16392 - X-rays from a Unique Spun-up Post Mass Transfer Main Sequence Carbon Star

Cycle: 28, 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) J043526.14+340136.48	ACS/SBC WFC3/UVIS	2	17-Sep-2020 12:03:04.0	yes

2 Total Orbits Used

ABSTRACT

Carbon stars (C>O) were long assumed to all be giants, because only AGB stars dredge up significant carbon into their atmospheres. We now know that dwarf carbon (dC) stars are actually far more common than C giants. The dCs have accreted C-rich envelope material from an AGB companion, eventually yielding a white dwarf and a dC that has gained both significant mass and angular momentum. We propose a Chandra study of the nearest

known typical dC, J0435+3401, to investigate its extreme X-ray spectral properties and variability, while using HST to constrain the cooling age of its white dwarf companion. Since dCs are the likely progenitors of CH, BaII and CEMP stars, and probably also interacting binaries like CVs, novae, or SN Ia, our results will have wide-ranging implications.

OBSERVING DESCRIPTION

We plan observations of an interesting dwarf carbon (dC) star, utilizing both the ACS-SBC and WFC3-UVIS detectors. This will allow us to obtain stronger UV constraints than allowed by the weak GALEX NUV detection. The dC must have (from an evolutionary perspective) a WD component. Since no WD features are evident in the optical spectrum the WD must be relatively cool, implying Gyr since its AGB phase. We seek to detect and constrain its age using these NUV and FUV HST observations.

For all ETC calculations we assume a 7,000K blackbody normalized to the GALEX NUV magnitude, with E(B-V) =0.606.

For the FUV observations, we use both the [F140LP] and [F165LP] filters in order to account for the red leak of the SBC as recommneded. We fit both observations into 1 orbit and the ACS ETC estimates a S/N~7 for both filter obeservations.

THe WFC3 ETC predcits S/N=100 in the NUV with UVIS+[F225W] in 2384s.

For both the SBC and UVIS observations we utilize a BOX dither. For the UVIS observations we include a post-FLASH of 11e to aid with CTE issues as recommended.

The SBC observation passes the BOT using the GALEX catalog with all SAFE objects. The UVIS observations pass saturation checks with the BOT and GSC2.

Visit

Proposal 16392, Visit 01 Thu Sep 17 16:03:05 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/SBC

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-SBC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.179 Line Spacing=0.116	Coordinate Frame=POS-TARG Pattern Orientation=20.02 Angle Between Sides=63.65 Center Pattern=false		(2-3)
(2)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1)

