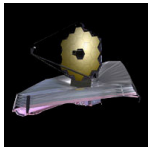

1263 - NIRSpec and MIRI Spectroscopy of QSOs - Part 2

Cycle: 1, Proposal Category: GTO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
MIRI - J1120				
	4	J1120-MRS	MIRI Medium Resolution Spectroscopy	(1) MIRI-J1120-MRS
NIRSPEC - J1120				
	3	NIRSpec IFU observation of J1120 [FERRUIT_3053]	NIRSpec IFU Spectroscopy	(3) NIRSPEC-J1120+0641

ABSTRACT

This APT is for IFU Observations of the high-z QSO J1120 which is in common with the MIRI programme, hence the programmes are merged to save slew.

The goals of both observations are to map the optical and near-IR nebular lines in the host galaxy circumgalactic region of this quasar at z=7.08.

MIRI, with its spectral coverage from 5 to 28 m and sensitivity, is the only instrument onboard JWST able to explore the optical and near-infrared spectrum and light distribution of galaxies and QSOs at redshifts above 6.7. A complete 5 to 28 spectrum (~0.6 to 3.5 microns rest-frame) of QSO J1120+0641 at z of 7.0842 will be obtained together with MIRI F560W and F1000W simultaneous imaging of a nearby field.

NIRSpec will observe this quasar with the IFS and with R2700 - band III grating, with the goal of tracing the distribution and kinematics of the main nebular emission lines and, in
particular, [OII], Hbeta, [OIII], [OI], Halpha. The ultimate goal is to trace the presence and properties of a quasar driven outflow and the dynamics and star formration of the host galaxy and
its close enviroment. This information will be precious to constrain the evolutionary processes of early massive galaxies hosting supermassive accreting black holes.

Update MRS observations (14-December-2022). The total integration time is now divived into 8 exposures instead of the original 4 to mitigate the impact of the cosmic ray showers on the detector. The additional parameters of the observational strategy, simultaneous imaging for astrometry, 4-point dither and readout mode are kept the same as before

OBSERVING DESCRIPTION
February 2021 update

Justification of Special Requirements.
The position angles and background requirement have been selected so as to avoid the bright stars (which would saturate the detectors) in the MIRI imager simultaneous fields, and to minimize the impact of background in the MRS observations, in particular for channels 3 and 4 in this faint target. Due to the bright stars in the field and MSA contamination issues, the V3 range between 55 to 130 should be avoided.

March 2020 update
- NIRSpec-IFU: New dither/ detector sequences to account for the new CR expectations
- V3PA constraints refined

MIRI MRS and Imager:

The purpose of the program is to get a full 5 - 28 um spectrum of J1120 using the 3 MRS configurations. In addition, we request MIRIM simultaneous imaging with F560W and F1000W of a nearby field.

The dithering strategies (4-pt, point source) were selected to optimize the PSF and detector effects in all MRS channels and Imager filters. These strategies could be subject to change without modifying the total charged time.

Constraints:
MIRI: the position angle has been selected so as to avoid the bright stars and minimize the impact of background in the MRS observations.
NIRSpec: due to the bright stars in the field and MSA contamination issues, the V3 range between 55 to 130 should be avoided.

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NIRSpec IFU OBSERVATION:

This part corresponds to NIRSpec IFU Proposal ID: FERRUIT_3053

(NIRSpec contact person: Roberto Maiolino)

Proposal title "NIRSpec and MIRI spectroscopy of QSOs - part #2"

The NIRSpec IFU observation is done with the G395H grating and it is aimed aimed primarily at

mapping the strongest optical nebular lines (Hbeta, [OIII], Halpha, [NII]).

PA constraints are driven by the MIRI observation and by the requirement to avoid some bright stars to be in the NIRSpec MSA footprint.

In this specific case, if the target is positioned in the center of the IFU field of view then
at this specific redshift the brightest [OIII]5007 is located in the detectors gap over about half of
the field of view. Hence, we have offset the centering by -0.7 arcsec in the X-direction (we hope this
is in the instrument coordinates, not on sky), which will enable to properly map [OIII]5007 in the central +-0.7 arcsec
of the source.

We have adopted a "small" dither pattern, given the reduced effective field as a consequence of the
offset discussed above.

We are using no target acquisition (i.e. point-and-shoot).
At any of the constrained PA range there are Gaia GS that can be selected for guiding and which will
ensure the proper location of the target within the IFU aperture, with the required accuracy.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	MIRI-J1120-MRS	RA: 11 20 1.4600 (170.0060833d) Dec: +06 41 23.80 (6.68994d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[Quasars]* *Extended=NO*				
(3)	NIRSPEC-J1120+0641	RA: 11 20 1.4630 (170.0060958d) Dec: +06 41 23.79 (6.68994d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Quasars]*				

Observation

Proposal 1263, Observation 4: J1120-MRS Wed Jan 04 18:00:47 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

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
(1)	MIRI-J1120-MRS	RA: 11 20 1.4600 (170.0060833d) Dec: +06 41 23.80 (6.68994d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[Quasars]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray
F560W	ALL	YES	FULL

Dithers

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

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	94	3	1	Dither 1	4	12	3152.445	
1	SHORT(A)	MRSLONG		SLOWR1	16	2	1	Dither 1	4	8	3153.469	
1	SHORT(A)	MRSSHORT		SLOWR1	16	2	1	Dither 1	4	8	3153.469	
2		IMAGER	F770W	FASTR1	94	3	1	Dither 1	4	12	3152.445	
2	MEDIUM(B)	MRSLONG		SLOWR1	16	2	1	Dither 1	4	8	3153.469	
2	MEDIUM(B)	MRSSHORT		SLOWR1	16	2	1	Dither 1	4	8	3153.469	
3		IMAGER	F1000W	FASTR1	94	3	1	Dither 1	4	12	3152.445	
3	LONG(C)	MRSLONG		SLOWR1	16	2	1	Dither 1	4	8	3153.469	
3	LONG(C)	MRSSHORT		SLOWR1	16	2	1	Dither 1	4	8	3153.469	

Special Requirements	Background Limited. Background no more than 40th percentile above minimum

Observation

Proposal 1263, Observation 3: NIRSpec IFU observation of J1120 [FERRUIT_3053] Wed Jan 04 18:00:47 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Comments: PA is restricted to minimise possible MSA leakage
The off-set is done to minimise effects of the gap for the brightest [OIII]5007 line.

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
(3)	NIRSPEC-J1120+0641	RA: 11 20 1.4630 (170.0060958d) Dec: +06 41 23.79 (6.68994d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Quasars]

Template

TA Method
NONE

Dithers

#	Dither Type	Size	Starting Point	Number of Points	Points
1	CYCLING	MEDIUM	1	6	

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	G395H/F290LP	NRSIRS2	25	1	false	true	NONE	6	6	11029.201	

Special Requirements

Aperture PA Range 269.89297485 to 162.89297485 Degrees (V3 130.92044067 to 23.92044067)
Offset -0.7 arcsec, 0.0 arcsec