18132 - The first UV spectra of optically overluminous and featureless tidal disruption events

Cycle: 33, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*
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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	(6) AT2026HIR	STIS/CCD STIS/FUV-MAMA	2	06-Apr-2026 09:00:14.0	yes
02	(6) AT2026HIR	STIS/CCD STIS/NUV-MAMA	2	06-Apr-2026 09:00:14.0	yes
03	(2) TDE-FEATURELESS-2	STIS/CCD STIS/FUV-MAMA	2	06-Apr-2026 09:00:15.0	yes
04	(2) TDE-FEATURELESS-2	STIS/CCD STIS/NUV-MAMA	2	06-Apr-2026 09:00:15.0	yes

8 Total Orbits Used

ABSTRACT

We propose 8 orbits of HST STIS ultraviolet spectroscopic ToO observations to study a rare subclass of tidal disruption events (TDEs) characterized by featureless optical spectra. Only ~10 such events have been identified to date, and none have UV spectra. Compared to typical TDEs, these events exhibit higher UV and optical luminosities and are hosted by more massive black holes M_BH ~ 10^8 Msun), where general relativistic effects are more pronounced. They may arise from the disruption of massive stars and/or involve rapidly spinning black holes. Owing to their high luminosities, these events are expected to dominate the high-redshift TDE population to be uncovered by LSST, JWST, and Roman. This program will deliver the first UV spectroscopic observations of this elusive subclass, providing critical insights into their origin and enabling the first exploration of their rest-frame UV properties. These data will illuminate the physics of black hole accretion in extreme relativistic regimes and guide the identification of high-z TDE candidates in forthcoming surveys.

OBSERVING DESCRIPTION

This proposal consists of non-disruptive ToO observations (up to 25 days response time) of 2 optically featureless tidal disruption events (TDEs), each for 4 orbits of STIS spectroscopic observations.

Each trigger will be for a TDE that has (1) a nuclear location, (2) consistent blue colors, (3) an optical spectrum that is featureless, and (4) an apparent magnitude of g<19.5 at the time of triggering.

Each TDE trigger will have two visits:
- first visit: 2 orbits with STIS/FUV-MAMA using G140L, with the 52x0.2 aperture.
- second visit: 2 orbits with STIS/NUV-MAMA using G230L, with the 52x0.2 aperture.

Each visit requires an ACQ in the first orbit. As these are triggered observations, we do not yet know the exact brightness of the TDE or the host. We expect that the TDE will be a UV-bright point source on top of a (much redder) galaxy nucleus. The ACQ process uses the STIS/CCD with the F28X50LP filter, but the host galaxy may dominate in the optical. I have entered placeholder parameters for a diffuse acquisition. The exposure times and checkbox size may be adjusted depending on the actual properties of the target, so we have not provided ETC output until the actual fluxes are known.

