



13869 - Pinpointing the location and host of the candidate tidal disruption Swift J1112.3-8238

Cycle: 22, Proposal Category: GO
(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) SWIFT-J1112.2-8238	WFC3/IR WFC3/UVIS	1	21-Jul-2014 21:12:46.0	yes

1 Total Orbits Used

ABSTRACT

Multiwavelength observations over the past few years have revealed a new class of high energy transient. These systems persist as bright gamma-ray sources for days, with luminosities in excess of the Eddington limit for a 10^{10} solar mass black hole. They are accompanied by bright, long-lived (months to years) X-ray emission, and rather fainter, but still clearly detectable optical and IR counterparts. They are suggested to arise from the tidal

disruption of stars in the nuclei of their host galaxies, which create a powerful relativistic outflow. In the first case (Swift J1644+57) astrometry ties the transient to nucleus of its host galaxy, while in a second (Swift J2058.4+0516) the host is exceptionally faint making ($H \sim 26.5$) such tests challenging. However, other models have been postulated, such as the collapse of a giant star, where the outer envelope forms a disc that powers the observed transients, akin to a scaled-up gamma-ray burst. A key distinguishing feature between the two progenitors is their expected locations. Tidal disruptions are nuclear, while GRB-like events are consistent with the nuclei of their hosts only 1/6 of the time. Here we propose observations of an event recently uncovered in an archival search. These will resolve its host galaxy and provide a precise location on the host. An IR visit will also provide a colors, and an estimate of the stellar and (through the bulge mass -- black hole mass relation) black hole mass. These data will provide the key astrometric and photometric evidence to disentangle competing models for these events, and will greatly aid the development of a definitive understanding of this new class of transient.

OBSERVING DESCRIPTION

Our proposal is to obtain observations of the candidate relativistic tidal disruption event Swift J1112-8238. To do this we will obtain a single orbit of observations using WFC3 (IR and UVIS).

For both observations we specify a somewhat restricted range of roll angles in order to avoid diffraction spikes from the relatively proximate ($6''$), bright ($R \sim 16.5$, $H \sim 13$) star. The Galactic latitude of the source is moderate so there are additional bright sources in the field. However, inspection of archival imaging suggests that diffraction spikes from these should not reach the source position.

For the IR observations we will obtain a standard 4 point dither pattern, and the STEP non-destructive read sequences for maximum dynamic range (to allow for astrometry with the bright stars in non-saturated images).

For the UVIS observations we will also obtain the standard 4-point dither pattern, and will utilize UVIS2. We have include a POSTARG offset that places the source towards the corner of the chip in order to minimize the impact of CTE.

Proposal 13869 - Visit 01 - Pinpointing the location and host of the candidate tidal disruption Swift J1112.3-8238

Tue Jul 22 01:12:48 GMT 2014

Visit	Proposal 13869, Visit 01 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: ORIENT 15D TO 65 D; ORIENT 105D TO 155 D; ORIENT 195D TO 245 D; ORIENT 285D TO 335 D									
	#	Primary Pattern	Secondary Pattern	Exposures						
Patterns	(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)						
	(2)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false	(2)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SWIFT-J1112.2-8238	RA: 11 11 47.7230 (167.9488458d) Dec: -82 38 45.01 (-82.64584d) Equinox: J2000		V=(?) i' = 23.2+/-0.1, r' = 23.8+/-0.1, z' = 23.0 +/- 0.1	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) SWIFT-J1112.2-8238	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=STEP50; NSAMP=10			Pattern 1, Exps 1-1 in Visit 01 (1)	249.23203 Secs (996.928 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]
2		(1) SWIFT-J1112.2-8238	WFC3/UVIS, ACCUM, UVIS2	F606W			POS TARG -60,-30	Pattern 2, Exps 2-2 in Visit 01 (2)	360 Secs (1568 Secs) [==>392.0 Secs (Pattern 1)] [==>392.0 Secs (Pattern 2)] [==>392.0 Secs (Pattern 3)] [==>392.0 Secs (Pattern 4)]	[1]

