

# 1558 - The Ring Nebula as a laboratory for the interaction of molecules, PAHs and dust in strong UV radiation fields

Cycle: 1, Proposal Category: GO

# **INVESTIGATORS**

Name	Institution	E-Mail
Prof. Michael J. Barlow (PI) (ESA Member)	<b>University College London</b>	mjb@star.ucl.ac.uk
Dr. Raghvendra Sahai (CoI) (US Admin CoI)	Jet Propulsion Laboratory	raghvendra.sahai@jpl.nasa.gov
Dr. Harriet L. Dinerstein (CoI)	University of Texas at Austin	harriet@astro.as.utexas.edu
Dr. Nick Cox (CoI) (ESA Member) (CoPI)	ACRI-ST	nljcox@gmail.com
Prof. Jan Cami (CoI) (CSA Member)	The University of Western Ontario	jcami@uwo.ca
Dr. Els Peeters (CoI) (CSA Member)	The University of Western Ontario	epeeters@uwo.ca
Dr. Mikako Matsuura (CoI) (ESA Member)	Cardiff University	matsuuram@cardiff.ac.uk
Dr. Roger Wesson (CoI) (ESA Member)	University College London (UCL)	rw@nebulousresearch.org
Dir. Arturo Manchado (CoI) (ESA Member)	Instituto de Astrofisica de Canarias	amt@iac.es
Dr. Griet Van de Steene (CoI) (ESA Member)	Royal Observatory of Belgium	gsteene@oma.be
Dr. Isabel Aleman (CoI)	Universidade Federal de Itajubá	bebel.aleman@gmail.com
Prof. Albert Zijlstra (CoI) (ESA Member)	University of Manchester	a.zijlstra@manchester.ac.uk
Dr. Kay Justtanont (CoI) (ESA Member)	Chalmers University of Technology	kay.justtanont@chalmers.se
Dr. Peter van Hoof (CoI) (ESA Member)	Royal Observatory of Belgium	p.vanhoof@oma.be
Dr. Jeronimo Bernard-Salas (CoI) (ESA Member)	ACRI-ST	jeronimo.bernard-salas@acri-st.fr
Dr. Kevin Volk (CoI)	Space Telescope Science Institute - CSA - JWST	volk@stsci.edu

# **OBSERVATIONS**

Folder Observation	Label	Observing Template	Science Target
NGC 6720 MIRI			-

JWST Proposal 1558 (Created: Wednesday, September 7, 2022 at 12:00:33 PM Eastern Standard Time) - Overview

Folder	Observation	Label	Observing Template	Science Target		
	1	NGC 6720 MIRI Imagi	MIRI Imaging	(1) NGC6720		
		NGC 6720 MRS Positi on 1	MIRI Medium Resolution Spectroscopy	(4) NGC6720-MRS-POSITION-1		
	3	NGC 6720 MRS off position	MIRI Medium Resolution Spectroscopy	(2) NGC6720-MRS-OFF		
	4	NGC 6720 MRS Positi on 2	MIRI Medium Resolution Spectroscopy	(6) NGC6720-MRS-POSITION-2		
NGC 67	720 NIRCam					
	5	NGC 6720 NIRCam Imaging	NIRCam Imaging	(1) NGC6720		
NGC 67	720 NIRSpec IFU	J				
	6	NGC 6720 Position 1	NIRSpec IFU Spectroscopy	(5) NGC6720-NIRSPEC-POSITION-1		
	56	NGC 6720 Position 1 R epeat Obs 6	NIRSpec IFU Spectroscopy	(5) NGC6720-NIRSPEC-POSITION-1		
7 NGC 6720 off position			NIRSpec IFU Spectroscopy	(3) NGC6720-NIRSPEC-OFF		
	8	NGC 6720 Position 2	NIRSpec IFU Spectroscopy	(7) NGC6720-NIRSPEC-POSITION-2		

### **ABSTRACT**

We propose to observe the Ring Nebula, NGC 6720, at unprecedented spatial resolution and spectral sensitivity using MIRI, NIRSpec and NIRCam, with the aim of measuring and analyzing the emission from a range of atomic, molecular and particulate components commonly found in astrophysical environments. We will use this planetary nebula (PN) as an astrophysical laboratory, with a well-defined geometry and a single exciting central star. With Spitzer, PAH emission and strong mid-IR molecular H2 emission have already been detected from the O-rich PN NGC 6720. We will image the entire nebula in multiple NIRCAM and MIRI filters to enable us to spatially resolve the different gas and PAH components, combining these with high spatial and spectral resolution NIRSpec and MIRI IFU spectroscopy at two positions, one on an isolated clump at the inner edge of the bright ring and the other on the main ring itself. We will use the data to analyze and model the physical conditions in the ionized and molecular gas in order to probe how these, together with the radiation field, influence spatial variations of the PAH charge balance, size and structures deduced from the observed PAH band ratios. This will allow us to investigate how PAHs and other molecules form, evolve and survive in clumpy, irradiated environments.

#### **OBSERVING DESCRIPTION**

JWST Proposal 1558 (Created: Wednesday, September 7, 2022 at 12:00:33 PM Eastern Standard Time) - Overview

We will observe the old, high-excitation PN NGC 6720 and its knots and PDR as a laboratory to (i) map out the poorly understood physical conditions and chemical pathways that lead to the formation of large organics such as PAHs, and (ii) understand the puzzling survival of molecules (including PAHs) in strongly UV-irradiated environments.

To spatially and spectrally resolve the distribution of the ionized gas, molecules and dust in this object, our observations will include a combination of IFU spectroscopy at selected positions and imaging of larger areas.

#### NGC 6720 NIRCAM:

- Module B only (to limit data rate). Coverage includes entire nebula.
- FULL array.
- Primary dithers: 3 INTRAMODULE to cover the short-wave detector gaps.
- Subpixel dithers: 3 for Nyquist sampling.
- 2 filter pairs, each with RAPID readout, 5 groups, and 1 integration.
- Total depth provides adequate signal to noise of faint diffuse regions around the ring (as estimated in ETC) even for regions that fall within short-wave gaps where the depth is lower.
- Bright spots on the ring are not in danger of saturating before the end of a ramp.
- Special Requirement: small offset to center the nebula in the array.

# NGC 6720 MIRI Imaging:

- 1x2 mosaic to cover entire nebula (~square coverage).
- 9 MIRI filters with 20 groups & 1 integration each.
- 4-point dither pattern ensures good PSF sampling at all wavelengths.
- Total depth provides adequate S/N of >50 at 25 um and >100 in all other filters for the weak diffuse dust continuum. The S/N will be higher for emission features.
- No saturation is anticipated.
- Special Requirements: Small offset so that nebula is centered in the 1x2 mosaic.

#### NGC 6720 MIRI MRS:

• 2 on- positions (an isolated knot and bright region of the PDR) and 1 off- position. The targets of these positions are linked under 'Fixed Targets'

JWST Proposal 1558 (Created: Wednesday, September 7, 2022 at 12:00:33 PM Eastern Standard Time) - Overview for background subtraction.

- All three targets use the same setup.
- No need for Target Acq.
- 4-point dither for good PSF sampling.
- Simultaneous imaging with the FULL array for ALL (short, medium, and long).
- 80 groups, 1 integration, 1 exposure.
- Total depth provides adequate S/N of 10 or greater in the continuum oif interest. Expected S/N for the 11.3 um PAH emission feature will be > 50.
- No saturation is anticipated.
- Special Requirements: The two 'on' positions and the 'off' position are linked in an uninterruptible sequence for background subtraction.

# NGC 6720 NIRSpec IFU:

- Same targets as NGC 6720 MRS. Duplicated under "Fixed Targets" because the detector setup for the OFF position only includes one grating/filter setting (others don't need background subtraction). Since settings are different, we couldn't link the targets explicitly. We will do background subtraction manually.
- Standard 4-point dither for spatial sampling
- We use the R=1000 mode and cover the full wavelength range, hence we need 4 settings of grating/blocking filters.
- The exposure is set to provide peak S/N of order 100 in the brighter emission lines within the 1 to 5 micron wavelength range for the smallest sky resolution element (about 3 spaxels). This will allow detection of other lines at a signal level of 1% or less compared to the hydrogen recombination lines.
- We need the leakcal observations because other parts of the nebula will fall within the MSA field of view depending on the orientation angle. This is the case for both the on-source and the off nebula position.
- The off-source exposure only needs to cover the 3.3 micron feature that will be present from the diffuse ISM. Hence that observation only has one grating setting.
- Special Requirements: All three put in an uninterruptible sequence for background subtraction.

Proposal 1558 - Targets - The Ring Nebula as a laboratory for the interaction of molecules, PAHs and dust in strong UV radiation fields

	#	Name	RING INEDUIA AS A IADOFATORY FOR THE IT  Target Coordinates	Targ. Coord. Corrections	Miscellaneous								
	(1)	NGC6720	RA: 18 53 35.0790 (283.3961625d)	<del>.</del>									
			Dec: +33 01 45.03 (33.02918d)										
			Equinox: J2000										
		Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=Star											
	Category=Sta Description=	r [Planetary nebulae nuclei]											
	Extended=YE	S											
	(2)	NGC6720-MRS-OFF	RA: 18 53 8.8379 (283.2868246d)										
			Dec: +33 01 49.90 (33.03053d)										
			Equinox: J2000										
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	(3)	NGC6720-NIRSPEC-OFF	RA: 18 53 8.8379 (283.2868246d)										
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ts	Description=[	Planetary nebulae nuclei]											
Fixed Targets	(4)	NGC6720-MRS-POSITION-1	RA: 18 53 34.5100 (283.3937917d)										
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	(5)	NGC6720-NIRSPEC-	RA: 18 53 34.5100 (283.3937917d)										
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		a Planetary nebulae]											
	(6)	NGC6720-MRS-POSITION-2	RA: 18 53 33.2430 (283.3885125d)										
			Dec: +33 01 49.90 (33.03053d)										
			Equinox: J2000										
			argetselector and retrieved from the SIMBAD database.										
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	(7)	NGC6720-NIRSPEC-	RA: 18 53 33.2430 (283.3885125d)										
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Ę	Proposal 1558, Observation 1: NGC	C 6720 MIRI Imagin	g						Wed Sep 07	17:00:33 GMT 2022	
Ĭij	Diagnostic Status: Warning										
Observation	Observing Template: MIRI Imaging										
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Ś	(Visit 1:1) Warning (Form): Overhead	ds are provisional unt	l the Visit Planne	er has been run.							
Diagnostics		ī									
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<b>"</b>	# Name	Target Co	ordinates		Targ. Coo	ord. Correc	tions	Miscella	neous		
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Spectral Elements	1 F560W	FASTR1	20	1	1	Dither 1	4	4	222.003	86777.2	
l e	2 F770W	FASTR1	20	1	1	Dither 1	4	4	222.003	86777.3	
<u>e</u>	3 F1000W	FASTR1	20	1	1	Dither 1	4	4	222.003	86777.4	
	4 F1130W	FASTR1	20	1	1	Dither 1	4	4	222.003	86777.5	
tra	5 F1280W	FASTR1	20	1	1	Dither 1	4	4	222.003	86777.6	
[ 당	6 F1500W	FASTR1	20	1	1	Dither 1	4	4	222.003	86777.7	
ြင္တ	7 F1800W	FASTR1	20	1	1	Dither 1	4	4	222.003	53912.8	
1	8 F2100W	FASTR1	20	1	1	Dither 1	4	4	222.003	53912.9	
	9 F2550W	FASTR1	20	1	1	Dither 1	4	4	222.003	53912.10	

