



16911 - The Host Galaxy and Environment of the Unusual Transient AT2022cmc

Cycle: 29, Proposal Category: GO/DD

(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) AT2022CMC	WFC3/IR WFC3/UVIS	1	28-Feb-2022 17:30:17.0	yes
02	(1) AT2022CMC	WFC3/IR WFC3/UVIS	2	28-Feb-2022 17:30:17.0	yes

3 Total Orbits Used

ABSTRACT

AT2022cmc is a luminous, fast transient recently discovered by the Zwicky Transient Facility (ZTF). The combination of luminous (absolute magnitude -25), rapidly fading optical emission, extremely luminous ($> 1e47$ erg/s) X-ray emission, and self-absorbed radio emission, do not neatly fit into the traditional transient classification scheme. We consider the most likely explanations for AT2022cmc is either a relativistic tidal disruption event (i.e., a star disrupted by a central supermassive black hole that forms a new relativistic jet pointed along the observer line of sight), or an exceptional member of the new class of fast blue optical transients (FBOTs). Here we request HST observations to allow us to precisely pinpoint the transient location with respect to the host galaxy nucleus. A nuclear origin would strongly favor a relativistic tidal disruption event origin, only the fourth firmly established member of this class (and the first in over a decade). Alternatively, an off-nuclear origin would rule out a tidal disruption event, and instead favor either an exceptionally luminous FBOT or an entirely new class of transient phenomena.

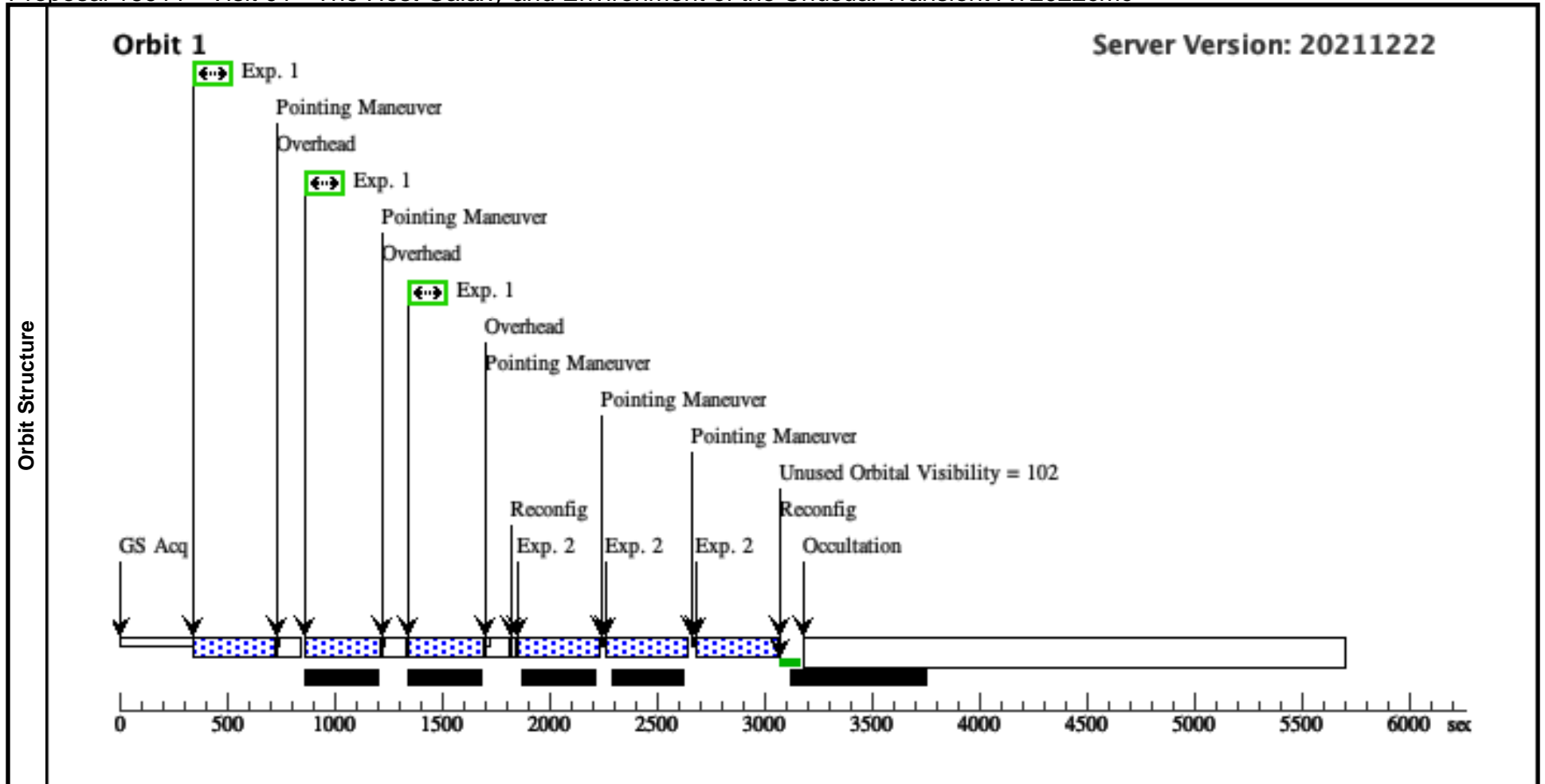
OBSERVING DESCRIPTION

AT2022cmc is a luminous, fast transient recently discovered by the Zwicky Transient Facility (ZTF). The combination of luminous (absolute magnitude -25), rapidly fading optical emission, extremely luminous ($> 1e47$ erg/s) X-ray emission, and self-absorbed radio emission, do not neatly fit into the traditional transient classification scheme. We consider the most likely explanations for AT2022cmc is either a relativistic tidal disruption event (i.e., a star disrupted by a central supermassive black hole that forms a new relativistic jet pointed along the observer line of sight), or an exceptional member of the new class of fast blue optical transients (FBOTs). Here we request HST observations to allow us to precisely pinpoint the transient location with respect to the host galaxy nucleus. A nuclear origin would strongly favor a relativistic tidal disruption event origin, only the fourth firmly established member of this class (and the first in over a decade). Alternatively, an off-nuclear origin would rule out a tidal disruption event, and instead favor either an exceptionally luminous FBOT or an entirely new class of transient phenomena.

Proposal 16911 - Visit 01 - The Host Galaxy and Environment of the Unusual Transient AT2022cmc

Mon Feb 28 22:30:17 GMT 2022

Visit		Proposal 16911, Visit 01, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: BETWEEN 27-FEB-2022:00:00:00 AND 12-MAR-2022:00:00:00								
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		(1)						
(2)	Pattern Type=WFC3-IR-DITHER- LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=1.210 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(2)							
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	AT2022CMC	RA: 13 34 43.2030 (203.6800125d) Dec: +33 13 0.67 (33.21685d) Equinox: J2000		V=22.0+/-0.2	Reference Frame: ICRS				
<i>Comments:</i> Category=EXT-STAR Description=[ACCRETION DISK, NUCLEUS, X-RAY TRANSIENT]										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(WFC3UVI S.im.1719291)	(1) AT2022CMC	WFC3/UVIS, ACCUM, UVIS	F606W	FLASH=5.0			Pattern 1, Exps 1-1 in Visit 01 (1)	348 Secs (1044 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]
2	(WFC3IR.im.1719295)	(1) AT2022CMC	WFC3/IR, MULTIACCUM, IR	F160W		NSAMP=15; SAMP-SEQ=SPAR S25		Pattern 2, Exps 2-2 in Visit 01 (2)	352.939501 Secs (1058.819 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]	[1]



Proposal 16911 - Visit 02 - The Host Galaxy and Environment of the Unusual Transient AT2022cmc

Mon Feb 28 22:30:17 GMT 2022

Visit	Proposal 16911, Visit 02, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: AFTER 01 BY 120 D TO 240 D									
	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				(1)			
(2)		Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=1.210 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false				(2)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	AT2022CMC	RA: 13 34 43.2030 (203.6800125d) Dec: +33 13 0.67 (33.21685d) Equinox: J2000		V=22.0+/-0.2	Reference Frame: ICRS				
<i>Comments:</i> Category=EXT-STAR Description=[ACCRETION DISK, NUCLEUS, X-RAY TRANSIENT]										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(WFC3UVIS.im.1719293)	(1) AT2022CMC	WFC3/UVIS, ACCUM, UVIS	F606W		GS ACQ SCENARIO BASE1BE	Pattern 1, Exps 1-1 in Visit 02 (1)	800 Secs (2400 Secs)	
									[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]	[1]
2	(WFC3IR.im.1719299)	(1) AT2022CMC	WFC3/IR, MULTIACCUM, IR	F160W		SAMP-SEQ=SPARS100; NSAMP=9		Pattern 2, Exps 2-2 in Visit 02 (2)	802.934875 Secs (2408.805 Secs)	
									[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]	[2]

