



9331 - A Deep Search for a Counterpart to the Nearby FRB 20250316A

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>
Observation Folder				
	1		NIRCam Imaging	(1) FRB20250316A

ABSTRACT

Fast radio bursts (FRBs) remain one of the most mysterious phenomena in time-domain astrophysics. While improved localization capabilities have confirmed their extragalactic origin, their diverse host galaxy environments have not shed direct light on their progenitor systems. Indeed, numerous models have emerged, involving compact objects in various configurations, including with binary companions. Recently (2025 March 16), CHIME localized FRB 20250316A to a precision of $<0.1''$ in the galaxy NGC4141 ($d \sim 40$ Mpc), making it one of the best localized nearby FRBs and hence an ideal testbed for progenitor models. Here we propose a deep JWST/NIRCam search for the progenitor system. Currently, there are no detections of any source at the FRB position in the radio, X-rays, or optical ($r > 25$ mag); the optical limits however are susceptible to progenitor obscuration or a spectral energy distribution peaking in the IR. JWST provides the best combination of sensitivity and angular resolution, and will allow us to reach an extremely deep absolute magnitude limit of -3 mag. This will be the deepest observation available for any FRB progenitor, and could detect (or

rule out) for example, progenitors involving mass transfer from supergiant/giant companions. Given the significant impact such deep observations will have on urgent scientific questions, this program is suitable as a Discovery DDT request. In case of a detection, the DDT observation will also serve as a baseline for future regular cycle observations to search for evolution of a detected progenitor.

OBSERVING DESCRIPTION

We will use NIRCcam to obtain deep imaging of FRB 20250316A with the extra-wide F150W2 and F322W2 filters. We will use a 9-point sub-pixel dither pattern, 10 groups per exposure, FULL array of Module B, and the MEDIUM8 readout mode.

Proposal 9331 - Targets - A Deep Search for a Counterpart to the Nearby FRB 20250316A

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	FRB20250316A	RA: 12 09 44.3100 (182.4346250d) Dec: +58 50 56.70 (58.84908d) Equinox: J2000	Epoch of Position: 2000.0	
<i>Comments:</i> Category= <i>Unidentified</i> Description= <i>[Radio sources]</i>					

Proposal 9331 - Observation 1 - A Deep Search for a Counterpart to the Nearby FRB 20250316A

Thu May 01 19:00:07 GMT 2025

Observation	<p>Proposal 9331, Observation 1</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Imaging</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)	FRB20250316A	RA: 12 09 44.3100 (182.4346250d) Dec: +58 50 56.70 (58.84908d) Equinox: J2000		Epoch of Position: 2000.0					
	<p><i>Comments:</i> <i>Category=Unidentified</i> <i>Description=/Radio sources]</i></p>									
Template	Module				Subarray					
	B				FULL					
Dithers	#	Primary Dither Type		Primary Dithers		Subpixel Dither Type		Dither Size		Subpixel Positions
	1	NONE				STANDARD				9
Spectral Elements	#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
	1	F150W2	F322W2	MEDIUM8	10	1	9	9	9469.831	
Special Requirements	<p>Before Date 27-MAY-2025:00:00:00 Offset 38.8 arcsec, 38.3 arcsec</p>									