



2654 - Kpc-scale dual supermassive black holes and their impact on galaxy formation at cosmic noon

Cycle: 1, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
SDSSJ0841-z2.9				
	1	J0841-NIRSPEC	NIRSpec IFU Spectroscopy	(1) SDSSJ0841-NIRSPEC
	2	J0841-MIRI	MIRI Medium Resolution Spectroscopy	(2) SDSSJ0841-MIRI
	3	J0841-MIRI-BG	MIRI Medium Resolution Spectroscopy	(3) SDSSJ0841-BG
SDSSJ0749-z2.17				
	4	J0749-NIRSPEC	NIRSpec IFU Spectroscopy	(4) SDSSJ0749-NIRSPEC
	7	J0749-NIRSPEC-REPEAT	NIRSpec IFU Spectroscopy	(7) SDSSJ0749-NIRSPEC-REPEAT
	5	J0749-MIRI	MIRI Medium Resolution Spectroscopy	(5) SDSSJ0749-MIRI
	6	J0749-MIRI-BG	MIRI Medium Resolution Spectroscopy	(6) SDSSJ0749-BG

ABSTRACT

The search for dual supermassive black holes is of immense interest in modern astrophysics. Following a merger of two galaxies, the two central supermassive black holes evolve into a bound binary and further inspiral until they eventually coalesce into a single merger product. If black holes are actively accreting during the inspiral, such objects can be observed as a dual or binary quasar. Gaia observations have enabled a novel technique to search for such dual quasars at previously unreachable sub-kpc scales, based on the small motions of the light centroid as the two sources vary stochastically. We propose to study two kpc-scale dual quasars identified with this method and confirmed with follow-up observations at $z=2-3$, the peak epoch of galaxy formation. Dual quasars at this epoch are not well characterized, especially due limited wavelength coverage of key spectral features and stringent spatial resolution requirements. The unprecedented NIR sensitivity, spatial resolution, and spectral coverage of JWST will enable us to study the gas dynamics in dual quasars for the first time at these redshifts. We propose to use the IFU capabilities of NIRSpec and MIRI to study the impact of these dual quasars on their hosts and to probe the quasar fueling mechanisms, host galaxy merger signatures, host stellar continuum, and merger induced star formation.

OBSERVING DESCRIPTION

SDSSJ0841-- acquisition: NIRSpec (VERIFY ONLY) and MIRI (point-and-shoot)

- NIRSpec IFU:

-- with G140M/F100LP:

9-point "small cycling" dither pattern

25 groups and 1 integration per dither position

Readout mode: NRSIRS2RAPID

1 leakage exposure at one dither position

-- G235M/F170LP:

9-point "small cycling" dither pattern

25 groups and 1 integration per dither position

Readout mode: NRSIRS2RAPID

1 leakage exposure at one dither position

- MIRI IFU with the SHORT wavelength setting:

4-point dither pattern

30 groups and 3 integrations per dither position

JWST Proposal 2654 (Created: Friday, November 4, 2022 at 4:01:26 PM Eastern Standard Time) - Overview

Readout mode: SLOW

1 background image slightly offset from target position for every spectral setting: 30 groups and 3 integrations

--> total exposure: 4.418 hours science +0.6 hours background (8.32 hours charged)

SDSSJ0749 -- acquisition: NIRSpec (VERIFY ONLY) and MIRI (point-and-shoot)

- NIRSpec IFU:

-- with G140M/F100LP:

9-point "small cycling" dither pattern

25 groups and 1 integration per dither position

Readout mode: NRSIRS2RAPID

1 leakage exposure at one dither position

-- G235M/F170LP:

9-point "small cycling" dither pattern

25 groups and 1 integration per dither position

Readout mode: NRSIRS2RAPID

1 leakage exposure at one dither position

- MIRI IFU with the LONG wavelength setting:

4-point dither pattern

30 groups and 3 integrations per dither position

Readout mode: SLOW

1 background image slightly offset from target position for every spectral setting: 30 groups and 3 integrations

--> total exposure: 4.418 hours science +0.6 hours background (8.29 hours charged)

Total request: 10.03 hours science (16.61 hours charged)

Proposal 2654 - Targets - Kpc-scale dual supermassive black holes and their impact on galaxy formation at cosmic noon

