



18433 - Decoding the Remarkable Transient AT2026hir: Offset and Black Hole Mass with HST and XMM

Cycle: 34, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) AT2026HIR	ACS/SBC WFC3/UVIS	2	12-Aug-2026 09:01:11.0	yes

2 Total Orbits Used

ABSTRACT

EP260324a/AT2026hir is a luminous X-ray and optical nuclear transient at $z=0.087$ that defies classification within known transient populations. Its nuclear location and quiescent massive host galaxy are consistent with a luminous tidal disruption event (LTDE), yet its anomalously rapid light-curve evolution is more reminiscent of Luminous Fast Blue Optical Transients (LFBOTs). Panchromatic early-time follow-up leaves the nature of AT2026hir ambiguous: it may be a TDE powered by the supermassive black hole in the galaxy nucleus, or an LFBOT powered by a much lower-mass black hole at a slightly off-nuclear location. To resolve this ambiguity, we propose joint late-time HST (2 orbits) + XMM-Newton (30 ks) observations targeting two key measurements: the positional offset of the transient relative to the host nucleus, and the mass of the central black hole (M_{bh}). HST UV+optical imaging will improve the current ground-based astrometric uncertainty of 0.3 arcsec by an order of magnitude, enabling detection or exclusion of offsets down to 50 pc. Joint HST+XMM-Newton broadband SED modeling will precisely constrain M_{bh} via relativistic disk theory, leveraging both the X-ray spectral shape and the normalization of the UV/optical plateau.

OBSERVING DESCRIPTION

This proposal consists of two orbits of HST imaging observations of the optical transient AT2026hir. The HST observation is coordinated with a 30ks XMM-Newton observation.

First orbit: ACS/SBC Imaging, F150LP filter

Second orbit: WFC3/UVIS Imaging, F625W (optical) and F275W (NUV) filters.

For the scheduling, we focus on the first half of Cycle 34 to maximize the probability of getting a high-SNR X-ray spectrum before the disk cools significantly. Three suitable HST visibility windows are listed below (based on the Phase II Visit Planner result).

2026 Nov 7-22

2027 Feb 9-21

2027 March 29-30; April 2-9

Proposal 18433 - Visit 01 - Decoding the Remarkable Transient AT2026hir: Offset and Black Hole Mass with HST and XMM

Visit	Proposal 18433, Visit 01										Wed Aug 12 13:01:11 GMT 2026	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS, ACS/SBC											
	Special Requirements: (none)											
	Comments: - 1 orbit: ACS/SBC Imaging in F150LP - 1 orbit: WFC3/UVIS imaginq in F225W+F625W											
Patterns	#	Primary Pattern					Secondary Pattern				Exposures	
	(1)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=			Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false						(2), (3)	
	(2)	Pattern Type=ACS-SBC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.472 Line Spacing=			Coordinate Frame=POS-TARG Pattern Orientation=44.4 Angle Between Sides= Center Pattern=false						(1)	
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	AT2026HIR Alt Name1: ZTF26AAPVIIM Alt Name2: EP260324A Comments: Category=UNIDENTIFIED Description=[ULTRAVIOLET EMITTER] Extended=YES		RA: 08 44 12.3716 (131.0515483d) Dec: +82 01 10.91 (82.01970d) Equinox: J2000		Epoch of Position: 2000		V=17+/-0.5		Reference Frame: ICRS		
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(ACS.im.23 64186)	(1) AT2026HIR	ACS/SBC, ACCUM, SBC		F150LP			Pattern 2, Exps 1-1 i n Visit 01 (2)	1330 Secs (2660 Secs) [==>(Pattern 1)] [==>(Pattern 2)]		[1]
	2	(WFC3UVI S.im.236418 9)	(1) AT2026HIR	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB		F275W	FLASH=21.0		Pattern 1, Exps 2-2 i n Visit 01 (1)	207 Secs (621 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]		[2]
	3	(WFC3UVI S.im.236419 8)	(1) AT2026HIR	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB		F625W	FLASH=5		Pattern 1, Exps 3-3 i n Visit 01 (1)	566 Secs (1698 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]		[2]
	Comments: This F625W image will measure the nucleus of the host qalaxy.											



