wavelength range encompassed within each filter of roughly 30 (though S/N values are generally much higher), while following recommended best practices to maximize S/N, minimize integration time on target, and avoid background saturation. Our observations aim to conduct a census of massive young stellar objects (YSOs) and asymptotic giant branch (AGB) stars, and characterize their properties with spectral energy distribution (SED) model fitting in effort to better understand star formation and dust production mechanics, as well as massive star cluster evolution, in an extragalactic system which mimics the metal-poor nature of early-universe SF galaxies.

Proposal 8525 - Targets - Evolutionary Snapshots of Massive Star Formation in NGC 6822

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	NGC-6822-HUBBLE-V	RA: 19 44 52.8960 (296.2204000d) Dec: -14 43 4.80 (-14.71800d) Equinox: J2000 <i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Category=Stellar Cluster</i> <i>Description=[OB associations, Young star clusters]</i> <i>Extended=YES</i>	Epoch of Position: 2015.5	
	(2)	NGC-6822-HUBBLE-X	RA: 19 45 5.3520 (296.2723000d) Dec: -14 43 17.76 (-14.72160d) Equinox: J2000 <i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Category=Stellar Cluster</i> <i>Description=[OB associations, Young star clusters]</i> <i>Extended=YES</i>	Epoch of Position: 2015.5	
	(3)	NGC-6822-HUBBLE-IV	RA: 19 44 49.8240 (296.2076000d) Dec: -14 52 45.48 (-14.87930d) Equinox: J2000 <i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Category=Stellar Cluster</i> <i>Description=[OB associations, Young star clusters]</i> <i>Extended=YES</i>	Epoch of Position: 2015.5	
	(4)	NGC-6822-HUBBLE-I-III	RA: 19 44 33.5700 (296.1398750d) Dec: -14 42 15.20 (-14.70422d) Equinox: J2000 <i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Category=Stellar Cluster</i> <i>Description=[OB associations, Young star clusters]</i> <i>Extended=YES</i>	Epoch of Position: 2015.5	

Proposal 8525 - Observation 1 - Evolutionary Snapshots of Massive Star Formation in NGC 6822

Observation	Proposal 8525, Observation 1: Hubble V MIRI									Wed Jul 22 20:00:17 GMT 2026	
	Diagnostic Status: Warning										
	Observing Template: MIRI Imaging										
Diagnosics	(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)	NGC-6822-HUBBLE-V	RA: 19 44 52.8960 (296.2204000d) Dec: -14 43 4.80 (-14.71800d) Equinox: J2000			Epoch of Position: 2015.5					
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	Category=Stellar Cluster										
	Description=[OB associations, Young star clusters] Extended=YES										
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						LARGE	
	2	CYCLING	1	4						LARGE	
	3	CYCLING	1	4						LARGE	
	4	CYCLING	1	8						LARGE	
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	52	1	1	Dither 1	4	4	577.208	227723
	2	F1000W	FASTR1	36	2	1	Dither 2	4	8	810.312	227723
	3	F1500W	FASTR1	15	8	1	Dither 3	4	32	1409.72	227723
	4	F2100W	FASTR1	17	6	1	Dither 4	8	48	2375.434	312086

Proposal 8525 - Observation 2 - Evolutionary Snapshots of Massive Star Formation in NGC 6822

Observation	Proposal 8525, Observation 2: Hubble X MIRI										Wed Jul 22 20:00:17 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.										
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous		
	(2)	NGC-6822-HUBBLE-X	RA: 19 45 5.3520 (296.2723000d) Dec: -14 43 17.76 (-14.72160d) Equinox: J2000			Epoch of Position: 2015.5					
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	Category=Stellar Cluster										
	Description=[OB associations, Young star clusters]										
Template	Extended=YES										
	Subarray										
Dithers	FULL										
	#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size	
	1	CYCLING	1	4						LARGE	
	2	CYCLING	1	4						LARGE	
	3	CYCLING	1	4						LARGE	
4	CYCLING	1	8						LARGE		
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	52	1	1	Dither 1	4	4	577.208	227723
	2	F1000W	FASTR1	36	2	1	Dither 2	4	8	810.312	227723
	3	F1500W	FASTR1	15	8	1	Dither 3	4	32	1409.72	227723
	4	F2100W	FASTR1	17	6	1	Dither 4	8	48	2375.434	312086

Proposal 8525 - Observation 6 - Evolutionary Snapshots of Massive Star Formation in NGC 6822

Observation	Proposal 8525, Observation 6: Hubble IV MIRI										Wed Jul 22 20:00:17 GMT 2026
	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)	NGC-6822-HUBBLE-IV	RA: 19 44 49.8240 (296.2076000d)			Epoch of Position: 2015.5					
			Dec: -14 52 45.48 (-14.87930d)								
			Equinox: J2000								
		Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=Stellar Cluster Description=[OB associations, Young star clusters] Extended=YES									
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						LARGE	
	2	CYCLING	1	4						LARGE	
	3	CYCLING	1	4						LARGE	
	4	CYCLING	1	8						LARGE	
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	52	1	1	Dither 1	4	4	577.208	227723
	2	F1000W	FASTR1	36	2	1	Dither 2	4	8	810.312	227723
	3	F1500W	FASTR1	15	8	1	Dither 3	4	32	1409.72	227723
	4	F2100W	FASTR1	17	6	1	Dither 4	8	48	2375.434	312086

Proposal 8525 - Observation 9 - Evolutionary Snapshots of Massive Star Formation in NGC 6822