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1 5	Proposal 155	8, Observation 2:	NGC 6720 MR	RS Position 1								Wed Sep 07 17	7:00:33 GMT 2022
Iĕ	Diagnostic St	atus: Warning											
Į≝	Observing Ter	mplate: MIRI Med	dium Resolution	Spectroscopy									
Observation	Background C	Observations:[NGC	C 6720 MRS off	position (Obs 3	3)]								
Diagnostics	(Visit 2:1) Wa	arning (Form): Ov	erheads are prov	isional until the	e Visit Planner ha	s been run.							
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Dithers Template	AcqFilter F1000W  # 1	Range	IMAGER	ALL  Dither 1  4-Point  Filter	Readout Pattern	20	Optim EXTE  Integrations/Exp	nized For NDED SOURCE Exposures/Dit h	Dither Dither 1	Di NI Total Dithers	rection EGATIVE  Total Integrations	Exposure Time 921.313	Wkbk.Calc ID
Dithers Template	AcqFilter F1000W  # 1	Range SHORT(A)	IMAGER MRSLONG	ALL  Dither 1  4-Point  Filter	Readout Pattern FASTR1 FASTR1	20 83	Optim EXTE  Integrations/Exp	nized For NDED SOURCE Exposures/Dit h	Dither  Dither 1  Dither 1	Di NI Total Dithers	rection EGATIVE  Total Integrations  16 4	Exposure Time 921.313 921.313	Wkbk.Calc ID 86777.17
Dithers Template	AcqFilter F1000W  # 1	Range SHORT(A)	IMAGER MRSLONG MRSSHORT	Dither 7 4-Point Filter F770W	Readout Pattern FASTR1 FASTR1 FASTR1	20 83 83	Optim EXTE  Integrations/Exp	nized For NDED SOURCE Exposures/Dit h	Dither  Dither 1  Dither 1  Dither 1	Di NI Total Dithers	rection EGATIVE  Total Integrations  16 4 4	Exposure Time 921.313 921.313 921.313	Wkbk.Calc ID 86777.17
Dithers Template	AcqFilter F1000W  # 1	SHORT(A) SHORT(A)	IMAGER MRSLONG MRSSHORT IMAGER	Dither 7 4-Point Filter F770W	Readout Pattern  FASTR1 FASTR1 FASTR1 FASTR1	20 83 83 20	Optim EXTE  Integrations/Exp	nized For NDED SOURCE Exposures/Dit h	Dither  Dither 1  Dither 1  Dither 1  Dither 1	Di NI  Total Dithers  4 4 4 4	Total Integrations  16 4 4 16	Exposure Time  921.313  921.313  921.313  921.313	86777.17 86777.11
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<u>Pr</u>	oposal 1558 - Observation 2 - The Ring Nebula as a laboratory for the interaction of molecules, PAHs and dust in strong UV radiatio
	Sequence Observations 2, 3, 4, Non-interruptible
Special Re	
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Pro	posal 1558	<u> 8 - Obser</u>	vation 3 -	The Ring	Nebula as	s a laborato	ry for the ir	nteraction of	of molec	ules, PAHs	and dust i	<u>n strong l</u>	JV radiatio	
uc	Proposal 1558,	Observation 3:	NGC 6720 M	RS off position								Wed Sep 07 1	7:00:33 GMT 2022	
ij	Diagnostic Stat	us: Warning												
ڲ	Observing Temp	olate: MIRI Med	dium Resolution	n Spectroscopy										
Observation	Background Obs	servation For: [1	NGC 6720 MRS	S Position 1 (Ob	s 2), NGC 6720	MRS Position 2 (C	Obs 4)]							
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Diagnostics	(Visit 3:1) Warn	ning (Form): Ov	erheads are pro	visional until the	e Visit Planner ha	as been run.								
<b>_</b>	# N	lame		Target Coordi	nates		Targ. Co	oord. Correction	ıs	M	iscellaneous			
Targets	(2) N	IGC6720-MRS-	-OFF	RA: 18 53 8.83	79 (283.2868246	id)								
arg				Dec: +33 01 49	.90 (33.03053d)									
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Fixed	Comments: Category=Star													
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<b> </b>	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	
Spectral Elements	1	<u> </u>	IMAGER	F770W	FASTR1	20	4	1	Dither 1	4	16	921.313		
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۱ <u>۳</u>	2		IMAGER	F1000W	FASTR1	20	4	1	Dither 1	4	16	921.313		
<b>I</b> ∺	2	MEDIUM(B)	MRSLONG		FASTR1	83	1	1	Dither 1	4	4	921.313	86777.18	
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ကြ	3		IMAGER	F1130W	FASTR1	20	4	1	Dither 1	4	16	921.313		
	3	LONG(C)	MRSLONG		FASTR1	83	1	1	Dither 1	4	4	921.313	86777.19	
	3	LONG(C)	MRSSHORT		FASTR1	83	1	1	Dither 1	4	4	921.313	86777.13	

