14229 - Characterizing a Magnetic CV Associated with a PNe via COS UV Spectroscopy

Cycle: 23, Proposal Category: GO

(UV Initiative)

(Availability Mode: AVAILABLE)

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) PNEG343	COS/FUV COS/NUV	2	07-Sep-2016 17:11:51.0	yes
B1	(2) PNEG343-SAFE-TARGET	COS/FUV COS/NUV	2	07-Sep-2016 17:11:52.0	yes
T1	(1) PNEG343	S/C	1	07-Sep-2016 17:11:53.0	yes

5 Total Orbits Used

ABSTRACT

Cataclysmic variables (CVs) are the most abundant class of X-ray binary system. We have recently discovered a new CV that is consistent with the position of a known planetary nebula. The discovery of a compact binary system in a planetary nebula comes with the promise of insight into common envelope physics and SN Ia progenitors if the binary mass is greater than Chandrasekhar. Herein, we propose to obtain 2 orbits of HST/COS FUV moderate resolution spectroscopy to further characterize this intriguing binary system. The requested science exposure will enable

the first constraints to be placed on the FUV emission, including the potential emission from the WD and the truncated accretion disk.

OBSERVING DESCRIPTION

Proposed Observation:

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We propose to obtain a high quality FUV spectrum of the cataclysmic variable G343.3-0.6, with HST/COS. This observation will enable constraints to be placed on the nature of the accretion flow via detection of the high energy flux from the inner accretion disk and perhaps even the surface of the white dwarf (e.g., Gansicke et al. 2006, Sion et al. 2013).

Observing Mode:

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We plan to use the FUV grating G140L with a central wavelength of lambda_c=1105Ang. This will provide continuous spectral coverage between 1121 - 2148Ang (segment A), while turning segment B off. This wavelength range includes most of the high and medium ionization lines from C, N, O, Si and HeII which we expect to be strong for this source. We prefer lambda_c=1105 over lambda_c=1280 because we are especially interested in the N V line emission near 1240Ang (to determine the elemental abundances, ionization structure), which would fall between the A and B segments for lambda_c=1280Ang setting. The bright geo-coronal Ly_alpha emission will make a region of 10Ang width unusable around 1216Ang, but should not affect the N V line.

All observations will be carried out in TIME-TAG, FLASH=YES, SEGMENT=A mode so that the position, arrival time, and pulse height of each detected photon are recorded, and science and wavelength-calibration spectra are obtained concurrently. The spectral lines we are interested in are significantly far from the prominent geo-coronal emission lines like Ly_alpha and O I 1304Ang. Furthermore, TIME-TAG mode will allow us to filter out any unpredictable transient changes in the background. Based on the detailed orbit planning, the entire program will be completed in 2 HST orbits.

Visit

Proposal 14229, orbit I (01), implementation Wed Sep 07 21:11:53 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: ORIENT 260D TO 120 D

Comments: This should be scheduled in evening, local time. Flags need to be cleared during the work day.

Fixed Targets

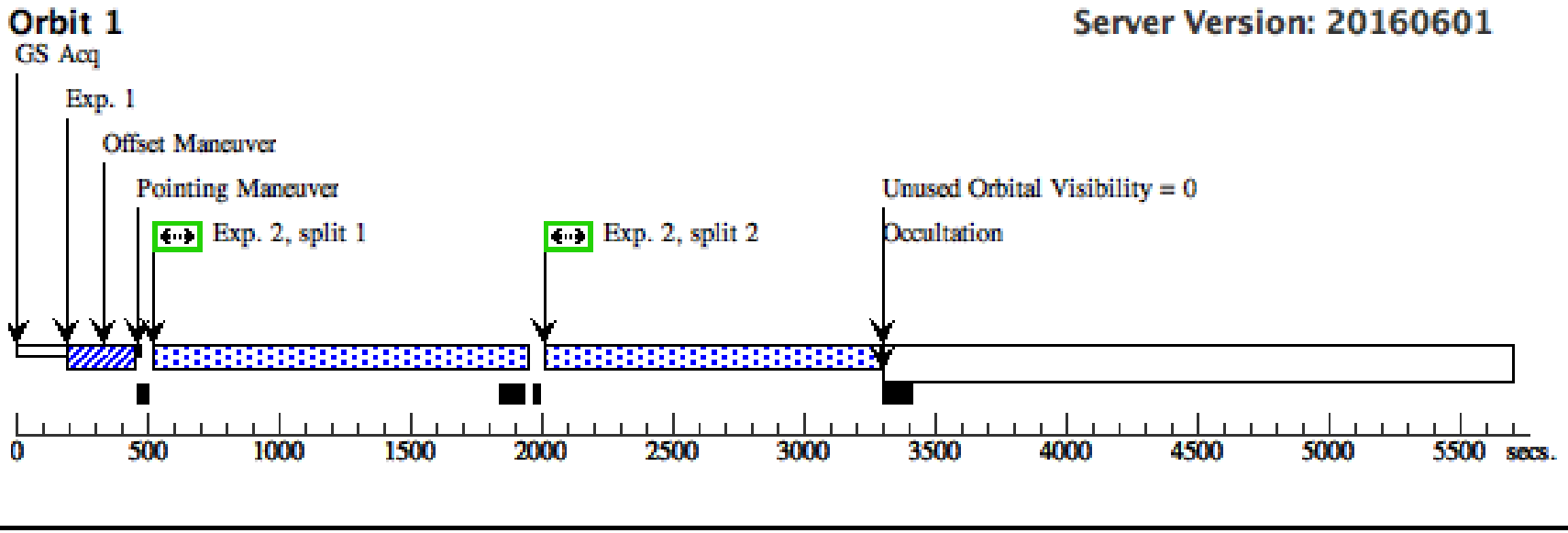
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	PNEG343	RA: 17 01 28.1600 (255.3673333d) Dec: -43 06 12.40 (-43.10344d) Equinox: J2000		V=16+/-0.5 0.06 mJy @ 2000 Angstrom	Reference Frame: ICRS

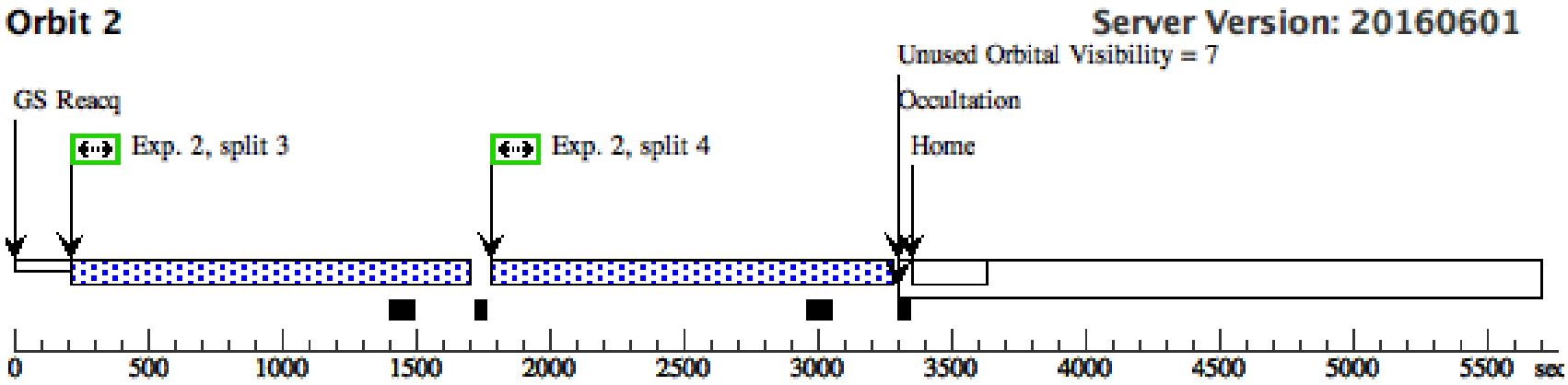
Comments: Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquisation (727640)	(1) PNEG343	COS/NUV, ACQ/IMAGE, PSA	MIRRORA		USE OFFSET V01S AF		15 Secs (15 Secs) *[==>]*	 ***[1]***
2	Science (701990)	(1) PNEG343	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=ALL; BUFFER-TIME=1150; SEGMENT=A; FLASH=YES	USE OFFSET V01S AF		1250 Secs (5370 Secs) *[==>1250.0 Secs (Split 1)]* *[==>1230.0 Secs (Split 2)]* *[==>1440.0 Secs (Split 3)]* *[==>1450.0 Secs (Split 4)]*	 ***[1]*** ***[2]***

Orbit Structure





Visit

Proposal 14229, SCIENCETARGET-BOP-ONLY (B1), implementation Wed Sep 07 21:11:54 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: ORIENT 260D TO 120 D

Comments: This visit is for BOP checking the safe target only and should not execute onboard HST

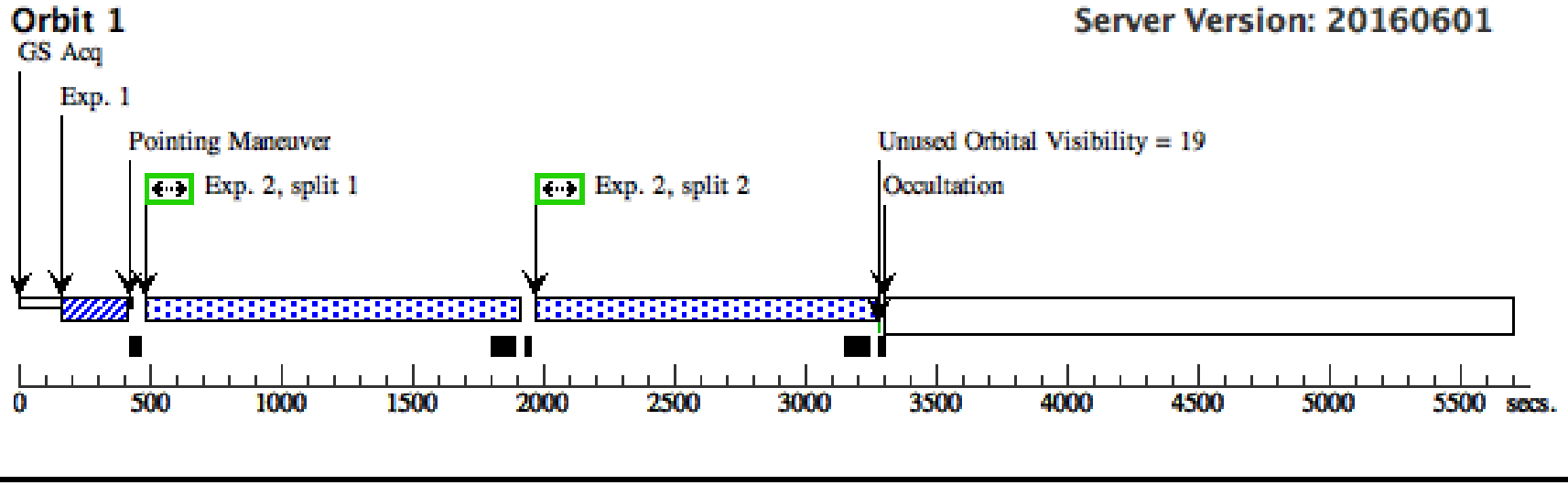
Fixed Targets

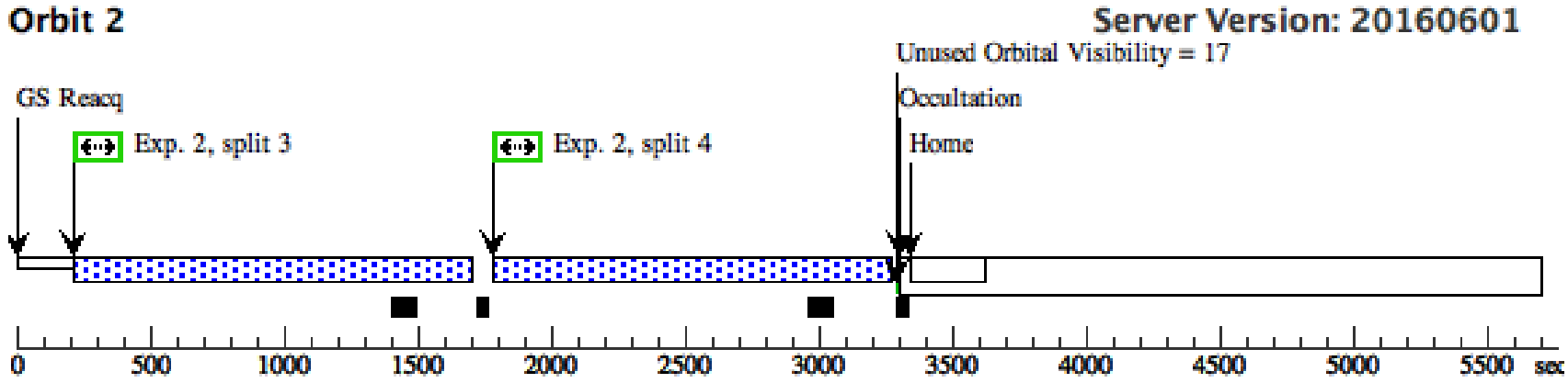
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	PNEG343	RA: 17 01 28.1600 (255.3673333d) Dec: -43 06 12.40 (-43.10344d) Equinox: J2000		V=16+/-0.5 0.06 mJy @ 2000 Angstrom	Reference Frame: ICRS
Comments: Extended=NO					
(2)	PNEG343-SAFE-TARGET	Offset from PNEG343 RA Offset: 0.69 Secs Dec Offset: 5.033 Arcsec		V=16+/-0.5	Offset Position (PNEG343-SAFE-TARGET)
Comments: This target is a blank piece of sky which is the bright object safe pointing and is 9.163 arseconds away at a PA 56.7 degrees from PNEG343. Based on observations for day 16.280 (U3=105) Extended=NO					

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquisation (727640)	(2) PNEG343-SAFE-TARGET	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				12 Secs (12 Secs) *[==>]*	***[1]***
2	Science (701990)	(2) PNEG343-SAFE-TARGET	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=ALL; BUFFER-TIME=1150; SEGMENT=A; FLASH=YES			1250 Secs (5380 Secs) *[==>1250 Secs (Split 1)]* *[==>1250 Secs (Split 2)]* *[==>1440.0 Secs (Split 3)]* *[==>1440.0 Secs (Split 4)]*	***[1]*** ***[2]***

Orbit Structure





Visit

Proposal 14229, Offset SC visit (T1), implementation Wed Sep 07 21:11:54 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: S/C

Special Requirements: ORIENT 260D TO 120 D

Comments: This visit allocates and sets up the safe position offset slot for 01 which will use that slot. This S/C visit should go early in the week while visit 01 will be at least 3 days later. The S/C visit will contain only 1 exposure.

Offset based on 16.280, U3=105

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	PNEG343	RA: 17 01 28.1600 (255.3673333d) Dec: -43 06 12.40 (-43.10344d) Equinox: J2000		V=16+/-0.5 0.06 mJy @ 2000 Angstrom	Reference Frame: ICRS

Comments: Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) PNEG343	S/C, DATA, V1			POS TARG 232.723, -237.515; SAVE OFFSET V01 SAF; SPEC COM INSTR ECSLOTSET; QESIPARM ANGL E 56.7; QESIPARM DIST 9. 163		5 Secs (5 Secs) *[==>]*	***[1]***

Orbit Structure