Observation	Proposal 8525, Observation 9: Hubble I/III MIRI									Wed Jul 22 20:00:17 GMT 2026	
	Diagnostic Status: Warning										
Observing Template: MIRI Imaging											
Diagnosics	(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Miscellaneous			
	(4)	NGC-6822-HUBBLE-I-III	RA: 19 44 33.5700 (296.1398750d)			Epoch of Position: 2015.5					
			Dec: -14 42 15.20 (-14.70422d)								
			Equinox: J2000								
			Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.								
Template	Category=Stellar Cluster										
	Description=[OB associations, Young star clusters]										
	Extended=YES										
	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						LARGE	
	2	CYCLING	1	4						LARGE	
	3	CYCLING	1	4						LARGE	
	4	CYCLING	1	8						LARGE	
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	52	1	1	Dither 1	4	4	577.208	227723
	2	F1000W	FASTR1	36	2	1	Dither 2	4	8	810.312	227723
	3	F1500W	FASTR1	15	8	1	Dither 3	4	32	1409.72	227723
	4	F2100W	FASTR1	17	6	1	Dither 4	8	48	2375.434	312086

Proposal 8525 - Observation 7 - Evolutionary Snapshots of Massive Star Formation in NGC 6822

Observation	Proposal 8525, Observation 7: Hubble V NIRCам								Wed Jul 22 20:00:17 GMT 2026		
	Diagnostic Status: Warning										
Observing Template: NIRCам 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			
	(1)	NGC-6822-HUBBLE-V	RA: 19 44 52.8960 (296.2204000d) Dec: -14 43 4.80 (-14.71800d) Equinox: J2000			Epoch of Position: 2015.5					
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Category=Stellar Cluster</i> <i>Description=[OB associations, Young star clusters]</i> <i>Extended=YES</i>											
Template	Module					Subarray					
	B					FULL					
Dithers	#	Primary Dither Type		Primary Dithers		Subpixel Dither Type		Dither Size		Subpixel Positions	
	1	INTRAMODULEBOX		4		STANDARD				3	
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	Optional ETC ID	
	1	F115W	F356W	BRIGHT2	7	1	12	12	1803.777	227722	
	2	F200W	F444W	BRIGHT2	7	1	12	12	1803.777	227722	

Proposal 8525 - Observation 8 - Evolutionary Snapshots of Massive Star Formation in NGC 6822

Observation	Proposal 8525, Observation 8: Hubble X NIRCам									Wed Jul 22 20:00:17 GMT 2026	
	Diagnostic Status: Warning										
Diagnostics	Observing Template: NIRCам Imaging										
	(Visit 8:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Miscellaneous			
	(2)	NGC-6822-HUBBLE-X	RA: 19 45 5.3520 (296.2723000d) Dec: -14 43 17.76 (-14.72160d) Equinox: J2000			Epoch of Position: 2015.5					
Template	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	Category=Stellar Cluster										
Dithers	Description=[OB associations, Young star clusters]										
	Extended=YES										
Spectral Elements	Module					Subarray					
	B					FULL					
Dithers	#	Primary Dither Type		Primary Dithers		Subpixel Dither Type		Dither Size		Subpixel Positions	
	1	INTRAMODULEBOX		4		STANDARD				3	
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	Optional ETC ID	
	1	F115W	F356W	BRIGHT2	7	1	12	12	1803.777	227722	
	2	F200W	F444W	BRIGHT2	7	1	12	12	1803.777	227722	

Proposal 8525 - Observation 10 - Evolutionary Snapshots of Massive Star Formation in NGC 6822

Observation	Proposal 8525, Observation 10: Hubble I/III NIRC <i>am</i>									Wed Jul 22 20:00:17 GMT 2026	
	Diagnostic Status: Warning Observing Template: NIRC <i>am</i> 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		
	(4)	NGC-6822-HUBBLE-I-III	RA: 19 44 33.5700 (296.1398750d) Dec: -14 42 15.20 (-14.70422d) Equinox: J2000 <i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=Stellar Cluster Description=[OB associations, Young star clusters] Extended=YES</i>			Epoch of Position: 2015.5					
Template	Module					Subarray					
	B					FULL					
Dithers	#	Primary Dither Type		Primary Dithers		Subpixel Dither Type		Dither Size		Subpixel Positions	
	1	INTRAMODULEBOX		4		STANDARD				3	
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	Optional ETC ID	
	1	F115W	F356W	BRIGHT2	7	1	12	12	1803.777	227722	
	2	F200W	F444W	BRIGHT2	7	1	12	12	1803.777	227722	

Proposal 8525 - Observation 13 - Evolutionary Snapshots of Massive Star Formation in NGC 6822

Observation	Proposal 8525, Observation 13: Hubble IV NIRCam									Wed Jul 22 20:00:17 GMT 2026	
	Diagnostic Status: Warning										
	Observing Template: NIRCam Imaging										
Diagnostics	(Visit 13:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.										
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous		
	(3)	NGC-6822-HUBBLE-IV	RA: 19 44 49.8240 (296.2076000d)			Epoch of Position: 2015.5					
			Dec: -14 52 45.48 (-14.87930d)								
			Equinox: J2000								
		Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=Stellar Cluster Description=[OB associations, Young star clusters] Extended=YES									
Template	Module					Subarray					
	B					FULL					
Dithers	#	Primary Dither Type		Primary Dithers		Subpixel Dither Type		Dither Size		Subpixel Positions	
	1	INTRAMODULEBOX		4		STANDARD				3	
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	Optional ETC ID	
	1	F115W	F356W	BRIGHT2	7	1	12	12	1803.777	227722	
	2	F200W	F444W	BRIGHT2	7	1	12	12	1803.777	227722	