<u>Pr</u>	oposal 1558 - Observation 3 - The Ring Nebula as a laboratory for the interaction of molecules, PAHs and dust in strong UV radiatio.
Requirements	
Special R	

<u>Prc</u>	posal 155	<u> 8 - Obser</u>	vation 4 -	The Ring	Nebula as	<u>s a laborato</u>	<u>ry for the ir</u>	nteraction o	<u>of molect</u>	<u>ıles, PAHs </u>	<u>and dust i</u>	<u>n strong L</u>	JV radiatio	
'n	Proposal 1558	Observation 4	: NGC 6720 MR	S Position 2								Wed Sep 07 17	7:00:33 GMT 2022	
Ιij	Diagnostic Sta	tus: Warning												
Į≚	Observing Tem	plate: MIRI Med	dium Resolution	Spectroscopy										
Se	Background Ob	servations:[NG0	C 6720 MRS off	position (Obs 3	3)]									
Observation														
Diagnostics	(Visit 4:1) War	ning (Form): Ov	erheads are prov	isional until the	Visit Planner ha	is been run.								
<b>—</b>	#	Name	7	Farget Coordii	nates		Targ. Co	oord. Correction	ıs	M	iscellaneous			
ets	(6)	NGC6720-MRS-	-POSITION-2	RA: 18 53 33.24	430 (283.388512	5d)								
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Fixed	Comments: Thi Category=ISM	s object was gen	erated by the tar	getselector and	retrieved from t	he SIMBAD datab	ase.							
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Spectral Elements	1	•	IMAGER	F770W	FASTR1	20	4	1	Dither 1	4	16	921.313	,	
l ei	1	SHORT(A)	MRSLONG		FASTR1	83	1	1	Dither 1	4	4	921.313	86777.17	
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1 😃	2	` '	IMAGER	F1000W	FASTR1	20	4	1	Dither 1	4	16	921.313		
ta	2	MEDIUM(B)	MRSLONG		FASTR1	83	1	1	Dither 1	4	4	921.313	86777.18	
e	2	MEDIUM(B)	MRSSHORT		FASTR1	83	1	1	Dither 1	4	4	921.313	86777.12	
S	3		IMAGER	F1130W	FASTR1	20	4	1	Dither 1	4	16	921.313		
	3	LONG(C)	MRSLONG		FASTR1	83	1	1	Dither 1	4	4	921.313	86777.19	
1	3	LONG(C)	MRSSHORT		FASTR1	83	1	1	Dither 1	4	4	921.313	86777.13	

<u>Prc</u>	posal 1558 - Observation 4 - The Ring Nebula as a laboratory for the interaction of molecules, PAHs and dust in strong UV radiatio
Requirements	Sequence Observations 2, 3, 4, Non-interruptible
Special	

Pro	posal 155	8 - Observation	5 - The Ring	Nebula as a	laboratory for	or the interaction	n of molecule	s, PAHs and	d dust in stron	g UV radiatio
ľ	Proposal 1558	, Observation 5: NGC 67	20 NIRCam Imagin	ıg					Wed Sep (	07 17:00:33 GMT 2022
Ĭä	Diagnostic Sta	tus: Warning								
Ĭ	Observing Ten	plate: NIRCam Imaging								
Observation										
ō										
Diagnostics	(Visit 5:1) War	rning (Form): Overheads a	re provisional until th	ne Visit Planner has bee	en run.					
Sti										
١٤										
jaj.										
뿌	,,		m	• .		m		3.0.		
ts		Name	Target Coord			Targ. Coord. Correc	ctions	Miscel	laneous	
Targets	(1)	NGC6720		0790 (283.3961625d) 5.03 (33.02918d)						
٦ď			Equinox: J200	` ′						
٦	Comments: Th	is object was generated by	*		MRAD datahase					
Fixed	Category=Star	•	ine targeiseiceior an	a retrieved from the 51	mB/15 unuouse.					
I۳	Description=[Extended=YES	Planetary nebulae nuclei]								
ē	Module					Subarray				
la B	В					FULL				
Template										
Ľ										
SIS	#	Prin	nary Dither Type	Primary Di	thers	Subpixel Dither Ty	ype Dithe	er Size	Subpixel Po	ositions
Dithers	1	INTI	RAMODULE	3		STANDARD			3	
_										
Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
ΙĔ	1	F212N	F335M	RAPID	5	1	9	9	483.155	
Iä	2	F162M+F150W2	F300M	RAPID	5	1	9	9	483.155	
न्न										
ਰਿ										
Spectral										
_		10 : 62 5	15.05.105500	27.427720)						
ements	Aperture PA R Aperture PA R	ange 18 to 63 Degrees (V3 ange 95 to 96 Degrees (V3	3 17.97427728 to 62.9 3 94.97427728 to 95.9	97427728) 97427728)						
Ιŝ	Aperture PA R	ange 134 to 156 Degrees (	V3 133.97427728 to	155.97427728)						
	Aperture PA R	ange 189 to 260 Degrees (ange 273 to 346 Degrees (	V3 272.97427728 to	345.97427728)						
ᄝ	Offset 3.15882	4547506675 arcsec, 10.14	5504083264637 arcs	ec						
R <sub>e</sub>										
<u>ख</u>										
Special Requir										
ဇွ										

# Proposal 1558 - Observation 6 - The Ring Nebula as a laboratory for the interaction of molecules, PAHs and dust in strong UV radiatio...

**Targ. Coord. Corrections** 

Proposal 1558, Observation 6: NGC 6720 Position 1 Observation

Wed Sep 07 17:00:33 GMT 2022

Miscellaneous

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets Name (5) NGC6720-NIRSPEC-POSITION-1

**Target Coordinates** RA: 18 53 34.5100 (283.3937917d)

Dec: +33 02 9.11 (33.03586d)

Equinox: J2000

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Category=ISM Description=[Planetary nebulae]

TA Method

NONE

Template

**ග** #

ร	#		Dither Type		Size		Starting Point		Number of Poin	ts	Points	
Dithers	1		4-POINT-DITHE	ER								
قا												
	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Ex p	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G140M/F070LP	NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.8
ıts	2	G140M/F070LP	NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	
eme	3	G140M/F100LP	NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.5
Spectral Elements	4	G140M/F100LP	NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	
ectra	5	G235M/F170LP	NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.6
Sp	6	G235M/F170LP	NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	
	7	G395M/F290LP	NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.7
	8	G395M/F290LP	NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	

<u>Prc</u>	posal 1558 - Observation 6 - The Ring Nebula as a laboratory for the interaction of molecules, PAHs and dust in strong UV radiatio
Requirements	Sequence Observations 6, 7, 8, Non-interruptible
Special	

# Proposal 1558 - Observation 56 - The Ring Nebula as a laboratory for the interaction of molecules, PAHs and dust in strong UV radiati...

**Targ. Coord. Corrections** 

Proposal 1558, Observation 56: NGC 6720 Position 1 Repeat Obs 6 Observation

Wed Sep 07 17:00:33 GMT 2022

Miscellaneous

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Comments: Repeat of observation 6.

Diagnostics

(Visit 56:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets Name (5) NGC6720-NIRSPEC-POSITION-1

**Target Coordinates** RA: 18 53 34.5100 (283.3937917d)

Dec: +33 02 9.11 (33.03586d)

Equinox: J2000

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Category=ISM Description=[Planetary nebulae]

TA Method

Template NONE

**ග** #

ſS	#		Dither Type		Size		Starting Point		Number of Poin	ts	Points	
Dithers	1		4-POINT-DITHE	ER								
Ë	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Ex	Leakcal	Dither	Autocal	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G140M/F070LP	NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.8
nts	2	G140M/F070LP	NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	
Elements	3	G140M/F100LP	NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.5
<u> </u>   <u> </u>	4	G140M/F100LP	NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	
Spectral	5	G235M/F170LP	NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.6
Sp	6	G235M/F170LP	NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	
	7	G395M/F290LP	NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.7
	8	G395M/F290LP	NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	

					<del>Jaia ao a lab</del>	<u>cratory r</u>	or the intere	dollori or ric	olecules, PAF	is and das		
٦	Proposal 155	58, Observation 7: NO	GC 6720 off posit	ion							Wed Sep 07 17	:00:33 GMT 2022
Ιž	Diagnostic S	tatus: Warning										
Į≚	Observing Te	emplate: NIRSpec IFU	Spectroscopy									
se												
Observation												
Diagnostics	(Visit 7:1) W	arning (Form): Overho	eads are provision.	al until the Visit	Planner has been rui	n.						
Ŋ	#	Name	Targe	et Coordinates			Targ. Coord.	Corrections		Miscellaneous		
Fixed Targets	(3)	NGC6720-NIRSPE	C-OFF RA: 1	18 53 8.8379 (283	3.2868246d)							
a c			Dec:	+33 01 49.90 (33	.03053d)							
١Ļ			Equin	nox: J2000								
ě	Comments:											
证	Category=Sta Description=	ar [Planetary nebulae ni	ıclei1									
ē	TA Method	,										
Template	NONE											
ΙĔ												
le L												
<b>"</b>												
2	#		Dither Type		Size		Starting Poi	int	Number of Poi	nts	Points	
hers	1		<b>Dither Type</b> 4-POINT-DITHI	ER	Size		Starting Poi	int	Number of Poin	nts	Points	
Dithers	1		*	ER	Size		Starting Poi	int	Number of Poin	nts	Points	
ents Dithers	1 #	Grating/Filter	*	ER Groups/Int	Size  Integrations/Ex p	Leakcal	Starting Poi	Autocal	Number of Poin	Total Integrations	Points  Total Exposure Time	ETC Wkbk.Calc ID
lements Dithers	#		4-POINT-DITHI	Groups/Int	Integrations/Ex	<b>Leakcal</b> false				Total	Total Exposure	ETC Wkbk.Calc ID
Elements   Dithers	# 1 2	G395M/F290LP	Readout Pattern NRSIRS2RAPI D NRSIRS2RAPI	Groups/Int	Integrations/Ex P		Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
ral Elements Dithers	# 1 2	G395M/F290LP	Readout Pattern NRSIRS2RAPI D	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk.Calc ID
ectral Elements Dithers	# 1 2	G395M/F290LP	Readout Pattern NRSIRS2RAPI D NRSIRS2RAPI	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk.Calc ID
Spectral Elements Dithers	# 1 2	G395M/F290LP	Readout Pattern NRSIRS2RAPI D NRSIRS2RAPI	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk.Calc ID
Spectral Elements	1 2	G395M/F290LP G395M/F290LP	Readout Pattern  NRSIRS2RAPI D  NRSIRS2RAPI D	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk.Calc ID
Spectral Elements	1 2	G395M/F290LP	Readout Pattern  NRSIRS2RAPI D  NRSIRS2RAPI D	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk.Calc ID
Spectral Elements	1 2	G395M/F290LP G395M/F290LP	Readout Pattern  NRSIRS2RAPI D  NRSIRS2RAPI D	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk,Calc ID
Spectral Elements	1 2	G395M/F290LP G395M/F290LP	Readout Pattern  NRSIRS2RAPI D  NRSIRS2RAPI D	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk.Calc ID
Spectral Elements	1 2	G395M/F290LP G395M/F290LP	Readout Pattern  NRSIRS2RAPI D  NRSIRS2RAPI D	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk.Calc ID
Spectral Elements	1 2	G395M/F290LP G395M/F290LP	Readout Pattern  NRSIRS2RAPI D  NRSIRS2RAPI D	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk.Calc ID
Spectral Elements	1 2	G395M/F290LP G395M/F290LP	Readout Pattern  NRSIRS2RAPI D  NRSIRS2RAPI D	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk.Calc ID
Spectral Elements	1 2	G395M/F290LP G395M/F290LP	Readout Pattern  NRSIRS2RAPI D  NRSIRS2RAPI D	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk,Calc ID
Special Requirements Spectral Elements Dithers	1 2	G395M/F290LP G395M/F290LP	Readout Pattern  NRSIRS2RAPI D  NRSIRS2RAPI D	Groups/Int	Integrations/Exp	false	<b>Dither</b> true	Autocal NONE	Total Dithers	Total Integrations	Total Exposure Time 641.911	ETC Wkbk.Calc ID

# Proposal 1558 - Observation 8 - The Ring Nebula as a laboratory for the interaction of molecules, PAHs and dust in strong UV radiatio.

Proposal 1558, Observation 8: NGC 6720 Position 2

Wed Sep 07 17:00:33 GMT 2022

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics Observation

(Visit 8:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

S	#	Name
Targets	(7)	NGC6720-NIRSPEC- POSITION-2
Fixed .	Category=1	This object was generated

**Target Coordinates Targ. Coord. Corrections**  Miscellaneous

RA: 18 53 33.2430 (283.3885125d)

Dec: +33 01 49.90 (33.03053d)

Equinox: J2000

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Category=ISM
Description=[Planetary nebulae]

TA Method

rs Template NONE

rs	#	#	Dither Type		Size		Starting Point		Number of Poin	ts	Points	
Dithers	1	1	4-POINT-DITH	ER								
	#	# Grating/Filter	Readout Pattern	Groups/Int	Integrations/Ex p	Leakcal	Dither	Autocal	<b>Total Dithers</b>	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	1 G140M/F070L	P NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.8
nts	2	2 G140M/F070L	P NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	
Elements	3	3 G140M/F100L	P NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.5
	4	4 G140M/F100L	P NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	
Spectral	5	5 G235M/F170L	P NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.6
Sp	•	6 G235M/F170L	P NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	
	7	7 G395M/F290L	P NRSIRS2RAPI D	10	1	false	true	NONE	4	4	641.911	57104.7
	8	8 G395M/F290L	P NRSIRS2RAPI D	10	1	true	true	NONE	4	4	641.911	

<u>Prc</u>	posal 1558 - Observation 8 - The Ring Nebula as a laboratory for the interaction of molecules, PAHs and dust in strong UV radiatio
Requirements	Sequence Observations 6, 7, 8, Non-interruptible
Special	