15184 - The SN Ia Candidate T Pyxidis: Is The Accretion Rate Declining?

Cycle: 25, Proposal Category: GO

(UV Initiative)

(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) NOVA-PYX-1890	COS/FUV	1	10-Aug-2017 19:00:33.0	yes
02	(1) NOVA-PYX-1890	COS/FUV	1	10-Aug-2017 19:00:34.0	yes

2 Total Orbits Used

ABSTRACT

T Pyx is a recurrent nova that unexpectedly went into outburst in 2011. It appears to have declined to its quiescent level accreting at a very high rate, possibly driven by irradiation of the donor star by the hot white dwarf or by the hot inner disk. Our team (Godon et al. 2014) has shown, using the light echo distance of 4.8kpc (Sokoloski et al. 2013), that the white dwarf in T Pyx is actually growing in mass and might be on its way to exploding as a Type Ia supernova. However, our most recent COS spectrum reveals that the flux decline continues and, in fact, has actually fallen to a flux level

that is 25% below the FUV flux levels observed with IUE between 1981 and 1996, following the 1966 outburst. Moreover, a new strong emission line (Si III + O I) and strong, broad N V (1238, 1242) absorption line appear, not detected in any prior FUV spectra of T Pyx.

We propose to continue spectroscopic observations of T Pyx with HST COS during cycle 25, to obtain the first FUV spectra in early quiescence (only six years after its 44 years-delayed outburst). The first FUV spectra of T Pyx following its 1967 outburst were a full 13 years later, in 1980, when IUE was launched. By obtaining FUV COS spectra of T Pyx during cycle 25, we will detect further changes, if any, in the continuum slope, in the velocity widths and intensities of the emission lines. We will use our suite of modeling codes to study the evolution of the accretion disk. Our analysis will yield the accretion rate, and help determine whether the WD increases its mass to reach the Chandrasekhar limit. Our observations will solidify the identification of recurrent novae as Type Ia Supernova Progenitors.

OBSERVING DESCRIPTION

We request two orbits taken successively with COS of the same target.
In the first COS is set to G140L 1105, in the second COS is set to G130M 1055.
The second orbit/visit is to follow the first orbit/visit immediately.

Visit

Proposal 15184, first visit (01), implementation Thu Aug 10 23:00:35 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV

Special Requirements: (none)

