14043 - HST Follow-up of a Fast Unexplained X-ray Transient in the CDF-S

Cycle: 22, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) CDFS-XT1	WFC3/IR	1	20-Jan-2015 16:11:55.0	yes

1 Total Orbits Used

ABSTRACT

A fast X-ray transient was discovered by Chandra in the Chandra Deep Field-South field on 2014 October 01. The transient lasted only a few ks in duration, reaching a 0.5-8 keV luminosity of ~1e45 erg/s (assuming z=0.3 from nearest galaxy), with no detection in ~4.5 Ms of previous data nor in a subseqent ~1.2 Ms of exposure. No optical transient down to R_AB~26.5 (2 sigma limit) has been found yet in three epochs (~0.05, 17, and 28 days after discovery). At this point, the observations appear inconsistent with all known Galactic phenomena, tidal disruption events, low-z gamma-ray bursts (GRB), and most types of supernovae (SNe). The transient could still be: 1) a SN from a SN1987A-like blue supergiant (BSG) progenitor, which are known to produce very late rising SNe; 2) a SN with little or no 56Ni due to fallback; 3) a highly extinguished or high-z GRB; or 4) a new type of transient. We request 1 orbit with HST to firmly confirm/rule out all known SNe light curves. If no counterpart is found, a high-z GRB or a new class of X-ray transient are all that remain. Importantly, the detection in the small CDF-S field may imply up to a factor of 100 higher rate than Swift/BAT.

OBSERVING DESCRIPTION

TBD

Visit

Proposal 14043, CDFS-XT1 (01) Tue Jan 20 21:11:56 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: BETWEEN 31-DEC-2014:00:00:00 AND 31-JAN-2015:00:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	CDFS-XT1	RA: 03 32 38.7980 (53.1616583d) Dec: -27 51 34.08 (-27.85947d) Equinox: J2000	Epoch of Position: 2000	V=28.4+/-2.0	Reference Frame: ICRS

Comments: CDFS-XT1 is an X-ray transient with no optical counterpart detected as yet. Two potential host galaxies lie within the error Chandra error circle, with R=27.3 and 27.5 respectively. As stated in the proposal, we wish to obtain a F110W image to enable image subtraction against previous F110W images of the field to probe as for a transient signature down to the level indicated.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	CDFS-XT1	(1) CDFS-XT1	WFC3/IR, MULTIACCUM, IR-FIX	F110W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 1, Exps 1-1 in CDFS-XT1 (01) (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure