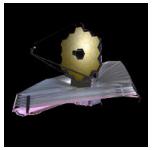

2348 - Chemistry of Mass Loss in the Interacting Stripped-Envelope Supernova 2014C

Cycle: 1, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1	NIRSpec IFU	NIRSpec IFU Spectroscopy	(2) SN2014C-FOR-NIRSPEC
	3	MIRI MRS	MIRI Medium Resolution Spectroscopy	(1) SN2014C-FOR-MIRI
	2	MIRI MRS Background	MIRI Medium Resolution Spectroscopy	(3) SN2014C-BACKGROUND

ABSTRACT

Supernova (SN) 2014C is a rare massive stellar death, in which a hydrogen-poor progenitor star explodes and interacts with its lost hydrogen-rich envelope. This is unlike most other stripped-envelope (SE) SNe that explode long after the envelope is stripped, and never show signs of interactions. The mass loss process that creates SESNe is not well understood, and SN 2014C presents us with an unprecedented opportunity to probe the history of mass loss of a SESN progenitor by observing the still ongoing interaction. Previous IR observations have revealed a tentative sign of silicate dust in the CSM, unlike other interacting SNe. We propose to obtain near- to mid-infrared spectroscopy of SN 2014C with NIRSpec IFU and MIRI MRS. These observations will probe emission features of different dust species, allowing us to confirm the presence of silicate dust and to robustly measure the dust composition in the CSM. They will also allow us to detect other molecular species, probing the gas chemistry of the CSM and other properties. We will compare the IR spectroscopic signatures of the CSM of SN 2014C to that around well-observed massive stars in the Milky Way and the Magellanic Clouds, to constrain what type of stars are able to produce SESNe. These observations are timely as the SN will inevitably fade away.

OBSERVING DESCRIPTION

We request NIRSpec IFU and MIRI MRS observations of an interacting SN 2014C. For NIRSpec IFU, we request the G235H/F170LP and G395H/F290LP grating/filter combinations. For MIRI MRS, we request all 3 grating settings. We also request simultaneous MIRI imaging to retreive precise astrometry to locate the SN in the IFU field of view. For both NIRSpec and MIRI, we request the standard 4-point dithering/nodding patterns to improve the spatial sampling. The SN has a bright and potentially complicated galaxy background, so we request an additional pointing to observe the background away from the galaxy only for MIRI (telescope background is negligible compared to the source for NIRSpec). We ask for no dither for this pointing.

Proposal 2348 - Targets - Chemistry of Mass Loss in the Interacting Stripped-Envelope Supernova 2014C

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	SN2014C-FOR-MIRI	RA: 22 37 5.6000 (339.2733333d) Dec: +34 24 31.90 (34.40886d) 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, Type Ib supernovae]* *Extended=NO*				
(2)	SN2014C-FOR-NIRSPEC	RA: 22 37 5.6000 (339.2733333d) Dec: +34 24 31.90 (34.40886d) 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, Type Ib supernovae]* *Extended=NO*				
(3)	SN2014C-BACKGROUND	RA: 22 37 10.8740 (339.2953083d) Dec: +34 24 29.13 (34.40809d) Equinox: J2000	Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Calibration* *Description=[Telescope/sky background]* *Extended=NO*				

Observation

Proposal 2348, Observation 1: NIRSpec IFU

Fri May 26 22:01:04 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec IFU 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
(2)	SN2014C-FOR-NIRSPEC	RA: 22 37 5.6000 (339.2733333d) Dec: +34 24 31.90 (34.40886d) 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, Type Ib supernovae]
Extended=NO

Template

TA Method
NONE

Dithers

#	Dither Type	Size	Starting Point	Number of Points	Points
1	4-POINT-NOD				

Spectral Elements

#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	G235H/F170LP	NRSIRS2RAPID	5	1	false	true	NONE	4	4	350.133	59194.16
2	G395H/F290LP	NRSIRS2RAPID	3	1	false	true	NONE	4	4	233.422	59194.18

Special Requirements

Aperture PA Range 192 to 266 Degrees (V3 53.02746582 to 127.02746582)

Observation

Proposal 2348, Observation 3: MIRI MRS Fri May 26 22:01:04 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[MIRI MRS Background (Obs 2)]

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)	SN2014C-FOR-MIRI	RA: 22 37 5.6000 (339.2733333d) Dec: +34 24 31.90 (34.40886d) 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, Type Ib supernovae]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
F560W	ALL	YES	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	POINT SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F560W	FASTR1	5	5	1	Dither 1	4	20	321.905	
1	SHORT(A)	MRSLONG		FASTR1	30	1	1	Dither 1	4	4	333.005	59194.9
1	SHORT(A)	MRSSHORT		FASTR1	30	1	1	Dither 1	4	4	333.005	59194.1
2		IMAGER	F1000W	FASTR1	5	5	1	Dither 1	4	20	321.905	
2	MEDIUM(B)	MRSLONG		FASTR1	30	1	1	Dither 1	4	4	333.005	59194.10
2	MEDIUM(B)	MRSSHORT		FASTR1	30	1	1	Dither 1	4	4	333.005	59194.4
3		IMAGER	F1130W	FASTR1	5	5	1	Dither 1	4	20	321.905	
3	LONG(C)	MRSLONG		FASTR1	30	1	1	Dither 1	4	4	333.005	59194.11
3	LONG(C)	MRSSHORT		FASTR1	30	1	1	Dither 1	4	4	333.005	59194.5

Special Requirements	Sequence Observations 2, 3, Non-interruptible

Observation

Proposal 2348, Observation 2: MIRI MRS Background

Fri May 26 22:01:04 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [MIRI MRS (Obs 3)]

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
(3)	SN2014C-BACKGROUND	RA: 22 37 10.8740 (339.2953083d) Dec: +34 24 29.13 (34.40809d) Equinox: J2000	Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Calibration
Description=[Telescope/sky background]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
F560W	ALL	YES	FULL	NEUTRAL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	POINT SOURCE	NEGATIVE

Spectral Elements

#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1		IMAGER	F560W	FASTR1	5	5	1	None	1	5	80.476	
1	SHORT(A)	MRSLONG		FASTR1	30	1	1	None	1	1	83.251	
1	SHORT(A)	MRSSHORT		FASTR1	30	1	1	None	1	1	83.251	
2		IMAGER	F1000W	FASTR1	5	5	1	None	1	5	80.476	
2	MEDIUM(B)	MRSLONG		FASTR1	30	1	1	None	1	1	83.251	
2	MEDIUM(B)	MRSSHORT		FASTR1	30	1	1	None	1	1	83.251	
3		IMAGER	F1130W	FASTR1	5	5	1	None	1	5	80.476	
3	LONG(C)	MRSLONG		FASTR1	30	1	1	None	1	1	83.251	
3	LONG(C)	MRSSHORT		FASTR1	30	1	1	None	1	1	83.251	

Special Requirements	Sequence Observations 2, 3, Non-interruptible