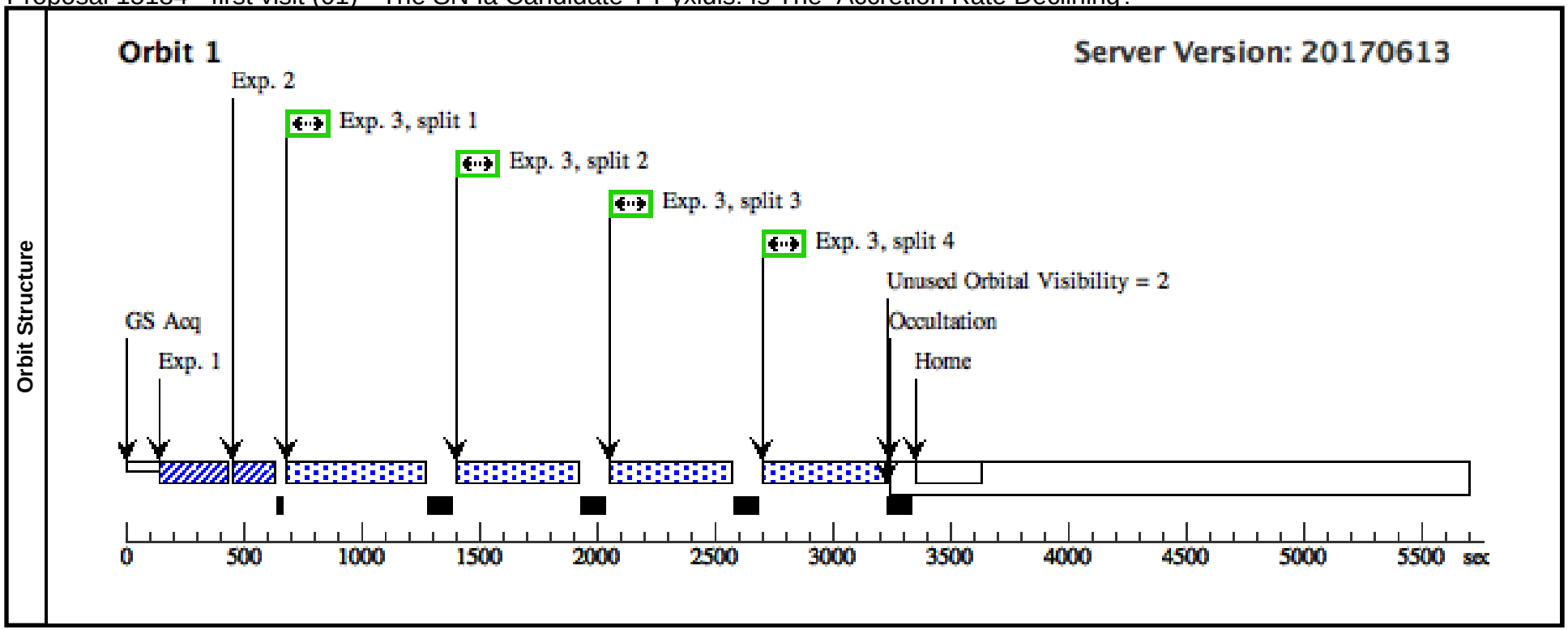
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVA-PYX-1890	RA: 09 04 41.5000 (136.1729167d) Dec: -32 22 47.50 (-32.37986d) Equinox: J2000		V=17.5	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	target acquisition (Cos.sa.1004713)	(1) NOVA-PYX-1890	COS/FUV, ACQ/PEAKXD, PSA	G140L 1105 A				6 Secs (6 Secs) *[==>]*	***[1]***
2	(Cos.sa.1004713)	(1) NOVA-PYX-1890	COS/FUV, ACQ/PEAKD, PSA	G140L 1105 A	NUM-POS=5.0; STEP-SIZE=0.9; CENTER=FLUX-WT-FLR			6 Secs (6 Secs) *[==>]*	***[1]***
3	(Cos.sp.1004708)	(1) NOVA-PYX-1890	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=518; FP-POS=ALL			518 Secs (1876 Secs) *[==>469.0 Secs (Split 1)]* *[==>469.0 Secs (Split 2)]* *[==>469.0 Secs (Split 3)]* *[==>469.0 Secs (Split 4)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20170613
Exp. 2
Exp. 3, split 1
Exp. 3, split 2
Exp. 3, split 3
Exp. 3, split 4
Unused Orbital Visibility = 2
GS Acq
Occultation
Exp. 1
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 15184, second visit (02), implementation Thu Aug 10 23:00:36 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV

Special Requirements: (none)

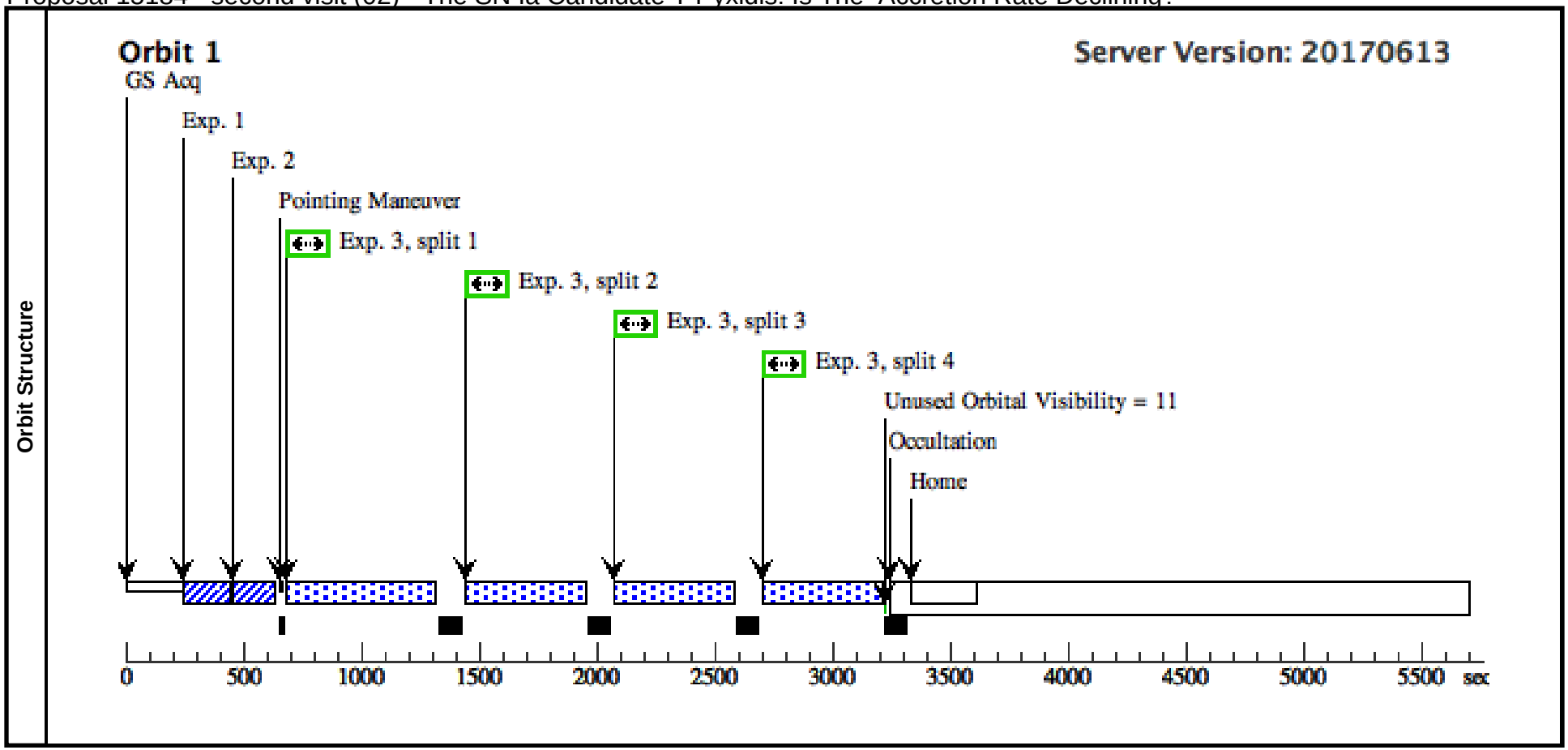
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NOVA-PYX-1890	RA: 09 04 41.5000 (136.1729167d) Dec: -32 22 47.50 (-32.37986d) Equinox: J2000		V=17.5	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	target acquisition (Cos.sa.1004713)	(1) NOVA-PYX-1890	COS/FUV, ACQ/PEAKXD, PSA	G130M 1291 A				6 Secs (6 Secs) *[==>]*	***[1]***
2	(Cos.sa.1004713)	(1) NOVA-PYX-1890	COS/FUV, ACQ/PEAKD, PSA	G130M 1291 A	NUM-POS=5.0; STEP-SIZE=0.9; CENTER=FLUX-WT-FLR			6 Secs (6 Secs) *[==>]*	***[1]***
3	(Cos.sp.1004708)	(1) NOVA-PYX-1890	COS/FUV, TIME-TAG, PSA	G130M 1055 A	BUFFER-TIME=518; FP-POS=ALL			518 Secs (1836 Secs) *[==>459.0 Secs (Split 1)]* *[==>459.0 Secs (Split 2)]* *[==>459.0 Secs (Split 3)]* *[==>459.0 Secs (Split 4)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20170613
GS Acq
Exp. 1
Exp. 2
Pointing Maneuver
Exp. 3, split 1
Exp. 3, split 2
Exp. 3, split 3
Exp. 3, split 4
Unused Orbital Visibility = 11
Occultation
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec