



12437 - An Unusual Outburst from the Nucleus of the Quiescent Galaxy NGC 1589

Cycle: 18, 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) NGC1589-OT	STIS/CCD STIS/FUV-MAMA	3	18-Jan-2011 21:26:16.0	yes

3 Total Orbits Used

ABSTRACT

As part of the Lick Observatory Supernova Search (LOSS), we have recently identified a highly unusual optical outburst from the nucleus (within 0.05", or 10 pc in projection) of the nearby ($d \sim 50$ Mpc) spiral (S0/a) galaxy NGC 1589. Over a decade of photometric monitoring with LOSS, together with archival spectroscopy from the CfA Redshift Survey, suggest that the galaxy does not harbor an active nucleus. Likewise, the transient,

bright observed X-ray emission and broad H-alpha emission-line profile do not appear to closely resemble those of any known Type II supernova. We therefore consider this transient source (dubbed NGC1589-OT) to be the most viable candidate for a tidal disruption flare (TDF) ever discovered in real time. Here we request UV (STIS) spectroscopy with HST to search for "smoking gun" evidence in favor of the TDF interpretation: photoionized stellar debris ejected by the disruption process. DD time is necessary because the outburst will almost certainly not be visible by the time Cycle 19 observations commence. We did not propose for analogous observations during the normal course of a previous GO cycle due to the extraordinarily small number of good, real-time TDF candidates detected in the past.

OBSERVING DESCRIPTION

We wish to obtain 3 orbits-worth of STIS FUV spectroscopy (G140L grating) of the tidal disruption flare candidate NGC1589-OT.

The target acquisition is probably the trickiest part of the observation. We don't have offsets good to $< 0.1''$ from any nearby point sources, so we have to acquire the target directly. Both our optical and (in particular) laser guide star adaptive optics (K-band) imaging suggest the region surrounding the galaxy nucleus (at least within the central $5''$ relevant for STIS acquisitions) is dominated by the transient point source. We have inputted our observed LGS K-band image into the STIS Target Acquisition Simulator, and find the point source centroiding algorithm works well, so this is what we have chosen.

We used a recent observed spectrum of the transient to calculate the appropriate acquisition exposure time. The exposure time calculator suggests we will reach a SNR of 40 with a 0.1 s exposure. We've increased this to 0.5 s for additional signal. The ETC suggests the source would saturate with an exposure time of ~ 15 s, so our flux estimate would need to be off by a factor of 30 for this to be a problem.

We note that because we are using the $0.2''$ slit, we do not need to conduct a peak-up acquisition.

Our remaining STIS FUV exposures are configured to maximize exposure time in the remaining orbits.

CALIBRATION JUSTIFICATION

Standard wavelength calibration (performed each orbit) will suffice for our observations.

Proposal 12437 - Visit 01 - An Unusual Outburst from the Nucleus of the Quiescent Galaxy NGC 1589

Visit	Proposal 12437, Visit 01, scheduling								Wed Jan 19 02:26:21 GMT 2011	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/CCD, STIS/FUV-MAMA									
	Special Requirements: BETWEEN 22-JAN-2011:00:00:00 AND 22-FEB-2011:00:00:00									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord.	Corrections	Fluxes	Miscellaneous			
	(1)	NGC1589-OT	RA: 04 30 45.4500 (67.6893750d) Dec: +00 51 49.16 (.86366d) Equinox: J2000	Redshift: 0.012652		V=11.89+/-0.06	Reference Frame: ICRS			
	Comments: V-band magnitude above is integrated over the entire galaxy (several arcminutes in extent). The magnitude of the transient (plus nucleus) is several times fainter.									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	STIS Acquis ition	(1) NGC1589-OT	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=POINT			0.5 Secs	
									[==>]	[1]
	2	FUV Spectr um - Orbit 1	(1) NGC1589-OT	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A				2430.0 Secs	
									[==>]	[1]
	3	FUV Spectr um - Orbit 2	(1) NGC1589-OT	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A				2984.0 Secs	
								[==>]	[2]	
	4	FUV Spectr um - Orbit 3	(1) NGC1589-OT	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A				2984.0 Secs	
									[==>]	[3]