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	SDSSJ0841-NIRSPEC	RA: 08 41 29.7587 (130.3739946d) Dec: +48 25 48.55 (48.43015d) Equinox: J2000		
<i>Comments:</i> Category=Galaxy Description=[Active galactic nuclei, Emission line galaxies, Quasar-galaxy pairs] Extended=NO				
(2)	SDSSJ0841-MIRI	RA: 08 41 29.7587 (130.3739946d) Dec: +48 25 48.55 (48.43015d) Equinox: J2000		
<i>Comments:</i> Category=Galaxy Description=[Active galactic nuclei, Emission line galaxies, Quasar-galaxy pairs] Extended=NO				
(3)	SDSSJ0841-BG	RA: 08 41 29.9716 (130.3748817d) Dec: +48 25 29.19 (48.42477d) Equinox: J2000		
<i>Comments: background</i> Category=Unidentified Description=[Blank field]				
(4)	SDSSJ0749-NIRSPEC	RA: 07 49 22.9000 (117.3454167d) Dec: +22 55 11.81 (22.91995d) Equinox: J2000		
<i>Comments:</i> Category=Galaxy Description=[Active galactic nuclei, Emission line galaxies, Quasar-galaxy pairs] Extended=NO				
(5)	SDSSJ0749-MIRI	RA: 07 49 22.9726 (117.3457192d) Dec: +22 55 12.05 (22.92001d) Equinox: J2000		
<i>Comments:</i> Category=Galaxy Description=[Active galactic nuclei, Emission line galaxies, Quasar-galaxy pairs] Extended=NO				
(6)	SDSSJ0749-BG	RA: 07 49 23.5408 (117.3480867d) Dec: +22 54 52.20 (22.91450d) Equinox: J2000		
<i>Comments: background</i> Category=Unidentified Description=[Blank field]				
(7)	SDSSJ0749-NIRSPEC- REPEAT	RA: 07 49 22.9726 (117.3457192d) Dec: +22 55 12.05 (22.92001d) Equinox: J2000		
<i>Comments:</i> Category=Galaxy Description=[Active galactic nuclei, Emission line galaxies, Quasar-galaxy pairs] Extended=NO				

Fixed Targets

Proposal 2654 - Observation 1 - Kpc-scale dual supermassive black holes and their impact on galaxy formation at cosmic noon

Fri Nov 04 21:01:26 GMT 2022

Observation	<p>Proposal 2654, Observation 1: J0841-NIRSPEC</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSPEC IFU Spectroscopy</p>											
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)	SDSSJ0841-NIRSPEC	RA: 08 41 29.7587 (130.3739946d) Dec: +48 25 48.55 (48.43015d) Equinox: J2000									
	<p><i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Emission line galaxies, Quasar-galaxy pairs]</i> <i>Extended=NO</i></p>											
Template	TA Method											
	NONE											
Dithers	#	Dither Type		Size	Starting Point			Number of Points	Points			
	1	CYCLING		SMALL	1			9				
Spectral Elements	#	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/F100LP	NRSIRS2RAPI D	25	1	true	false	NONE	1	1	379.311	
	2	G140M/F100LP	NRSIRS2RAPI D	25	1	false	true	NONE	9	9	3413.8	
	3	G235M/F170LP	NRSIRS2RAPI D	25	1	true	false	NONE	1	1	379.311	
	4	G235M/F170LP	NRSIRS2RAPI D	25	1	false	true	NONE	9	9	3413.8	

Proposal 2654 - Observation 2 - Kpc-scale dual supermassive black holes and their impact on galaxy formation at cosmic noon

Fri Nov 04 21:01:26 GMT 2022

Observation	Proposal 2654, Observation 2: J0841-MIRI Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observations:[J0841-MIRI-BG (Obs 3)]												
	(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)	SDSSJ0841-MIRI	RA: 08 41 29.7587 (130.3739946d) Dec: +48 25 48.55 (48.43015d) Equinox: J2000										
Comments: Category=Galaxy Description=[Active galactic nuclei, Emission line galaxies, Quasar-galaxy pairs] Extended=NO													
Acquisition	#	Target											
	1	NONE											
Template	AcqFilter	Primary Channel			Simultaneous Imaging				Imager Subarray				
		ALL			YES				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		IMAGER	F1130W	SLOWR1	30	3	1	Dither 1	4	12	8791.491	
	1	SHORT(A)	MRSLONG		SLOWR1	30	3	1	Dither 1	4	12	8791.491	
	1	SHORT(A)	MRSSHORT		SLOWR1	30	3	1	Dither 1	4	12	8791.491	

Proposal 2654 - Observation 2 - Kpc-scale dual supermassive black holes and their impact on galaxy formation at cosmic noon

Special Requirements

Sequence Observations 2, 3, Non-interruptible

Proposal 2654 - Observation 3 - Kpc-scale dual supermassive black holes and their impact on galaxy formation at cosmic noon

Fri Nov 04 21:01:26 GMT 2022

Observation	Proposal 2654, Observation 3: J0841-MIRI-BG Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [J0841-MIRI (Obs 2)]												
	(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)	SDSSJ0841-BG	RA: 08 41 29.9716 (130.3748817d) Dec: +48 25 29.19 (48.42477d) Equinox: J2000 <i>Comments: background Category=Unidentified Description=[Blank field]</i>										
Acquisition	#	Target											
	1	NONE											
Template	AcqFilter	Primary Channel				Simultaneous Imaging			Imager Subarray				
		ALL				YES			FULL				
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	F1130W	SLOWR1	30	3	1	None	1	3	2197.873	
	1	SHORT(A)	MRSLONG		SLOWR1	30	3	1	None	1	3	2197.873	
	1	SHORT(A)	MRSSHORT		SLOWR1	30	3	1	None	1	3	2197.873	
Special Requirements	Sequence Observations 2, 3, Non-interruptible												

Proposal 2654 - Observation 4 - Kpc-scale dual supermassive black holes and their impact on galaxy formation at cosmic noon

Fri Nov 04 21:01:26 GMT 2022

Observation	<p>Proposal 2654, Observation 4: J0749-NIRSPEC</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSpec IFU Spectroscopy</p>											
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)	SDSSJ0749-NIRSPEC	RA: 07 49 22.9000 (117.3454167d) Dec: +22 55 11.81 (22.91995d) Equinox: J2000									
	<p><i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Emission line galaxies, Quasar-galaxy pairs]</i> <i>Extended=NO</i></p>											
Template	TA Method											
	NONE											
Dithers	#	Dither Type		Size	Starting Point			Number of Points	Points			
	1	CYCLING		SMALL	1			9				
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	G140M/F100LP	NRSIRS2RAPI D	25	1	true	false	NONE	1	1	379.311	
	2	G140M/F100LP	NRSIRS2RAPI D	25	1	false	true	NONE	9	9	3413.8	
	3	G235M/F170LP	NRSIRS2RAPI D	25	1	true	false	NONE	1	1	379.311	
	4	G235M/F170LP	NRSIRS2RAPI D	25	1	false	true	NONE	9	9	3413.8	

Proposal 2654 - Observation 7 - Kpc-scale dual supermassive black holes and their impact on galaxy formation at cosmic noon

Fri Nov 04 21:01:26 GMT 2022

Observation	Proposal 2654, Observation 7: J0749-NIRSPEC-REPEAT Diagnostic Status: Warning Observing Template: NIRSpec IFU 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			
	(7)	SDSSJ0749-NIRSPEC-REPEAT	RA: 07 49 22.9726 (117.3457192d) Dec: +22 55 12.05 (22.92001d) Equinox: J2000									
	Comments: Category=Galaxy Description=[Active galactic nuclei, Emission line galaxies, Quasar-galaxy pairs] Extended=NO											
Template	TA Method NONE											
Dithers	#	Dither Type		Size	Starting Point		Number of Points		Points			
	1	CYCLING		SMALL	1		9					
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	G140M/F100LP	NRSIRS2RAPI D	25	1	true	false	NONE	1	1	379.311	
	2	G140M/F100LP	NRSIRS2RAPI D	25	1	false	true	NONE	9	9	3413.8	
	3	G235M/F170LP	NRSIRS2RAPI D	25	1	true	false	NONE	1	1	379.311	
	4	G235M/F170LP	NRSIRS2RAPI D	25	1	false	true	NONE	9	9	3413.8	

Proposal 2654 - Observation 5 - Kpc-scale dual supermassive black holes and their impact on galaxy formation at cosmic noon

Fri Nov 04 21:01:26 GMT 2022

Observation	Proposal 2654, Observation 5: J0749-MIRI Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observations:[J0749-MIRI-BG (Obs 6)]												
	(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)	SDSSJ0749-MIRI	RA: 07 49 22.9726 (117.3457192d) Dec: +22 55 12.05 (22.92001d) Equinox: J2000										
<i>Comments:</i> Category=Galaxy Description=[Active galactic nuclei, Emission line galaxies, Quasar-galaxy pairs] Extended=NO													
Acquisition	#	Target											
	1	NONE											
Template	AcqFilter	Primary Channel			Simultaneous Imaging			Imager Subarray					
		ALL			YES			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		IMAGER	F1000W	SLOWR1	30	3	1	Dither 1	4	12	8791.491	
	1	LONG(C)	MRSLONG		SLOWR1	30	3	1	Dither 1	4	12	8791.491	
	1	LONG(C)	MRSSHORT		SLOWR1	30	3	1	Dither 1	4	12	8791.491	

Proposal 2654 - Observation 5 - Kpc-scale dual supermassive black holes and their impact on galaxy formation at cosmic noon

Special Requirements

Sequence Observations 5, 6, Non-interruptible

Proposal 2654 - Observation 6 - Kpc-scale dual supermassive black holes and their impact on galaxy formation at cosmic noon

Fri Nov 04 21:01:26 GMT 2022

Observation	Proposal 2654, Observation 6: J0749-MIRI-BG Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [J0749-MIRI (Obs 5)]												
	(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)	SDSSJ0749-BG	RA: 07 49 23.5408 (117.3480867d) Dec: +22 54 52.20 (22.91450d) Equinox: J2000										
<i>Comments: background Category=Unidentified Description=[Blank field]</i>													
Acquisition	#	Target											
	1	NONE											
Template	AcqFilter	Primary Channel			Simultaneous Imaging			Imager Subarray					
		ALL			YES			FULL					
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	SLOWR1	30	3	1	None	1	3	2197.873	
	1	LONG(C)	MRSLONG		SLOWR1	30	3	1	None	1	3	2197.873	
	1	LONG(C)	MRSSHORT		SLOWR1	30	3	1	None	1	3	2197.873	
Special Requirements	Sequence Observations 5, 6, Non-interruptible												