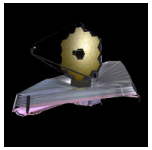

1762 - Halfway to the peak: A bridge program to map coeval star formation and supermassive black hole growth

Cycle: 1, Proposal Category: GO

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Alexandra Pope (PI)	**University of Massachusetts - Amherst**	**pope@astro.umass.edu**
Dr. Anna Sajina (CoI) (CoPI)	Tufts University	anna.sajina@tufts.edu
Dr. Lin Yan (CoI) (CoPI)	California Institute of Technology	lyan@caltech.edu
Dr. Stacey Alberts (CoI)	University of Arizona	salberts@email.arizona.edu
Dr. Lee Armus (CoI)	California Institute of Technology	lee@ipac.caltech.edu
Matteo Bonato (CoI) (ESA Member)	INAF, Istituto di Fisica Spaziale e Fisica Cosmica-Bologna	bonato@ira.inaf.it
Dr. Ranga-Ram Chary (CoI)	California Institute of Technology	rchary@caltech.edu
Prof. Kristen Coppin (CoI) (ESA Member)	University of Hertfordshire	k.coppin@herts.ac.uk
Dr. Daniel Dale (CoI)	University of Wyoming	ddale@uwyo.edu
Dr. Duncan Farrah (CoI)	University of Hawaii	dfarrah@hawaii.edu
Dr. Carl Ferkinhoff (CoI)	Winona State University	cferkinhoff@winona.edu
Dr. Brent Groves (CoI)	University of Western Australia	brent.groves@uwa.edu.au
Dr. Christopher Hayward (CoI)	Simons Foundation Center for Computational Astrophysics	chayward@flatironinstitute.org
Dr. Allison Kirkpatrick (CoI)	University of Kansas Center for Research, Inc.	akirkpatrick@ku.edu
Guilaine Lagache (CoI) (ESA Member)	Laboratoire d'Astrophysique de Marseille	guilaine.lagache@lam.fr
Jed McKinney (CoI)	University of Massachusetts - Amherst	jedmck@me.com
Dr. Eric J. Murphy (CoI)	Associated Universities, Inc.	emurphy@nrao.edu
Dr. Nicole Nesvadba (CoI) (ESA Member)	Observatoire de la Cote d'Azur	nicole.nesvadba@oca.eu
Dr. Patrick Michael Ogle (CoI)	Space Telescope Science Institute	pogle@stsci.edu
Prof. Sylvain Veilleux (CoI)	University of Maryland	veilleux@astro.umd.edu

OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
MIRI MRS				
	1	xFLS15967z=0.579	MIRI Medium Resolution Spectroscopy	(1) XFLS-IRS15967Z0.579
	2	xFLSSSTJ171324z=0.609	MIRI Medium Resolution Spectroscopy	(2) XFLS-SSTJ171324Z0.609
	3	xFLSSSTJ172118z=0.555	MIRI Medium Resolution Spectroscopy	(3) XFLS-SSTJ172118Z0.555
	4	xFLS562z=0.545	MIRI Medium Resolution Spectroscopy	(4) XFLS-IRS562Z0.545
	5	xFLSSSTJ172458z=0.494	MIRI Medium Resolution Spectroscopy	(5) XFLS-SSTJ172458Z0.494
	6	xFLS16047z=0.523	MIRI Medium Resolution Spectroscopy	(6) XFLS-IRS16047Z0.523
	7	XFLS-BKG	MIRI Medium Resolution Spectroscopy	(9) XFLS-BKG
	8	COS51728z=0.614	MIRI Medium Resolution Spectroscopy	(7) COSMOS-MIPS51728Z0.614
	9	COS51982z=0.595	MIRI Medium Resolution Spectroscopy	(8) COSMOS-MIPS51982Z0.595
	34	COSMOS-BKG	MIRI Medium Resolution Spectroscopy	(10) COSMOS-BKG
	33	xFLSSSTJ172118z=0.555	MIRI Medium Resolution Spectroscopy	(3) XFLS-SSTJ172118Z0.555

ABSTRACT

The rate of star formation and supermassive black hole growth in galaxies has been decreasing over the last 10 billion years. This proposal aims to understand this decline by localizing and quantifying the active galactic nucleus (AGN), spatially resolving the star formation activity, and measuring the interstellar medium (ISM) conditions in eight infrared-luminous galaxies at z~0.6. Our sample exists at a time when the cosmic star formation rate density was >3 times higher than locally, but when locally well-established diagnostic lines are still visible to MIRI/MRS. Mid-IR spectroscopy is a powerful way to separate the AGN and star formation energetics in galaxies, and only now with MIRI/MRS are we able to detect the rich atomic lines to quantify the black hole accretion rates ([NeV], [NeVI]) and spatially resolve the star formation (Br-alpha) outside the local Universe. Coupling these key lines with the polycyclic aromatic hydrocarbon dust features, the warm molecular hydrogen emission lines and other key spectral features, we will establish the physical state of the ISM halfway to the peak epoch of galaxy evolution. Our program leverages existing Spitzer/IRS spectroscopy to select an optimized sample spanning the full range of star formation to AGN dominated systems. Our program will produce a valuable dataset bridging the local and high redshift Universe by testing diagnostics of the AGN, star formation and ISM conditions at intermediate redshifts so they can be extended to higher redshifts in subsequent JWST cycles.

OBSERVING DESCRIPTION

(1) Instruments

We propose to use MIRI/MRS IFU to observe 8 galaxies at redshift of 0.6. We will use all four IFUs in three grating angles and obtain the spectra covering the full available wavelength region between 5 - 28 micron. As a bonus, we plan to take simultaneous direct images using in F560W filter with MIRI. This will produce 8 deep 5.6 micron images, covering a total of 18 sq. arcminutes.

(2) Targets

Our eight targets are summarized in Table 1 in the Technical Justification. Multiple targets within a same field reduces the telescope slew time after the first target. Furthermore, because the physical sizes of our targets are not larger than 1 arcseconds, our observations can be done efficiently in a single pointing for each target.

These sources all have Spitzer low resolution mid-IR spectra (see Figure 4 in the proposal). They are well studied in several published papers. In addition, these targets also have multi-waevlength photometry, HST images (both optical and Near-IR NICMOS), and optical spectroscopy. The detailed analysis has been performed on the Spitzer spectra and the fractional contribution to the total infrared luminosity has been quantified by the AGN fraction listed in the last column of Table 1.

(3) Expected mid-IR line fluxes and exposure time calculation

Our primary science goal is to detect mid-IR spectral features, including atomic fine structure lines, broad PAH features, and H2 molecular lines from rotational transitions. In order to estimate the expected line fluxes, we scale the line fluxes measured for a sample of nearby IR-luminous galaxies with high resolution spectra from Spitzer, assuming the same relation between line to total IR luminosity ratio as a function of AGN fraction (see left panel of Figure 5).

We are targeting a suite of lines, including [NeII], [NeIII], [NeV], Br-alpha, [NeVI], PAH3.3, PAH6.2, PAH7.7, H2S(2), H2S(3) etc. Of these features, the weakest are [NeV] in the star forming systems and Br-alpha because it is extended over an assumed region of 0.8"x0.8". We expect fluxes of 1.0e-16 erg/s/cm^2 for spatially unresolved [NeV] at the observed wavelength of ~22 micron and 1.05e-17 erg/s/cm^2 for Br-alpha within a

single resolution element of 0.3" FWHM at roughly 6.25 micron.

With the primary science goal of detecting central accreting blackholes and spatially resolving star forming regions, we require our observations to achieve the minimum SNR of 5 for the weakest lines, [NeV] from a star forming galaxy, and Br-alpha in a single resolution element of 0.3" from an AGN dominated target. The JWST Exposure Time Calculator (ETC) gives 2220 seconds per pixel in order to achieve the minimum required SNR. Most of the other spectral features should be detected with much higher SNR (middle panel Figure 5).

(4) Observational Plans:

As AGN indicatosr, the [NeV] and [NeVI] lines will be spatially unresolved at a spatial resolution 0.7". Also at >20 micron, [NeII] and [NeIII] lines are likely marginally resolved. Dust features such as PAH6.2 and 7.7um could be resolved in Channel 3 (FWHM ~ 0.4"), but should not be more than 1", much smaller than FOV~5.6"x6.2". The spatially resolved Br-alpha is in Channel 1, with a FOV of 3.3"x3.7". Our assumption of Br-alpha is a square region of 0.8"x0.8". We adopt 4-point dither and optimize it for all channels for an extended source. Using APT Aladin to visualize the focal plan over an HST NICMOS image of three of our targets, we find that the extended 4-point dither pattern will offer enough sky pixels without galaxy contamination for good background subtraction, as well as ensuring that Br-alpha are mostly within the Channel 1 FOV for all four exposures (see also Figure 5 right panel). For both short and long wavelength detectors, the science exposures will use group of 200, integration 1, fast readout mode and extended 4-point dither, which yields 2220 seconds per pixel. While MIRI IFU is taking the spectrum, we will also take bonus MIRI imaging in F560W filter simultaneously.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	XFLS-IRS15967Z0.579	RA: 17 19 24.6000 (259.8525000d) Dec: +59 28 58.80 (59.48300d) Equinox: J2000		
Comments: FLS5 --- FLS15967 z=0.579 1.45mJy F(AGN)=100 5.7um flux = 155uJy *Category=Galaxy* *Description=[Active galaxies, High-redshift galaxies, Infrared galaxies, Starburst galaxies, Ultraluminous infrared galaxies]*				
(2)	XFLS-SSTJ171324Z0.609	RA: 17 13 24.1680 (258.3507000d) Dec: +58 55 49.08 (58.93030d) Equinox: J2000		
Comments: FLS6 -- (also FLS14016256) z=0.609 F(AGN)=88% 4.94mJy LIR=11.96 *5.7um flux=437uJy* *Category=Galaxy* *Description=[Ultraluminous infrared galaxies]*				
(3)	XFLS-SSTJ172118Z0.555	RA: 17 21 18.3120 (260.3263000d) Dec: +58 46 1.56 (58.76710d) Equinox: J2000		
Comments: FLS3 --- (also called FLS14135040) z=0.555 F(AGN) = 70% 1.68mJy *5.7um flux = 206uJy group 5* *Category=Galaxy* *Description=[Ultraluminous infrared galaxies]*				
(4)	XFLS-IRS562Z0.545	RA: 17 12 39.6240 (258.1651000d) Dec: +58 59 54.96 (58.99860d) Equinox: J2000		
Comments: FLS1 -- (FLS-IRS562) z=0.545 F(AGN)=23% 1.01mJy *IRAC 5.7um 0.15mJy* *Category=Galaxy* *Description=[Ultraluminous infrared galaxies]*				
(5)	XFLS-SSTJ172458Z0.494	RA: 17 24 58.3000 (261.2429167d) Dec: +59 15 45.00 (59.26250d) Equinox: J2000		
Comments: FLS2 -- (Lacy FLS1724) z=0.494 F(AGN)=50% *5.7um flux = 433uJy* *Category=Galaxy* *Description=[Ultraluminous infrared galaxies]*				
(6)	XFLS-IRS16047Z0.523	RA: 17 23 1.4400 (260.7560000d) Dec: +59 40 54.12 (59.68170d) Equinox: J2000		
Comments: FLS4 -- (also FLS16047) z=0.523 1.29mJy composite *5.7um flux = 163uJy* *Category=Galaxy* *Description=[Ultraluminous infrared galaxies]*				
(7)	COSMOS-MIPS51728Z0.614	RA: 10 01 9.5352 (150.2897300d) Dec: +02 24 0.06 (2.40002d) Equinox: J2000		
Comments: COSMOS1 -- (also COSMOS mips51728) z=0.614 0.71mJy *5.7um flux = 71uJy* *Category=Galaxy* *Description=[Ultraluminous infrared galaxies]*				

(8)	COSMOS-MIPS51982Z0.595	RA: 10 01 37.0950 (150.4045625d) Dec: +02 46 49.98 (2.78055d) Equinox: J2000
Comments: COSMOS2 -- (also COSMOS mips51982) z=0.595 F(AGN)=100% 1.33mJy 5.7um flux = 282uJy *ALMA dust continuum detection* *Category=Galaxy* *Description=[Ultraluminous infrared galaxies]*		
(9)	XFLS-BKG	RA: 17 18 38.0000 (259.6583333d) Dec: +59 06 50.00 (59.11389d) Equinox: J2000
Comments: this is a background target for all 6 XFLS sources *Category=Calibration* *Description=[Telescope/sky background]*		
(10)	COSMOS-BKG	RA: 10 01 17.2640 (150.3219333d) Dec: +02 39 39.35 (2.66093d) Equinox: J2000
Comments: this is a background target for the 2 COSMOS sources *Category=Galaxy* *Description=[Ultraluminous infrared galaxies]*		

Observation

Proposal 1762, Observation 1: xFLS15967z=0.579 Wed Dec 21 19:04:18 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 1:1) Warning (Form): Data Excess over lower threshold

(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)	XFLS-IRS15967Z0.579	RA: 17 19 24.6000 (259.8525000d) Dec: +59 28 58.80 (59.48300d) Equinox: J2000		

Comments: FLS5 --- FLS15967 z=0.579 1.45mJy F(AGN)=100 5.7um flux = 155uJy
Category=Galaxy
Description=[Active galaxies, High-redshift galaxies, Infrared galaxies, Starburst galaxies, Ultraluminous infrared galaxies]

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	EXTENDED 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	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254

Observation

Proposal 1762, Observation 2: xFLSSSTJ171324z=0.609 Wed Dec 21 19:04:18 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 2:1) Warning (Form): Data Excess over lower threshold

(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	XFLS-SSTJ171324Z0.609	RA: 17 13 24.1680 (258.3507000d) Dec: +58 55 49.08 (58.93030d) Equinox: J2000		

Comments: FLS6 -- (also FLS14016256) z=0.609 F(AGN)=88% 4.94mJy LIR=11.96
5.7um flux=437uJy
Category=Galaxy
Description=[Ultraluminous infrared galaxies]

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	EXTENDED 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	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254

Observation

Proposal 1762, Observation 3: xFLSSSTJ172118z=0.555 Wed Dec 21 19:04:18 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 3:1) Warning (Form): Data Excess over lower threshold

(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)	XFLS-SSTJ172118Z0.555	RA: 17 21 18.3120 (260.3263000d) Dec: +58 46 1.56 (58.76710d) Equinox: J2000		

Comments: FLS3 --- (also called FLS14135040) z=0.555 F(AGN) = 70% 1.68mJy
5.7um flux = 206uJy group 5
Category=Galaxy
Description=[Ultraluminous infrared galaxies]

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	EXTENDED 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	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254

Observation

Proposal 1762, Observation 4: xFLS562z=0.545 Wed Dec 21 19:04:18 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 4:1) Warning (Form): Data Excess over lower threshold

(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)	XFLS-IRS562Z0.545	RA: 17 12 39.6240 (258.1651000d) Dec: +58 59 54.96 (58.99860d) Equinox: J2000		

Comments: FLS1 -- (FLS-IRS562) z=0.545 F(AGN)=23% 1.01mJy
IRAC 5.7um 0.15mJy
Category=Galaxy
Description=[Ultraluminous infrared galaxies]

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	EXTENDED 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	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254

Observation

Proposal 1762, Observation 5: xFLSSSTJ172458z=0.494 Wed Dec 21 19:04:18 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 5:1) Warning (Form): Data Excess over lower threshold

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(5)	XFLS-SSTJ172458Z0.494	RA: 17 24 58.3000 (261.2429167d) Dec: +59 15 45.00 (59.26250d) Equinox: J2000		

Comments: FLS2 -- (Lacy FLS1724) z=0.494 F(AGN)=50%
5.7um flux = 433uJy
Category=Galaxy
Description=[Ultraluminous infrared galaxies]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray
F1500W	ALL	YES	FULL

Dithers

#	Dither Type	Optimized For	Direction
1	4-Point	EXTENDED 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	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254

Observation

Proposal 1762, Observation 6: xFLS16047z=0.523 Wed Dec 21 19:04:18 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 6:1) Warning (Form): Data Excess over lower threshold

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(6)	XFLS-IRS16047Z0.523	RA: 17 23 1.4400 (260.7560000d) Dec: +59 40 54.12 (59.68170d) Equinox: J2000		

Comments: FLS4 -- (also FLS16047) z=0.523 1.29mJy composite
5.7um flux = 163uJy
Category=Galaxy
Description=[Ultraluminous infrared galaxies]

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	EXTENDED 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	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254

Observation

Proposal 1762, Observation 7: XFLS-BKG Wed Dec 21 19:04:18 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

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
(9)	XFLS-BKG	RA: 17 18 38.0000 (259.6583333d) Dec: +59 06 50.00 (59.11389d) Equinox: J2000		

Comments: this is a background target for all 6 XFLS sources
Category=Calibration
Description=[Telescope/sky background]

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	EXTENDED 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	20	1	1	Dither 1	4	4	222.003	56254
1	SHORT(A)	MRSLONG		FASTR1	20	1	1	Dither 1	4	4	222.003	56254
1	SHORT(A)	MRSSHORT		FASTR1	20	1	1	Dither 1	4	4	222.003	56254
2		IMAGER	F560W	FASTR1	20	1	1	Dither 1	4	4	222.003	56254
2	MEDIUM(B)	MRSLONG		FASTR1	20	1	1	Dither 1	4	4	222.003	56254
2	MEDIUM(B)	MRSSHORT		FASTR1	20	1	1	Dither 1	4	4	222.003	56254
3		IMAGER	F560W	FASTR1	20	1	1	Dither 1	4	4	222.003	56254
3	LONG(C)	MRSLONG		FASTR1	20	1	1	Dither 1	4	4	222.003	56254
3	LONG(C)	MRSSHORT		FASTR1	20	1	1	Dither 1	4	4	222.003	56254

Observation

Proposal 1762, Observation 8: COS51728z=0.614 Wed Dec 21 19:04:18 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 8:1) Warning (Form): Data Excess over lower threshold

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(7)	COSMOS-MIPS51728Z0.614	RA: 10 01 9.5352 (150.2897300d) Dec: +02 24 0.06 (2.40002d) Equinox: J2000		

Comments: COSMOS1 -- (also COSMOS mips51728) z=0.614 0.71mJy
5.7um flux = 71uJy
Category=Galaxy
Description=[Ultraluminous infrared galaxies]

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	EXTENDED 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	200	1	1	Dither 1	4	4	2220.032	56254
1	LONG(C)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
1	LONG(C)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	SHORT(A)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	SHORT(A)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254

Special Requirements	Group Observations 8, 9, 34 within 2 Days

Observation

Proposal 1762, Observation 9: COS51982z=0.595 Wed Dec 21 19:04:18 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 9:1) Warning (Form): Data Excess over lower threshold

(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(8)	COSMOS-MIPS51982Z0.595	RA: 10 01 37.0950 (150.4045625d) Dec: +02 46 49.98 (2.78055d) Equinox: J2000		

Comments: COSMOS2 -- (also COSMOS mips51982) z=0.595 F(AGN)=100% 1.33mJy
5.7um flux = 282uJy
ALMA dust continuum detection
Category=Galaxy
Description=[Ultraluminous infrared galaxies]

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	EXTENDED 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	200	1	1	Dither 1	4	4	2220.032	56254
1	LONG(C)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
1	LONG(C)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	SHORT(A)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	SHORT(A)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254

Special Requirements	Group Observations 8, 9, 34 within 2 Days

Observation

Proposal 1762, Observation 34: COSMOS-BKG Wed Dec 21 19:04:18 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Diagnostics

(Visit 34:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(10)	COSMOS-BKG	RA: 10 01 17.2640 (150.3219333d) Dec: +02 39 39.35 (2.66093d) Equinox: J2000		

Comments: this is a background target for the 2 COSMOS sources
Category=Galaxy
Description=[Ultraluminous infrared galaxies]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray
F560W	ALL	YES	FULL

Dithers

#	Dither Type	Optimized For	Direction
1	2-Point	EXTENDED 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	200	1	1	Dither 1	2	2	1110.016	56254
1	LONG(C)	MRSLONG		FASTR1	200	1	1	Dither 1	2	2	1110.016	56254
1	LONG(C)	MRSSHORT		FASTR1	200	1	1	Dither 1	2	2	1110.016	56254
2		IMAGER	F560W	FASTR1	200	1	1	Dither 1	2	2	1110.016	56254
2	MEDIUM(B)	MRSLONG		FASTR1	200	1	1	Dither 1	2	2	1110.016	56254
2	MEDIUM(B)	MRSSHORT		FASTR1	200	1	1	Dither 1	2	2	1110.016	56254
3		IMAGER	F560W	FASTR1	200	1	1	Dither 1	2	2	1110.016	56254
3	SHORT(A)	MRSLONG		FASTR1	200	1	1	Dither 1	2	2	1110.016	56254
3	SHORT(A)	MRSSHORT		FASTR1	200	1	1	Dither 1	2	2	1110.016	56254

Special Requirements	Group Observations 8, 9, 34 within 2 Days

Observation

Proposal 1762, Observation 33: xFLSSSTJ172118z=0.555 Wed Dec 21 19:04:19 GMT 2022

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Comments: Copy of observation 3

Diagnostics

(Visit 33:1) Warning (Form): Data Excess over lower threshold

(Visit 33:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(3)	XFLS-SSTJ172118Z0.555	RA: 17 21 18.3120 (260.3263000d) Dec: +58 46 1.56 (58.76710d) Equinox: J2000		

Comments: FLS3 --- (also called FLS14135040) z=0.555 F(AGN) = 70% 1.68mJy
5.7um flux = 206uJy group 5
Category=Galaxy
Description=[Ultraluminous infrared galaxies]

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	EXTENDED 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	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
1	SHORT(A)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
2	MEDIUM(B)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3		IMAGER	F560W	FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSLONG		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254
3	LONG(C)	MRSSHORT		FASTR1	200	1	1	Dither 1	4	4	2220.032	56254