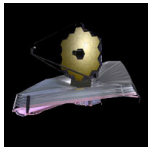

4569 - Gamma-ray burst supernovae across cosmic time

Cycle: 2, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observations non-disruptive ToO				
	1	NIRSpec Fixed Slit	NIRSpec Fixed Slit Spectroscopy	(5) GRB230818A
	2	NIRSpec Fixed Slit	NIRSpec Fixed Slit Spectroscopy	(7) GRB240414A
	4	NIRSpec Fixed Slit	NIRSpec Fixed Slit Spectroscopy	(10) GRB240801A
	3	NIRSpec Fixed Slit	NIRSpec Fixed Slit Spectroscopy	(12) GRB241026a

ABSTRACT

Long-duration gamma-ray bursts (GRBs) are the most luminous stellar explosions in nature and are associated with the collapse of massive stars. GRBs are bright enough to see at great distances, with a median redshift of z>2 and some GRBs seen out to z>8, perhaps even z>9. Therefore, they pinpoint the locations of supernovae at distances where we have never directly observed them. Here we propose to measure the evolution of three GRB supernovae at $1.5 < z < 3$ for the first time. These observations give us the ability to test if supernovae (in particular GRB-SNe) change with redshift. Differences in metallicity and stellar winds are quite likely to alter the evolution of massive stars with redshift. This is especially true if rare pathways only accessible at low metallicities, such as chemically homogeneous evolution, begin to dominate the lives of GRB progenitors. Since supernovae are a vital feedback mechanism to the interstellar and intergalactic medium via elements ejection and winds, a change in the properties of

supernovae could have significant implications not only for the progenitors of GRBs but also for galaxy evolution more generally. Our photometric observations will determine the peak magnitude and decay, while a single JWST spectrum at peak will measure composition and velocities. This will provide a measurement of radioactive nickel production and luminosity. From this, we can begin to ascertain how the properties of GRB progenitors, and by extension massive stars, vary over cosmic time.

OBSERVING DESCRIPTION

The aim of this proposal is to obtain approximately peak light spectroscopy of GRB supernovae at $1.5 < z < 3$. To do this we will condict fixed slit spectroscopy with the prism. We will acquire on a nearby star, and then offset the telescope to the afterglow position asit may be too faint for direct acquistion. Because these offsets will be determined from ground-based imaging we will use the 0.4" slit. We will then undertake approximately 3600s of science exposures using NRSRAPID2 reads, 60 reads per integration for integrations. The setup is identical for each burst.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(5)	GRB230818A	RA: 19 03 33.1170 (285.8879875d) Dec: +40 53 49.14 (40.89698d) Equinox: J2000		
Comments: *Category=Star* *Description=[Supernovae]*				
(6)	GRB230818A_refstar	RA: 19 03 32.4340 (285.8851417d) Dec: +40 53 40.67 (40.89463d) Equinox: J2000		
Comments: *Category=Star* *Description=[M stars]*				
(7)	GRB240414A	RA: 12 19 8.1120 (184.7838000d) Dec: +56 44 28.70 (56.74131d) Equinox: J2000		
Comments: *Category=Star* *Description=[Gamma Ray bursters, Supernovae]*				
(8)	GRB240414A_refstar	RA: 12 19 4.0580 (184.7669083d) Dec: +56 44 45.68 (56.74602d) Equinox: J2000		
Comments: 2MASS stars, mags of J=14.79, H=14.134, K=14.084 (all Vega), suggests using F140X + SUB32 would give good centroiding. *Category=Star* *Description=[Gamma Ray bursters, Supernovae]*				
(9)	GRB240801_refstar	RA: 23 00 38.1134 (345.1588058d) Dec: +32 35 59.18 (32.59977d) Equinox: J2000		
Comments: *Category=Star* *Description=[Gamma Ray bursters, Gamma Ray transients]*				
(10)	GRB240801A	RA: 23 00 39.0398 (345.1626658d) Dec: +32 35 37.96 (32.59388d) Equinox: J2000		
Comments: *Category=Star* *Description=[Gamma Ray bursters, Gamma Ray transients, X-ray transients]*				
(11)	GRB241026a_refstar	RA: 19 33 37.0238 (293.4042658d) Dec: +57 59 8.97 (57.98582d) Equinox: J2000		
Comments: *Category=Star* *Description=[Supernovae]*				
(12)	GRB241026a	RA: 19 33 36.0595 (293.4002479d) Dec: +57 59 9.04 (57.98584d) Equinox: J2000		
Comments: *Category=Star* *Description=[Gamma Ray bursters, Supernovae]*				

Proposal 4569 - Targets - Gamma-ray burst supernovae across cosmic time

Generic Targets

#	Name	Criteria	Description
(1)	GRB1	GRB at 1.5 < z < 3	
(2)	GRB2	GRB at 1.5 < z < 3	
(3)	GRB3	GRB at 1.5 < z < 3	
(4)	GRB-refstar	Refstar for GRB offsets	

Observation

Proposal 4569, Observation 1: NIRSpec Fixed Slit Wed Nov 20 14:00:18 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRSpec Fixed Slit Spectroscopy

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
(5)	GRB230818A	RA: 19 03 33.1170 (285.8879875d) Dec: +40 53 49.14 (40.89698d) Equinox: J2000		

Comments:
Category=Star
Description=[Supernovae]

Acquisition

#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	6 GRB230818A_ref star	WATA	SUB2048	F110W	NRSRAPID	3	1	1	3.628	169400

Template

Slit	Subarray
S400A1	FULL

Dithers

#	Primary Dither Positions	Sub-Pixel Pattern
1	2	SPATIAL

Spectral Elements

#	Grating/Filter	Slit	Readout Pattern	Groups/Int	Integrations/Exp	#	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	PRISM/CLEAR	S400A1	NRSIRS2RAPID	60	1	1	NONE	4	4	3559.689	

Special Requirements	Between Dates 10-OCT-2023 and 20-OCT-2023

Observation

Proposal 4569, Observation 2: NIRSpec Fixed Slit Wed Nov 20 14:00:18 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRSpec Fixed Slit Spectroscopy

Diagnostics

(NIRSpec Fixed Slit (Obs 2)) Warning (Form): The slew between the acquisition exposure and the farthest science exposure is 42.279 Arcsec (larger than the recommended limit of 40.000 Arcsec) and may result in reduced or no schedulability. See more information in the diagnostic browser.

(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(7)	GRB240414A	RA: 12 19 8.1120 (184.7838000d) Dec: +56 44 28.70 (56.74131d) Equinox: J2000		

Comments:
Category=Star
Description=[Gamma Ray bursters, Supernovae]

Acquisition

#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	8 GRB240414A_ref star	WATA	SUB32	F140X	NRSRAPID	3	1	1	0.08	198872

Template

Slit	Subarray
S400A1	FULL

Dithers

#	Primary Dither Positions	Sub-Pixel Pattern
1	2	SPATIAL

Spectral Elements

#	Grating/Filter	Slit	Readout Pattern	Groups/Int	Integrations/Exp	#	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	PRISM/CLEAR	S400A1	NRSIRS2RAPID	60	1	1	NONE	4	4	3559.689	

Special Requirements	Between Dates 25-MAY-2024:00:01:00 and 30-MAY-2024:00:01:00

Observation

Proposal 4569, Observation 4: NIRSpec Fixed Slit Wed Nov 20 14:00:18 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRSpec Fixed Slit Spectroscopy

Comments: WOPR repeat of 2:1. See WOPR 89161.

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
(10)	GRB240801A	RA: 23 00 39.0398 (345.1626658d) Dec: +32 35 37.96 (32.59388d) Equinox: J2000		

Comments:
Category=Star
Description=[Gamma Ray bursters, Gamma Ray transients, X-ray transients]

Acquisition

#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	9 GRB240801_refstar	WATA	SUB32	F110W	NRSRAPIDD6	3	1	1	0.26	222244

Template

Slit	Subarray
S400A1	FULL

Dithers

#	Primary Dither Positions	Sub-Pixel Pattern
1	2	SPATIAL

Spectral Elements

#	Grating/Filter	Slit	Readout Pattern	Groups/Int	Integrations/Exp	#	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	PRISM/CLEAR	S400A1	NRSIRS2RAPID	60	1	1	NONE	4	4	3559.689	

Special Requirements	Before Date 31-OCT-2024

Observation

Proposal 4569, Observation 3: NIRSpec Fixed Slit Wed Nov 20 14:00:18 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRSpec Fixed Slit Spectroscopy

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
(12)	GRB241026a	RA: 19 33 36.0595 (293.4002479d) Dec: +57 59 9.04 (57.98584d) Equinox: J2000		

Comments:
Category=Star
Description=[Gamma Ray bursters, Supernovae]

Acquisition

#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	11 GRB241026a_ref star	WATA	SUB2048	F110W	NRSRAPID	3	1	1	3.628	226695

Template

Slit	Subarray
S400A1	FULL

Dithers

#	Primary Dither Positions	Sub-Pixel Pattern
1	2	SPATIAL

Spectral Elements

#	Grating/Filter	Slit	Readout Pattern	Groups/Int	Integrations/Exp	#	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	PRISM/CLEAR	S400A1	NRSIRS2RAPID	60	1	1	NONE	4	4	3559.689	

Special Requirements	Between Dates 08-DEC-2024 and 15-DEC-2024