A ToO Activation on TDE-FEATURELESS1 should activate Visits 01 and 02

A ToO Activation on TDE-FEATURELESS2 should activate Visits 03 and 04

Visit

Proposal 18132, Visit 01, implementation Mon Apr 06 13:00:15 GMT 2026

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA

Special Requirements: TOO RESPONSE TIME 25.0D

Fixed Targets

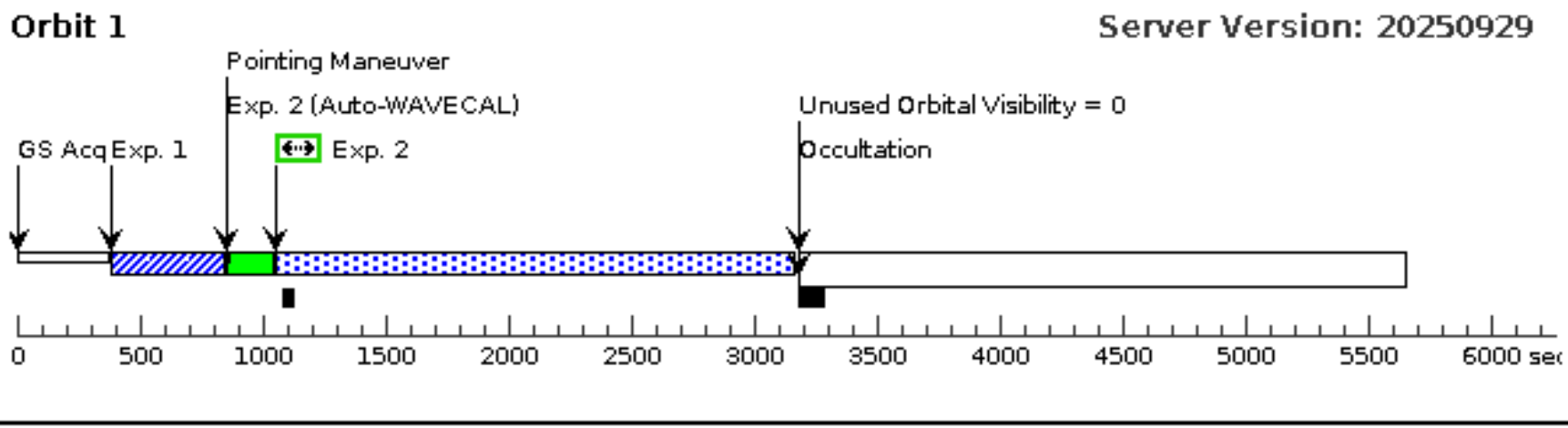
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	AT2026HIR	RA: 08 44 12.3377 (131.0514071d) Dec: +82 01 10.93 (82.01970d) Equinox: J2000	Proper Motion RA: 0 mas/yr Proper Motion Dec: 0 mas/yr Parallax: 0" Epoch of Position: 2000	V=17.5+/-0.5	Reference Frame: ICRS

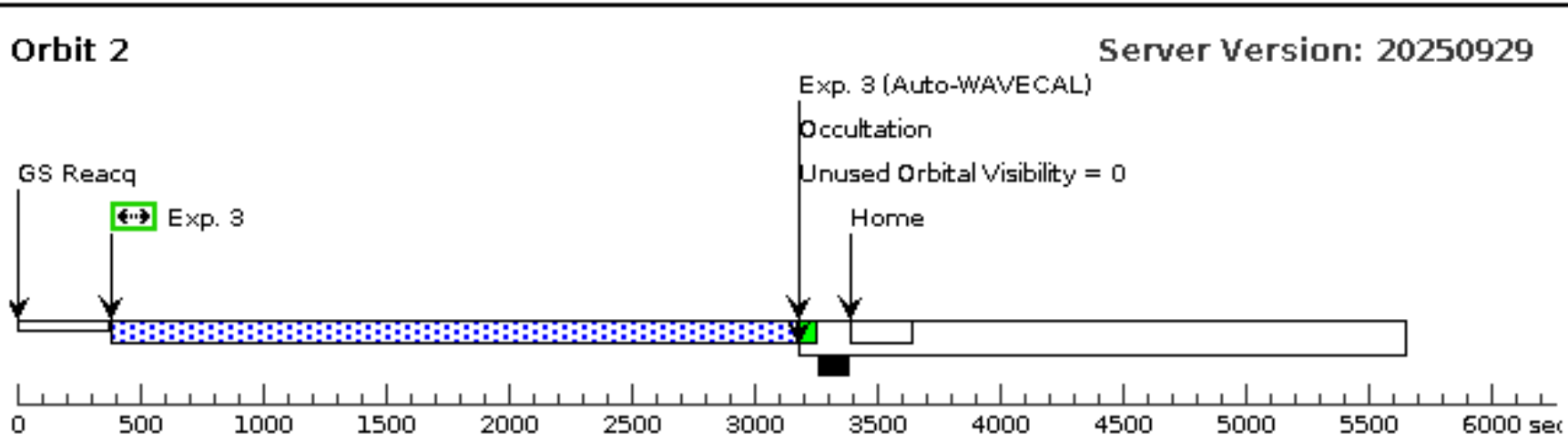
Comments:
Category=UNIDENTIFIED
Description=[ULTRAVIOLET EMITTER, X-RAY EMITTER]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(STIS.ta.2301018)	(6) AT2026HIR	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=FLUX-CENTROID; CHECKBOX=13			50 Secs (50 Secs) *[==>]*	 ***[1]***
2	(STIS.sp.2301026)	(6) AT2026HIR	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A				2094 Secs (2094 Secs) *[==>]*	 ***[1]***
3	(STIS.sp.2301027)	(6) AT2026HIR	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A				2773 Secs (2773 Secs) *[==>]*	 ***[2]***

Orbit Structure





Visit

Proposal 18132, Visit 02, implementation Mon Apr 06 13:00:16 GMT 2026

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/NUV-MAMA, STIS/CCD

Special Requirements: TOO RESPONSE TIME 25.0D

Fixed Targets

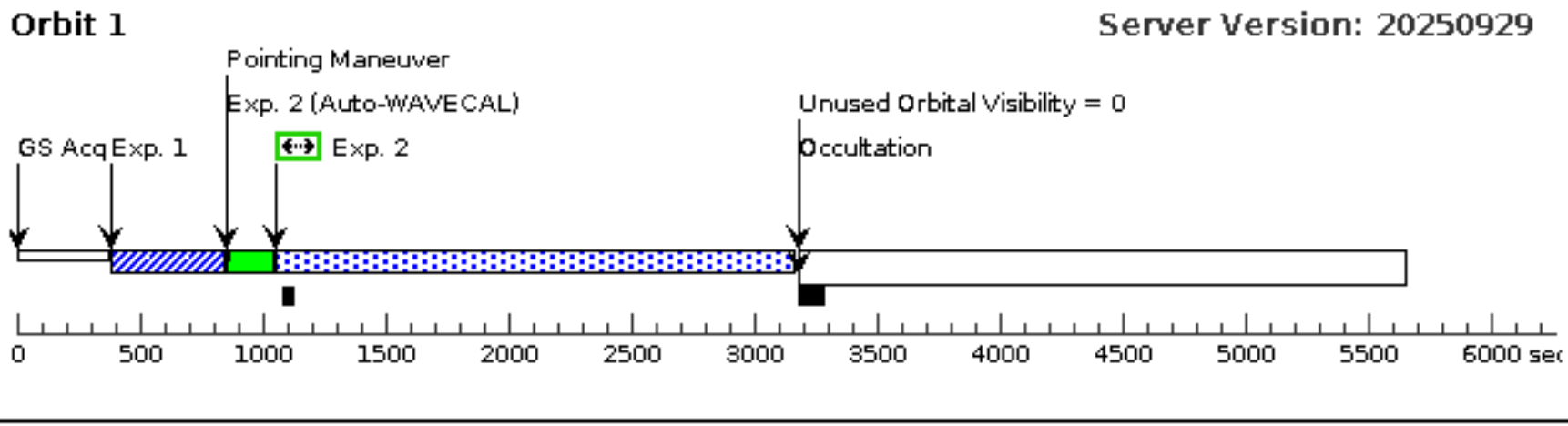
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	AT2026HIR	RA: 08 44 12.3377 (131.0514071d) Dec: +82 01 10.93 (82.01970d) Equinox: J2000	Proper Motion RA: 0 mas/yr Proper Motion Dec: 0 mas/yr Parallax: 0" Epoch of Position: 2000	V=17.5+/-0.5	Reference Frame: ICRS

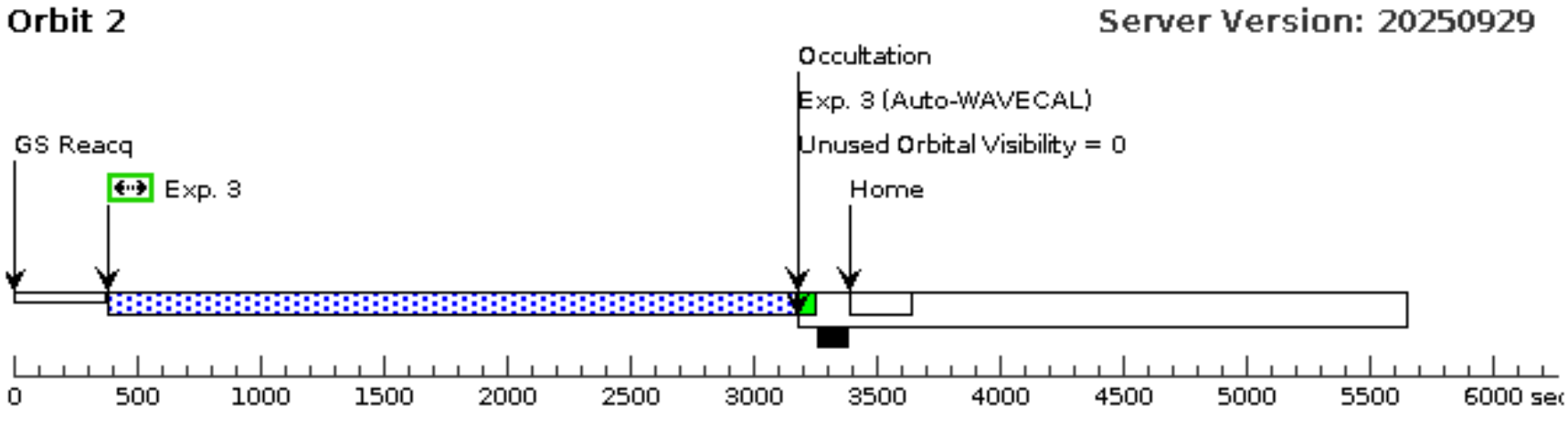
Comments:
Category=UNIDENTIFIED
Description=[ULTRAVIOLET EMITTER, X-RAY EMITTER]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(STIS.ta.2301018)	(6) AT2026HIR	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=13; DIFFUSE-CENTER=FLUX-CENTROID			50 Secs (50 Secs) *[==>]*	***[1]***
2	(STIS.sp.2301029)	(6) AT2026HIR	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2094 Secs (2094 Secs) *[==>]*	***[1]***
3	(STIS.sp.2301028)	(6) AT2026HIR	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2773 Secs (2773 Secs) *[==>]*	***[2]***

Orbit Structure





Visit

Proposal 18132, Visit 03, implementation Mon Apr 06 13:00:16 GMT 2026

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA

Special Requirements: TOO RESPONSE TIME 25.0D

Diagnostics

(Exposure 2 (Visit 03)) Warning (Form): Sensitive exposures should have an ETC run number provided.

(Exposure 3 (Visit 03)) Warning (Form): Sensitive exposures should have an ETC run number provided.

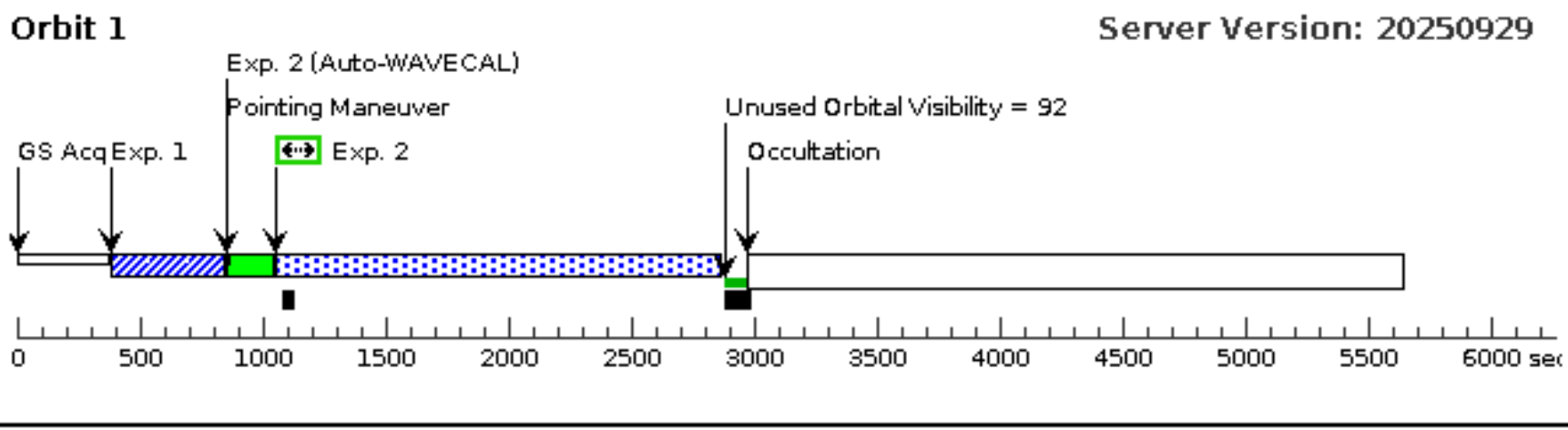
Generic Targets

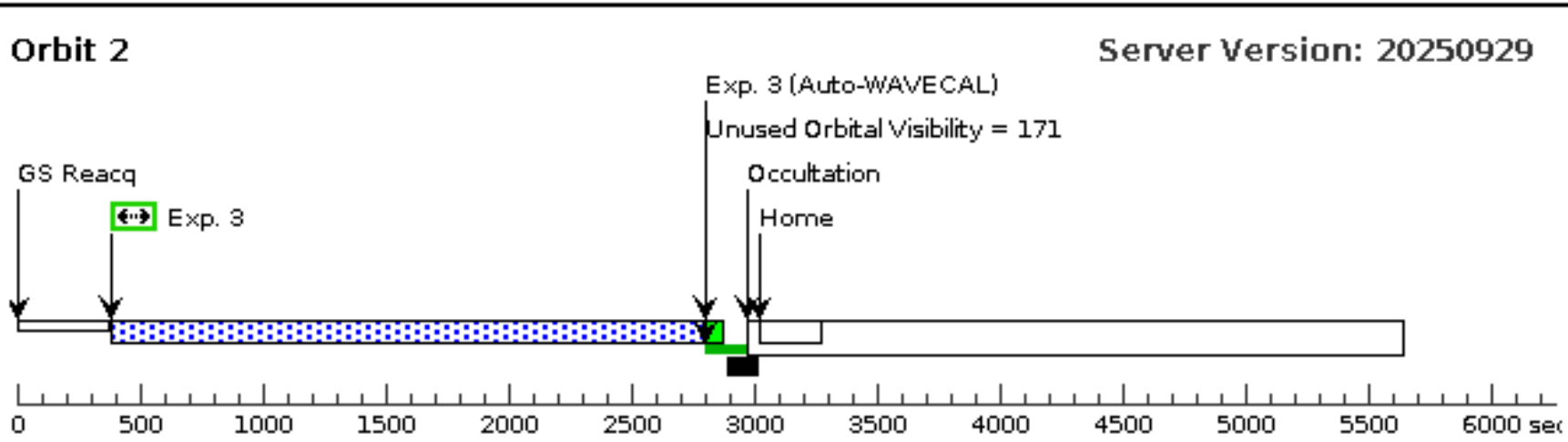
#	Name	Criteria	Description
(2)	TDE-FEATURELESS-2	(1) nuclear (2) blue color (3) optically featureless (4) g<19.5 mag	NUCLEUS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) TDE-FEATURELESS-2	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; DIFFUSE-CENTER=FLUX-CENTROID; CHECKBOX=13			50 Secs (50 Secs) *[==>]*	 ***[1]***
2		(2) TDE-FEATURELESS-2	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A				1800 Secs (1800 Secs) *[==>]*	 ***[1]***
3		(2) TDE-FEATURELESS-2	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A				2400 Secs (2400 Secs) *[==>]*	 ***[2]***

Orbit Structure





Visit

Proposal 18132, Visit 04, implementation Mon Apr 06 13:00:16 GMT 2026

Diagnostic Status: Warning

Scientific Instruments: STIS/NUV-MAMA, STIS/CCD

Special Requirements: TOO RESPONSE TIME 25.0D

Diagnostics

(Exposure 2 (Visit 04)) Warning (Form): Sensitive exposures should have an ETC run number provided.

(Exposure 3 (Visit 04)) Warning (Form): Sensitive exposures should have an ETC run number provided.

Generic Targets

#	Name	Criteria	Description
(2)	TDE-FEATURELESS-2	(1) nuclear (2) blue color (3) optically featureless (4) g<19.5 mag	NUCLEUS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) TDE-FEATURELESS-2	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=13; DIFFUSE-CENTER=FLUX-CENTROID			50 Secs (50 Secs)	
								[==>]	***[1]***
2		(2) TDE-FEATURELESS-2	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1800 Secs (1800 Secs)	
								[==>]	***[1]***
3		(2) TDE-FEATURELESS-2	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2400 Secs (2400 Secs)	
								[==>]	***[2]***

Orbit Structure