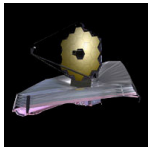

1262 - Integral Field Spectroscopy at z > 8

Cycle: 1, Proposal Category: GTO

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
MIRI EGSY8P7				
	3	MRS-EGSY8P7	MIRI Medium Resolution Spectroscopy	(3) EGSY8P7-MIRI-MRS
	4	MIRIM-EGSY8P7	MIRI Imaging	(4) EGSY8P7-MIRI-IMAGER
MIRI MACS1149-JD1				
	5	MRS-MACS1149-JD1	MIRI Medium Resolution Spectroscopy	(14) MACS1149-JD1-MIRI
	6	MIRIM-MACS1149-JD1	MIRI Imaging	(14) MACS1149-JD1-MIRI
NIRSpec observations				
	7	MACS1149-JD1-NIRSpec	NIRSpec IFU Spectroscopy	(13) MACS1149-JD1-NIRSPEC

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
	8	EGSY8P7-NIRSpec	NIRSpec IFU Spectroscopy	(2) EGSY8P7-NIRSPEC

ABSTRACT

This APT is for NIRSpec-IFU and MIRI observations of two EoR sources, one Lyman-alpha emitter (EGSY8p7) in the EGS cosmological field, and one [OIII] emitters in the MACS1149 Frontier Field. The two galaxies are spectroscopically confirmed at a redshifts of 8.68 and 9.11, respectively. They will be observed by both the NIRSpec and the MIRI GTO teams to cover the UV and optical (Halpha and other lines) rest-frame.

NIRSpec:

The NIRSpec-IFU observations are part of the NIRSpec GTO Physics of Galaxy Assembly IFS survey.

The NIRSpec-IFU observations are performed at R100 and R2700. The specific band for the high-resolution observations is aimed at including the most important emission lines (from ~ H-beta to H-alpha).

MIRI:

MIRI is the only instrument onboard JWST able to detect the H-alpha line for sources at redshifts beyond 6.7, the key diagnostic line to establish the instantaneous star formation, as well as the Ly-alpha and ionizing continuum escape fractions for sources during the Epoch of Reionization (EoR) of the universe. Deep MIRI spectroscopy of the H-alpha line with the medium resolution integral field spectrograph (MRS) of one bright Ly-alpha spectroscopically confirmed sources at z>8 in the Extended Groth Strip (EGSY8p7) will be obtained, as well as mid-IR imaging of the host galaxy and nearby fields with the MIRI imager and filters F770W and F1000W. A similar observational scheme will be used for MACS1149_JD1

OBSERVING DESCRIPTION

NIRSPEC OBSERVING DESCRIPTIONS:

These two galaxies will be observed using the NIRSpec-IFU as part of the “Physics of Galaxy Assembly IFU survey” program. Observations will be done with grating/filters PRISM (R100) and G395H/F290LP (R2700). By combining with the MIRI observations (see below), we take advantage of the "smart accounting" option to save slew overheads.

No TA (target acquisition) is included, as it has been checked that there is a large fraction of guide stars with GAIA astrometry.

A 8-point dither pattern ("medium" cycling) provides a good compromise between an amplitude (~0.5 ") large enough to "jump" the failed open

microsutthers and to deal with other sources of background, while keeping a large FoV with complete exposure time (~2.5"x2.5"). This dither pattern also allows a good sub-pixel sampling.

No extra background exposures are included. For R100 it was considered that there will be a relatively large number of spaxels free from galaxy emission to derive the background. For the R2700, in addition, the goal is to study the emission lines and therefore the background should be less relevant.

Even though the contamination by bright targets leaking through the MSA is expected to be small for the PAs selected (see above), we take an extra leakage exposure for R100 in one pointing in order to be able to understand the effects of the surronding field.

The IRS2RAPID reading mode was selected to maximise S/N, providing also good temporal resolution for CR detection/rejection.

MIRI OBSERVING DESCRIPTIONS:

MIRI observe two spectroscopically confirmed EoR sources, the Ly-alpha emitters EGSY8P7, and the [OIII[emitters MACS1149_JD1 with redshifts of 8.7 and 9.1, respectively. The main purpose of the program is to get the H-alpha emission line and the spectral range around it ([NII], [SII]) as well as the HeI 1.083 microns line. Nearby, adjacent fields will be simultaneously imaged with the F770W and F1000W filters. In addition, we request the imaging of the host galaxy with the IMAGER using the F560w filter.

The dithering strategies (4-pt+2-pt., point source) were selected to optimize the PSF and detector effects for channel 1 of the MRS (H-alpha line is located in this channel for the two sources).

The PA constrain (PA_V3 = 167 degrees) for EGSY8p7 has been selected to avoid bright stars that can saturate de simultaneous IMAGER observations, and to be in a low background regime emission in Channel 1 of the MRS. Low background conditions are required to minimize the impact of background in the observations and signal-to-noise ratio for these very faint galaxies at high redshifts.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	EGSY8P7-NIRSPEC	RA: 14 20 8.5000 (215.0354167d) Dec: +52 53 26.60 (52.89072d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[Emission line galaxies, High-redshift galaxies]* *Extended=YES*				
(3)	EGSY8P7-MIRI-MRS	RA: 14 20 8.5000 (215.0354167d) Dec: +52 53 26.60 (52.89072d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[Emission line galaxies, High-redshift galaxies]* *Extended=NO*				
(4)	EGSY8P7-MIRI-IMAGER	RA: 14 20 7.1667 (215.0298613d) Dec: +52 53 57.71 (52.89936d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[Emission line galaxies, High-redshift galaxies]* *Extended=NO*				
(13)	MACS1149-JD1-NIRSPEC	RA: 11 49 33.5800 (177.3899167d) Dec: +22 24 45.70 (22.41269d) Equinox: J2000		
Comments: Coordinates from Hashimoto et al. (2018) *Category=Galaxy* *Description=[Lyman-alpha galaxies, Primordial galaxies]*				
(14)	MACS1149-JD1-MIRI	RA: 11 49 33.5800 (177.3899167d) Dec: +22 24 45.70 (22.41269d) Equinox: J2000		
Comments: *Category=Galaxy* *Description=[High-redshift galaxies, Lyman-alpha galaxies]* *Extended=NO*				

Observation

Proposal 1262, Observation 3: MRS-EGSY8P7 Wed Mar 08 01:00:57 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Comments: The specific range of PA for MIRI observations has been selected such to avoid the presence of bright stars in the simultaneous MIRIM field while MRS is prime. These MIRIM images are in cosmological fields and would therefore be used not only for astrometric purposes but also for science. It is therefore important to avoid potentital contamination effects in sections of the imager due to saturation effects around bright point sources in the mid-IR

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)	EGSY8P7-MIRI-MRS	RA: 14 20 8.5000 (215.0354167d) Dec: +52 53 26.60 (52.89072d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[Emission line galaxies, High-redshift galaxies]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray
F560W	CHANNEL1	YES	FULL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	POINT SOURCE	NEGATIVE
2	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	F1000W	FASTR1	118	9	1	Dither 1	4	36	11877.171	
1	MEDIUM(B)	MRSLONG		SLOWR1	20	6	1	Dither 1	4	24	11944.96	
1	MEDIUM(B)	MRSSHORT		SLOWR1	20	6	1	Dither 1	4	24	11944.96	
2		IMAGER	F770W	FASTR1	124	6	1	Dither 2	4	24	8314.02	
2	MEDIUM(B)	MRSLONG		SLOWR1	21	4	1	Dither 2	4	16	8313.692	
2	MEDIUM(B)	MRSSHORT		SLOWR1	21	4	1	Dither 2	4	16	8313.692	

Special Requirements	
	Aperture PA Range 122.0 to 180.0 Degrees (V3 122.0 to 180.0) Background Limited. Background no more than 50th percentile above minimum

Observation

Proposal 1262, Observation 4: MIRIM-EGSY8P7 Wed Mar 08 01:00:57 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Comments: The specific range of PA for MIRI observations has been selected such to avoid the presence of bright stars in the simultaneous MIRIM field while MRS is prime. These MIRIM images are in cosmological fields and would therefore be used not only for astrometric purposes but also for science. It is therefore important to avoid potentital contamination effects in sections of the imager due to saturation effects around bright point sources in the mid-IR

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
(4)	EGSY8P7-MIRI-IMAGER	RA: 14 20 7.1667 (215.0298613d) Dec: +52 53 57.71 (52.89936d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[Emission line galaxies, High-redshift galaxies]
Extended=NO

Template

Subarray
FULL

Dithers

#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size
1	4-Point-Sets				6	1	POINT SOURCE	POSITIVE	DEFAULT

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	80	3	1	Dither 1	4	12	2686.239	

Special Requirements

Aperture PA Range 126.83425324 to 184.83425324 Degrees (V3 121.99880427 to 179.99880427)
Background Limited. Background no more than 40th percentile above minimum

Observation

Proposal 1262, Observation 5: MRS-MACS1149-JD1 Wed Mar 08 01:00:57 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Comments: The specific range of PA for MIRI observations has been selected such to avoid the presence of bright stars in the simultaneous MIRIM field while MRS is prime. These MIRIM images are in cosmological fields and would therefore be used not only for astrometric purposes but also for science. It is therefore important to avoid potentital contamination effects in sections of the imager due to saturation effects around bright point sources in the mid-IR

Diagnostics

(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(14)	MACS1149-JD1-MIRI	RA: 11 49 33.5800 (177.3899167d) Dec: +22 24 45.70 (22.41269d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-alpha galaxies]
Extended=NO

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray
F560W	CHANNEL1	YES	FULL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	POINT SOURCE	NEGATIVE
2	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	F1000W	FASTR1	105	9	1	Dither 1	4	36	10578.452	
1	LONG(C)	MRSLONG		SLOWR1	19	6	1	Dither 1	4	24	11371.602	
1	LONG(C)	MRSSHORT		SLOWR1	19	6	1	Dither 1	4	24	11371.602	
2		IMAGER	F770W	FASTR1	105	9	1	Dither 2	4	36	10578.452	
2	LONG(C)	MRSLONG		SLOWR1	19	6	1	Dither 2	4	24	11371.602	
2	LONG(C)	MRSSHORT		SLOWR1	19	6	1	Dither 2	4	24	11371.602	

Special Requirements	
	Aperture PA Range 115.0 to 135.0 Degrees (V3 115.0 to 135.0) Aperture PA Range 275.0 to 287.0 Degrees (V3 275.0 to 287.0) Background Limited. Background no more than 40th percentile above minimum

Observation

Proposal 1262, Observation 6: MIRIM-MACS1149-JD1 Wed Mar 08 01:00:57 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Comments: The specific range of PA for MIRI observations has been selected such to avoid the presence of bright stars in the simultaneous MIRIM field while MRS is prime. These MIRIM images are in cosmological fields and would therefore be used not only for astrometric purposes but also for science. It is therefore important to avoid potentital contamination effects in sections of the imager due to saturation effects around bright point sources in the mid-IR

Diagnostics

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(14)	MACS1149-JD1-MIRI	RA: 11 49 33.5800 (177.3899167d) Dec: +22 24 45.70 (22.41269d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[High-redshift galaxies, Lyman-alpha galaxies]
Extended=NO

Template

Subarray
FULL

Dithers

#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size
1	4-Point-Sets	1			4	1	POINT SOURCE	POSITIVE	SMALL

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F560W	FASTR1	120	2	1	Dither 1	4	8	2675.139	

Special Requirements

Aperture PA Range 119.83425324 to 139.83425324 Degrees (V3 114.99880427 to 134.99880427)
Aperture PA Range 279.83425324 to 291.83425324 Degrees (V3 274.99880427 to 286.99880427)
Background Limited. Background no more than 40th percentile above minimum

Observation

Proposal 1262, Observation 7: MACS1149-JD1-NIRSpec Wed Mar 08 01:00:57 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Comments: The PA is restricted to minimise potential MSA leakage contamination

Diagnostics

(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(13)	MACS1149-JD1-NIRSPEC	RA: 11 49 33.5800 (177.3899167d) Dec: +22 24 45.70 (22.41269d) Equinox: J2000		

Comments: Coordinates from Hashimoto et al. (2018)
Category=Galaxy
Description=[Lyman-alpha galaxies, Primordial galaxies]

Template

TA Method
NONE

Dithers

#	Dither Type	Size	Starting Point	Number of Points	Points
1	CYCLING	MEDIUM	1	8	

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	31	1	false	true	NONE	8	8	18206.935	
2	PRISM/CLEAR	NRSIRS2RAPID	33	1	false	true	NONE	8	8	3968.178	
3	PRISM/CLEAR	NRSIRS2RAPID	33	1	true	false	NONE	1	1	496.022	

Special Requirements

Aperture PA Range 33.892975 to 60.892975 Degrees (V3 254.92044082 to 281.92044082)
Aperture PA Range 259.892975 to 263.892975 Degrees (V3 120.92044082 to 124.92044082)

Observation

Proposal 1262, Observation 8: EGSY8P7-NIRSpec Wed Mar 08 01:00:57 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Comments: The PA is restricted to minimise potential MSA leakage contamination

Diagnostics

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	EGSY8P7-NIRSPEC	RA: 14 20 8.5000 (215.0354167d) Dec: +52 53 26.60 (52.89072d) Equinox: J2000		

Comments:
Category=Galaxy
Description=[Emission line galaxies, High-redshift galaxies]
Extended=YES

Template

TA Method
NONE

Dithers

#	Dither Type	Size	Starting Point	Number of Points	Points
1	CYCLING	MEDIUM	1	8	

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	31	1	false	true	NONE	8	8	18206.935	
2	PRISM/CLEAR	NRSIRS2RAPID	33	1	false	true	NONE	8	8	3968.178	
3	PRISM/CLEAR	NRSIRS2RAPID	33	1	true	false	NONE	1	1	496.022	

Special Requirements

Aperture PA Range 79.89297485 to 82.89297485 Degrees (V3 300.92044067 to 303.92044067)
Aperture PA Range 260.892975 to 275.892975 Degrees (V3 121.92044082 to 136.92044082)