13479 - The host and location of the candidate relativistic tidal disruption event Swift 2058+0516

Cycle: 21, Proposal Category: GO

(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) SWIFT2058+0516	ACS/WFC	2	12-Jul-2013 13:44:01.0	yes
02	(1) SWIFT2058+0516	WFC3/IR	1	12-Jul-2013 13:44:08.0	yes

3 Total Orbits Used

ABSTRACT

Recent panchromatic observations 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, lending support to this picture. 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 must be uniquely nuclear, while GRB-like events are consistent with the nuclei of their hosts only 1/6 of the time. Here we propose to obtain deep observations of the second of these events -- Swift J2058+0516. These deep observations will detect and resolve its host galaxy, providing (via our earlier DDT observations) a precise location on the host. An IR visit will also provide a color for the host, and an estimate of its stellar and (through the bulge mass -- black hole mass relation) black hole mass. These data will provide the key astrometric and photometric evidence to disentagle competing models for these events, and will greatly aid the development of a definitive understanding of this new class of transient.

OBSERVING DESCRIPTION

We propose deep observations of the location of the candidate tidal disruption event Swift J2058+0516. We will conduct two orbits of observations with ACS/WFC in F606W. These observations will utilize a 4-point dither, with indivdual ~1200s exposures. As we are interested in a compact point source we will place the source at the WFC1-CTE aperture.

We will also obtain a single orbit of F160W observations with WFC3/IR channel. The source will be placed at the default aim point with a 4-point dither.

In case there is any ongoing transient emission we ask for the observations to be placed relatively close to one another in time ~+/- 2 weeks.

Visit

Proposal 13479, Visit 01 Fri Jul 12 17:44:15 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: (none)

Patterns

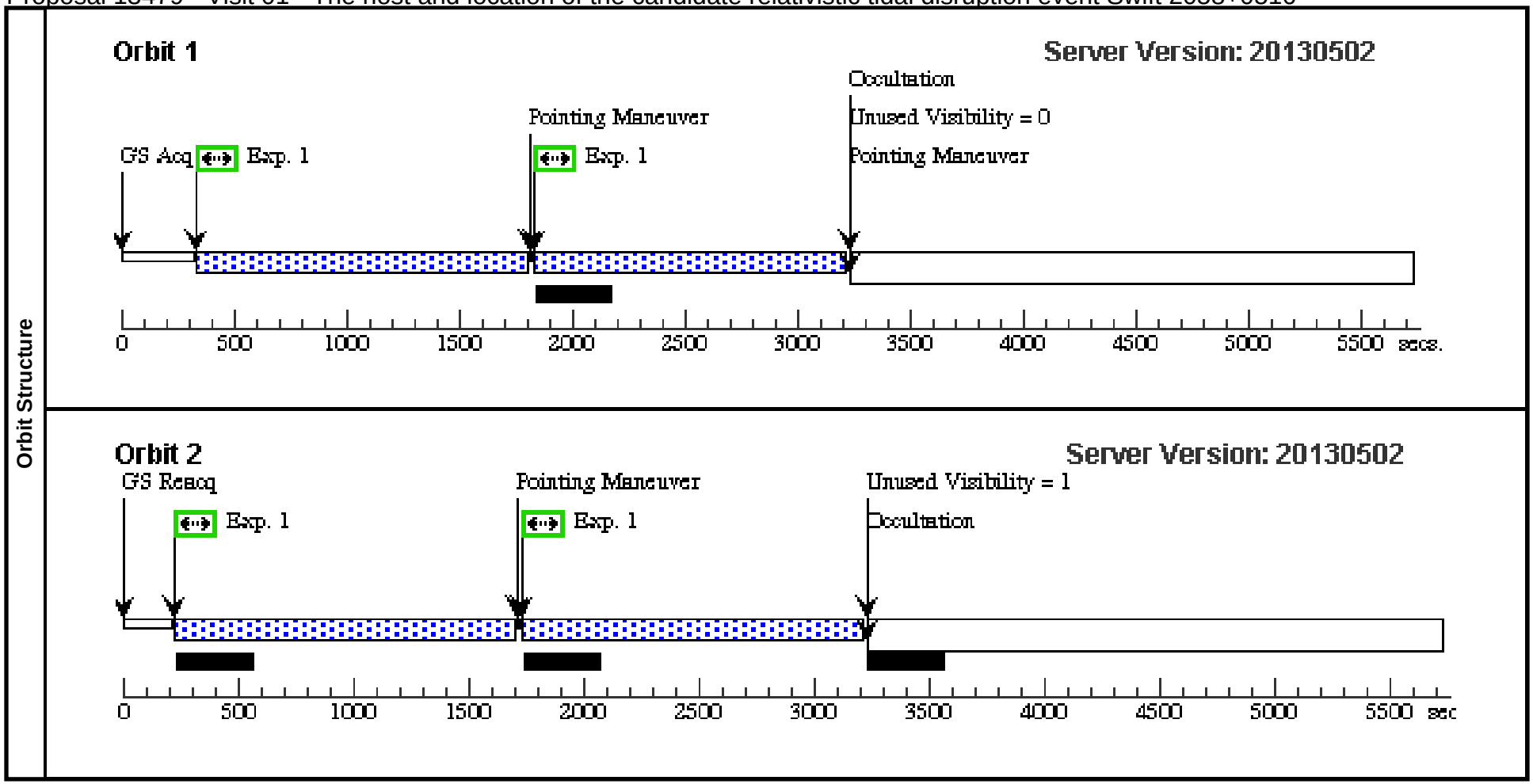
#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SWIFT2058+0516	RA: 20 58 19.8500 (314.5827083d) Dec: +05 13 33.00 (5.22583d) Equinox: J2000		V=25+/-1	Reference Frame: Chandra

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SWIFT2058+0516	ACS/WFC, ACCUM, WFC1-CTE	F606W			Pattern 1, Exps 1-1 in Visit 01 (1)	900 Secs (5236 Secs)	
								[==>1261.0 Secs (Pattern 1)] *[==>1261.0 Secs (Pattern 2)]*	***[1]***
								[==>1357.0 Secs (Pattern 3)] *[==>1357.0 Secs (Pattern 4)]*	***[2]***


Orbit Structure
Orbit 1
Server Version: 20130502
Occultation
Pointing Maneuver
Unused Visibility = 0
GS Acq
Exp. 1
Exp. 1
Pointing Maneuver
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.
Orbit 2
Server Version: 20130502
GS Reacq
Pointing Maneuver
Unused Visibility = 1
Exp. 1
Exp. 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13479, Visit 02

Fri Jul 12 17:44:17 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	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)	SWIFT2058+0516	RA: 20 58 19.8500 (314.5827083d) Dec: +05 13 33.00 (5.22583d) Equinox: J2000		V=25+/-1	Reference Frame: Chandra

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SWIFT2058+0516	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=14; SAMP-SEQ=SPARS50		Pattern 2, Exps 1-1 in Visit 02 (2)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure