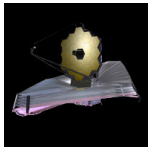

2402 - Opening Pandora's Box: Revealing the Hidden Content of a Forming Super Star Cluster

Cycle: 1, Proposal Category: GO

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
MRS Target				
	1	MRS on NGC-5253	MIRI Medium Resolution Spectroscopy	(1) NGC-5253
	3	Background for NGC-5253	MIRI Medium Resolution Spectroscopy	(2) NGC5253-BACKGROUND

ABSTRACT

We propose to observe the full 5-28 micron spectrum of the giant HII region in NGC 5253. The dominant infrared cluster in this galaxy is among the most luminous star-forming regions in the local universe. Consistent with a 10^9 Lsun IR luminosity, low resolution spectra from ISO and Spitzer reveal high excitation from intense and hard radiation fields within the HII region. But these large aperture IR observations could not isolate the HII region core from other nearby clusters. JWST can see through the more than 15 magnitudes of visual extinction to resolve the 3-pc radius IR nebula from more extended nebulosity. Thus the mid-IR spectrum of the giant HII region surrounding the forming super star cluster (SSC) can be separated

from lower excitation gas associated with older clusters. The final spectrum will provide a valuable template for the spectrum of a forming SSC for applications at higher redshifts. The line strengths computed from these spectra will be combined with optical and submillimeter data, and analyzed with grids of models of varying radiation field intensity and hardness and with different distributions of gas and dust.

OBSERVING DESCRIPTION

We propose to use the MRS on MIRI to obtain the full mid-IR spectrum of the heavily obscured giant star-forming region in the local dwarf galaxy, NGC 5253. All four channels of the MRS will be used to obtain the full 4.9-28.8 micron spectrum at the highest spectral resolution in a source with bright mid-IR lines but also a strong continuum. The core of the HII region is less than an arcsecond in size: the spatial resolution of JWST is essential to separate the spectrum of this HII region from separate extended nebulosity in the galaxy. Given that there is extended nebular emission of interest, the observations require a dedicated background observation rather than nodding on the array. Since most of the 2-15 Jy continuum is concentrated in a 0.2” region, saturation issues even with the smallest subarray mean that the MIRI Imager will not be used for simultaneous observations.

Proposal 2402 - Targets - Opening Pandora's Box: Revealing the Hidden Content of a Forming Super Star Cluster

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	NGC-5253	RA: 13 39 55.9632 (204.9831800d) Dec: -31 38 24.40 (-31.64011d) Equinox: J2000	Proper Motion RA: 0 mas/yr Proper Motion Dec: 0 mas/yr Parallax: 0" Epoch of Position: 2000	
Comments: The region consists of a very bright IR source from an embedded young cluster surrounded by extended nebulosity, and other clusters. The region of bright IR emission covers about 10" in the center. The given coordinates put the observation at the center of the extended nebulosity. *The brightest emission is pointlike, but there is extended nebulosity, so we need an off source background.* *Category=Stellar Cluster* *Description=[Young star clusters]* *Extended=YES*				
(2)	NGC5253-BACKGROUND	RA: 13 39 55.3400 (204.9805833d) Dec: -31 38 22.10 (-31.63947d) Equinox: J2000		
Comments: Background to NW of HII region *Category=Calibration* *Description=[Telescope/sky background]*				

Observation

Proposal 2402, Observation 1: MRS on NGC-5253

Mon Feb 06 19:03:33 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[Background for NGC-5253 (Obs 3)]

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
(1)	NGC-5253	RA: 13 39 55.9632 (204.9831800d)	Proper Motion RA: 0 mas/yr	
		Dec: -31 38 24.40 (-31.64011d)	Proper Motion Dec: 0 mas/yr	
		Equinox: J2000	Parallax: 0"	
			Epoch of Position: 2000	

Comments: The region consists of a very bright IR source from an embedded young cluster surrounded by extended nebulosity, and other clusters. The region of bright IR emission covers about 10" in the center. The given coordinates put the observation at the center of the extended nebulosity.

The brightest emission is pointlike, but there is extended nebulosity, so we need an off source background.
Category=Stellar Cluster
Description=[Young star clusters]
Extended=YES

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray
F1500W	ALL	NO	FULL

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	LONG(C)	MRSLONG		FASTR1	10	4	1	Dither 1	4	16	477.307	63610
1	LONG(C)	MRSSHORT		FASTR1	10	4	1	Dither 1	4	16	477.307	63610
2	MEDIUM(B)	MRSLONG		FASTR1	10	4	1	Dither 1	4	16	477.307	63610
2	MEDIUM(B)	MRSSHORT		FASTR1	10	4	1	Dither 1	4	16	477.307	63610
3	SHORT(A)	MRSLONG		FASTR1	10	4	1	Dither 1	4	16	477.307	63610
3	SHORT(A)	MRSSHORT		FASTR1	10	4	1	Dither 1	4	16	477.307	63610

Special Requirements	Sequence Observations 1, 3, Non-interruptible

Observation

Proposal 2402, Observation 3: Background for NGC-5253 Mon Feb 06 19:03:33 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [MRS on NGC-5253 (Obs 1)]

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
(2)	NGC5253-BACKGROUND	RA: 13 39 55.3400 (204.9805833d) Dec: -31 38 22.10 (-31.63947d) Equinox: J2000		

Comments: Background to NW of HII region
Category=Calibration
Description=[Telescope/sky background]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray
	ALL	NO	FULL

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	LONG(C)	MRSLONG		FASTR1	10	4	1	Dither 1	4	16	477.307	
1	LONG(C)	MRSSHORT		FASTR1	10	4	1	Dither 1	4	16	477.307	
2	MEDIUM(B)	MRSLONG		FASTR1	10	4	1	Dither 1	4	16	477.307	
2	MEDIUM(B)	MRSSHORT		FASTR1	10	4	1	Dither 1	4	16	477.307	
3	SHORT(A)	MRSLONG		FASTR1	10	4	1	Dither 1	4	16	477.307	
3	SHORT(A)	MRSSHORT		FASTR1	10	4	1	Dither 1	4	16	477.307	

Special Requirements	Sequence Observations 1, 3, Non-interruptible