Fixed Targets

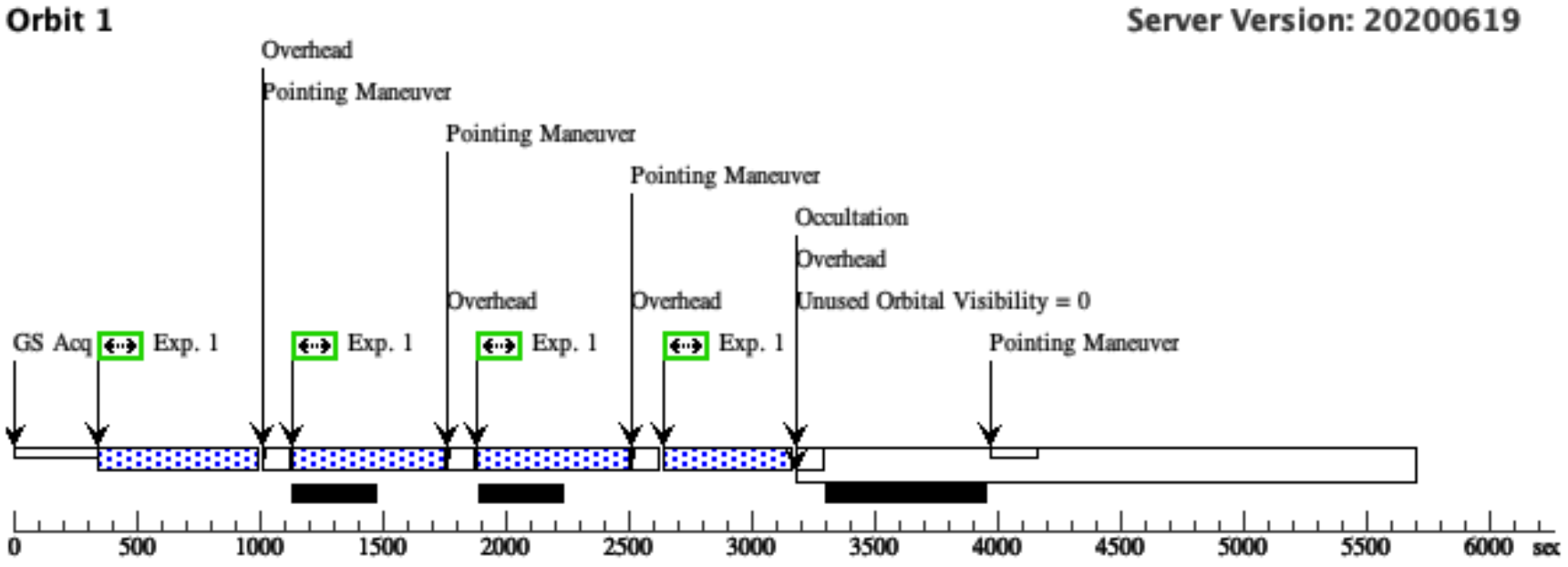
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	J043526.14+340136.48	RA: 04 35 26.3050 (68.8596042d) Dec: +34 01 35.58 (34.02655d) Equinox: J2000	Proper Motion RA: 150.086 mas/yr Proper Motion Dec: -69.262 mas/yr Parallax: 0.0078080" Epoch of Position: 2015.5 Radial Velocity: 77.43 km/sec	V=14.48+/-0.2 B=15.2, R=13.5, G=13.7165, NUV=22.08, E(B-V)=0.606, dC+DA?	Reference Frame: ICRS

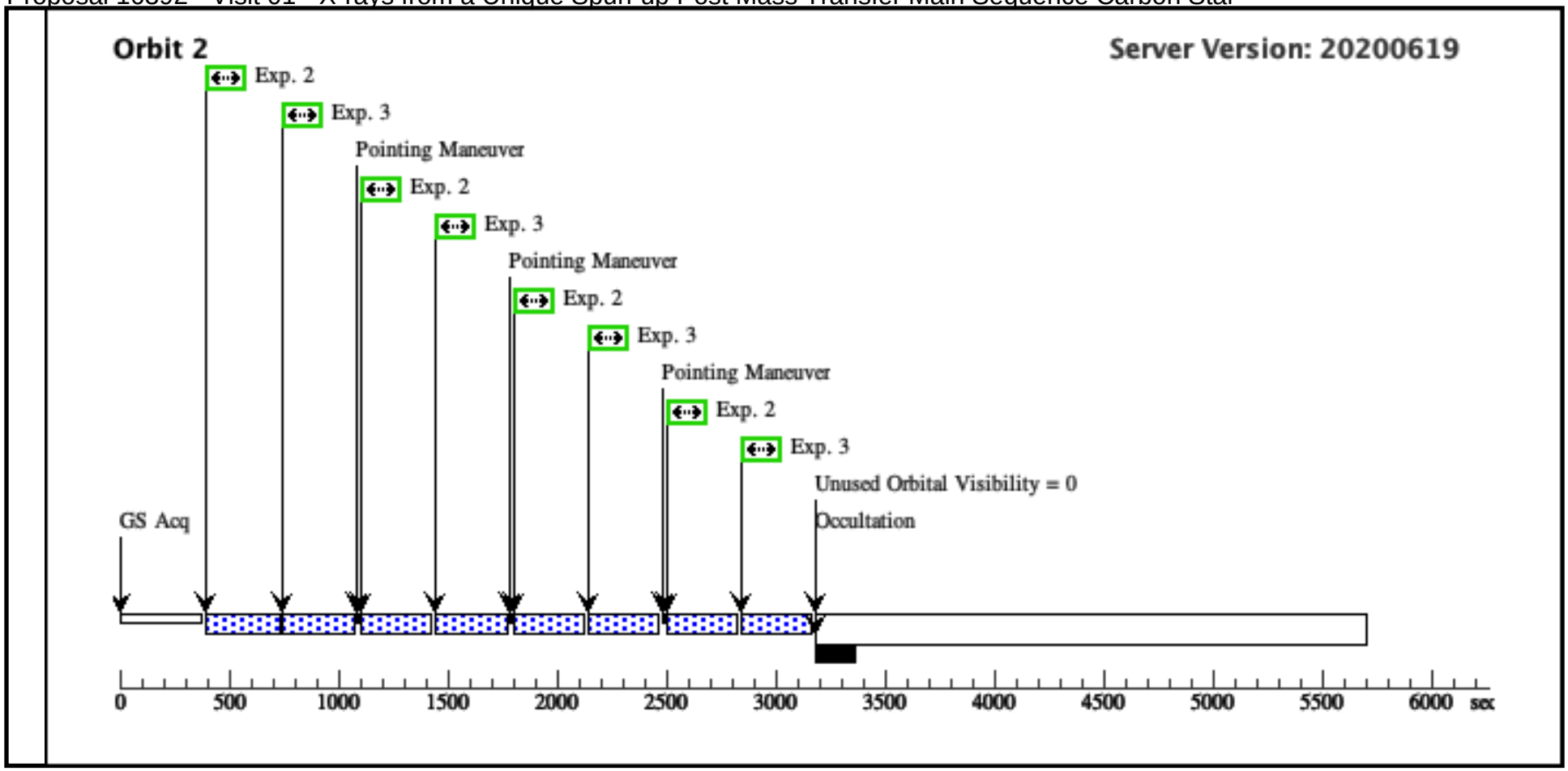
Comments:
Category=STAR
Description=[CARBON STAR]

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	WFC3.UVIS.F225W (WFC3UVIS.im.1464807)	(1) J043526.14+340136.48	WFC3/UVIS, ACCUM, UVIS2	F225W	FLASH=11.0		Pattern 2, Exps 1-1 in Visit 01 (2)	2396 Secs (2384 Secs) *[==>619.0 Secs (Pattern 1)]* *[==>619.0 Secs (Pattern 2)]* *[==>619.0 Secs (Pattern 3)]* *[==>527.0 Secs (Pattern 4)]*	***[1]***
2	SBC.F140LP (ACS.im.1464808)	(1) J043526.14+340136.48	ACS/SBC, ACCUM, SBC	F140LP			Pattern 1, Exps 2-3 in Visit 01 (1)	2593 Secs (1084 Secs) *[==>271.0 Secs (Pattern 1)]* *[==>271.0 Secs (Pattern 2)]* *[==>271.0 Secs (Pattern 3)]* *[==>271.0 Secs (Pattern 4)]*	***[2]***
3	SBC.F165LP (ACS.im.1464809)	(1) J043526.14+340136.48	ACS/SBC, ACCUM, SBC	F165LP			Pattern 1, Exps 2-3 in Visit 01 (1)	1215 Secs (1091 Secs) *[==>275.0 Secs (Pattern 1)]* *[==>273.0 Secs (Pattern 2)]* *[==>271.0 Secs (Pattern 3)]* *[==>272.0 Secs (Pattern 4)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20200619
Exp. 2
Exp. 3
Pointing Maneuver
Exp. 2
Exp. 3
Pointing Maneuver
Exp. 2
Exp. 3
Pointing Maneuver
Exp. 2
Exp. 3
Unused Orbital Visibility = 0
GS Acq
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec