



## 9249 - JWST observations of the off-nuclear TDE AT 2024tvd

Cycle: 3, Proposal Category: DD

### INVESTIGATORS

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### OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
NIRSpec IFU spectroscopy				
	1	NIRSPEC IFU 2024tvd	NIRSpec IFU Spectroscopy	(1) 2024tvd
NIRCam Imaging				
	2	NIRCam 2024tvd	NIRCam Imaging	(1) 2024tvd

### ABSTRACT

Simulations of galaxy mergers predict a significant population of off-nuclear massive black holes (MBHs), which may be further supplemented by recoil kicks from gravitational wave mergers. Tidal disruption events (TDEs) around these wandering MBHs offer a rare opportunity to study these otherwise inactive black holes.

## JWST Proposal 9249 (Created: Friday, March 7, 2025, 5:00:10PM Eastern Standard Time) - Overview

Recently, AT 2024tvd became the first confirmed off-nuclear TDE. We propose JWST NIRCam and NIRSpec IFU observations of this event and its host galaxy to: 1) Conduct a kinematic study of the TDE and its host galaxy to determine whether the MBH was ejected from the nucleus either via gravitational wave recoil or three-body interaction. 2) Measure the TDE's infrared spectral energy distribution (SED) to constrain the accretion disk properties and test for a bound nuclear star cluster that may be feeding stars to the MBH. 3) Understand the properties of dust near the TDE site. Additionally, high-resolution imaging will help detect faint features linked to stellar dynamics along the MBH's trajectory. These observations will provide critical insights into the coevolution of MBHs and their host galaxies.

### **OBSERVING DESCRIPTION**

Observations include NIRSpec IFU spectroscopy and NIRCam imaging.

NIRSpec IFU spectroscopy will be performed using three disperser-filter combinations to cover the full NIRSpec wavelength range:

G140H + F100LP

G235H + F170LP

G395H + F290LP

NIRCam imaging will be conducted simultaneously in both the SW and LW channels using the following filters:

F090W

F150W

F277W

F444W

Proposal 9249 - Targets - JWST observations of the off-nuclear TDE AT 2024tvd

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	2024tvd	RA: 17 10 42.5562 (257.6773175d) Dec: +28 50 14.78 (28.83744d) Equinox: J2000	Epoch of Position: 2000	
<i>Comments:</i> Category= <i>Unidentified</i> Description= <i>[Infrared sources, Ultraviolet sources, Variable radiation sources, Visible sources, X-ray sources]</i> Extended= <i>YES</i>					

Proposal 9249 - Observation 1 - JWST observations of the off-nuclear TDE AT 2024tvd

Fri Mar 07 22:00:10 GMT 2025

<b>Observation</b>	<p><b>Proposal 9249, Observation 1: NIRSPEC IFU 2024tvd</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: NIRSpec IFU Spectroscopy</p>											
<b>Diagnostics</b>	(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(1)	2024tvd	RA: 17 10 42.5562 (257.6773175d) Dec: +28 50 14.78 (28.83744d) Equinox: J2000			Epoch of Position: 2000						
	<p><i>Comments:</i>  <i>Category=Unidentified</i>  <i>Description=[Infrared sources, Ultraviolet sources, Variable radiation sources, Visible sources, X-ray sources]</i>  <i>Extended=YES</i></p>											
<b>Template</b>	<b>TA Method</b>						<b>HFF Readout Mode</b>					
	NONE						false					
<b>Dithers</b>	<b>#</b>	<b>Dither Type</b>		<b>Size</b>	<b>Starting Point</b>		<b>Number of Points</b>		<b>Points</b>			
	1	4-POINT-DITHER										
<b>Spectral Elements</b>	<b>#</b>	<b>Grating/Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Ex p</b>	<b>Leakcal</b>	<b>Dither</b>	<b>Autocal</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	G140M/F100LP	NRSIRS2	8	1	false	true	NONE	4	4	2392.578	240277
	2	G235H/F170LP	NRSIRS2	12	1	false	true	NONE	4	4	3559.689	240277
	3	G395H/F290LP	NRSIRS2	15	1	false	true	NONE	4	4	4435.023	240277
<b>Special Requirements</b>	Before Date 30-APR-2025:00:00:00											

Proposal 9249 - Observation 2 - JWST observations of the off-nuclear TDE AT 2024tvd

Fri Mar 07 22:00:10 GMT 2025

<b>Observation</b>	<b>Proposal 9249, Observation 2: NIRCam 2024tvd</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRCam Imaging <i>Comments: PA constraints recommended by NIRCam reviewer to avoid claw artifacts</i>									
	(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.									
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>		<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>		
	(1)	2024tvd	RA: 17 10 42.5562 (257.6773175d) Dec: +28 50 14.78 (28.83744d) Equinox: J2000		Epoch of Position: 2000					
<i>Comments:</i> Category=Unidentified Description=[Infrared sources, Ultraviolet sources, Variable radiation sources, Visible sources, X-ray sources] Extended=YES										
<b>Template</b>	<b>Module</b>					<b>Subarray</b>				
	B					FULL				
<b>Dithers</b>	<b>#</b>	<b>Primary Dither Type</b>		<b>Primary Dithers</b>	<b>Subpixel Dither Type</b>		<b>Dither Size</b>	<b>Subpixel Positions</b>		
	1	INTRAMODULEBOX		4	SMALL-GRID-DITHER			3		
<b>Spectral Elements</b>	<b>#</b>	<b>Short Filter</b>	<b>Long Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Total Integrations</b>	<b>Total Dithers</b>	<b>Total Exposure Time</b>	<b>ETC Wkbk.Calc ID</b>
	1	F090W	F277W	BRIGHT2	4	1	12	12	1030.73	240345
	2	F150W	F444W	BRIGHT2	4	1	12	12	1030.73	240345
<b>Special Requirements</b>	Before Date 30-APR-2025:00:00:00 Aperture PA Range 2.05262691 to 61.05262691 Degrees (V3 2.0 to 61.0) Aperture PA Range 94.05262691 to 102.05262691 Degrees (V3 94.0 to 102.0) Aperture PA Range 112.05262691 to 171.05262691 Degrees (V3 112.0 to 171.0) Aperture PA Range 176.05262691 to 219.05262691 Degrees (V3 176.0 to 219.0) Aperture PA Range 228.05262691 to 231.05262691 Degrees (V3 228.0 to 231.0) Aperture PA Range 233.05262691 to 265.05262691 Degrees (V3 233.0 to 265.0) Aperture PA Range 278.05262691 to 296.05262691 Degrees (V3 278.0 to 296.0) Aperture PA Range 300.05262691 to 305.05262691 Degrees (V3 300.0 to 305.0) Aperture PA Range 312.05262691 to 351.05262691 Degrees (V3 312.0 to 351.0)									