



15918 - Accurate physical parameters of an orphan runaway white dwarf

Cycle: 27, Proposal Category: GO

(UV Initiative)

(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) J1825-3757	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	3	17-Apr-2020 12:02:01.0	yes
02	(1) J1825-3757	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	3	17-Apr-2020 12:02:03.0	yes

6 Total Orbits Used

ABSTRACT

Recent discoveries have been revolutionising the field of thermonuclear supernovae with the identification of a new family of remarkable stars that, like their prototype LP 40-365, are suggested to be the former accreting white dwarfs that likely survived to peculiar (possibly Type Ia_x) supernova explosions. Their element abundance pattern shows ONeMg-dominated atmospheres, presenting large traces of partial Si-burning, iron-peak elements, which are heavily produced in near Chandrasekhar-mass thermonuclear explosions. Thanks to the accurate parallaxes of the Second Data Release of Gaia, these stars are confirmed as inflated low-mass white dwarfs that have been ejected with velocities in the range of 600 km/s. The observational evidence collected so far strongly suggests these stars were the former white dwarf accretors in single-degenerate binaries, which were partly burned by the explosions that unbound the binaries they belonged to. Near- and far-ultraviolet spectroscopy is crucial to precisely measure key properties of these stars, as this wavelength range enables to accurately measure their effective temperature leading to improved determinations of their atmospheric bulk composition and, in combination with Gaia parallaxes, their radii and masses. The proposed target is the hottest and the brightest star of this family, enabling a favorable perspective on the likely earliest phases of their formation. Hence, the HST observations will allow us to gain deeper insight in the evolutionary status and formation mechanisms of these stars via comparison with theoretical models.

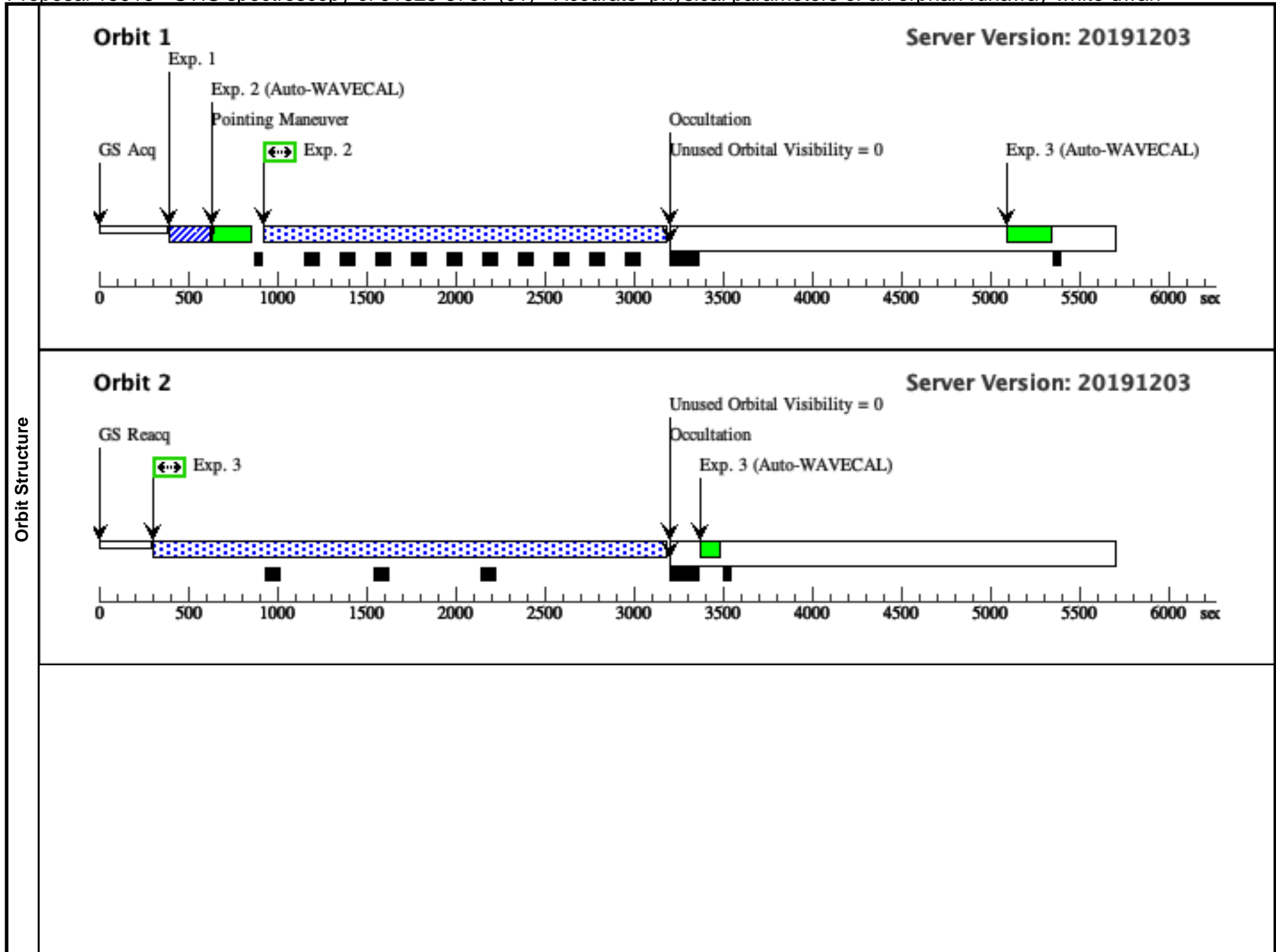
OBSERVING DESCRIPTION

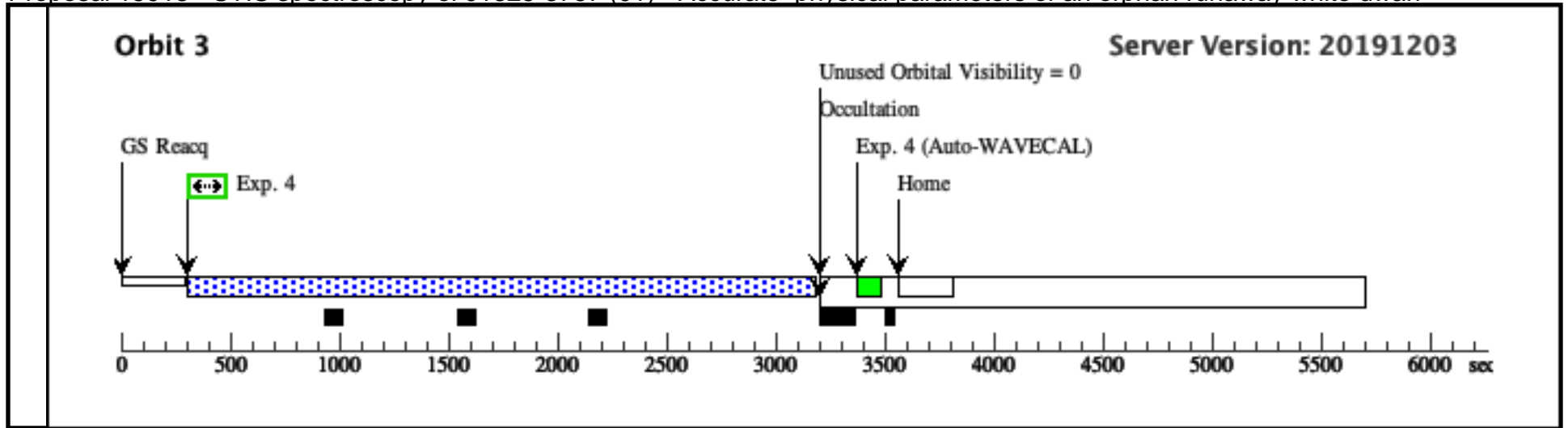
The primary goal of this proposal is to obtain the far- and near-ultraviolet spectral energy distribution of this star. We choose the STIS G140L/G230L gratings and the widest slit, 52x2, to ensure that we optimise the throughput and minimise possible slit flux losses. The observation sequence is straight-forward: acquisition with the optical CCD and the FP28x50LP broadband filter, one orbit of STIS/G230L spectroscopy, and two orbits of STIS/G140L spectroscopy.

Proposal 15918 - STIS spectroscopy of J1825-3757 (01) - Accurate physical parameters of an orphan runaway white dwarf

Fri Apr 17 16:02:03 GMT 2020

Visit	Proposal 15918, STIS spectroscopy of J1825-3757 (01), failed Diagnostic Status: No Diagnostics Scientific Instruments: STIS/NUV-MAMA, STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
		(1)	J1825-3757	RA: 18 25 22.1500 (276.3422917d) Dec: -37 57 26.10 (-37.95725d) Equinox: J2000	Proper Motion RA: -37.6 mas/yr Proper Motion Dec: -143 mas/yr Epoch of Position: 2015.5 Radial Velocity: -48 km/sec	V=13.270 GALEX NUV = 14.6	Reference Frame: ICRS			
	<i>Comments:</i> Category=STAR Description=[SDB] 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.136 7857)	(1) J1825-3757	STIS/CCD, ACQ, F28X50LP	MIRROR				0.5 Secs (0.5 Secs)	
									[==>]	[1]
	2	(STIS.sp.13 67858)	(1) J1825-3757	STIS/NUV-MAMA, TIME-TAG, 52X2	G230L 2376 A	BUFFER-TIME=20 0			2218 Secs (2218 Secs)	
									[==>]	[1]
3	(STIS.sp.13 67860)	(1) J1825-3757	STIS/FUV-MAMA, TIME-TAG, 52X2	G140L 1425 A	BUFFER-TIME=60 0			2830 Secs (2830 Secs)		
								[==>]	[2]	
4	(STIS.sp.13 67860)	(1) J1825-3757	STIS/FUV-MAMA, TIME-TAG, 52X2	G140L 1425 A	BUFFER-TIME=60 0			2830 Secs (2830 Secs)		
								[==>]	[3]	





Proposal 15918 - STIS spectroscopy of J1825-3757 (02) - Accurate physical parameters of an orphan runaway white dwarf

Fri Apr 17 16:02:04 GMT 2020

Visit	Proposal 15918, STIS spectroscopy of J1825-3757 (02) Diagnostic Status: No Diagnostics Scientific Instruments: STIS/NUV-MAMA, STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
		(1)	J1825-3757	RA: 18 25 22.1500 (276.3422917d) Dec: -37 57 26.10 (-37.95725d) Equinox: J2000	Proper Motion RA: -37.6 mas/yr Proper Motion Dec: -143 mas/yr Epoch of Position: 2015.5 Radial Velocity: -48 km/sec	V=13.270 GALEX NUV = 14.6	Reference Frame: ICRS			
	<i>Comments:</i> Category=STAR Description=[SDB] 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.136 7857)	(1) J1825-3757	STIS/CCD, ACQ, F28X50LP	MIRROR				0.5 Secs (0.5 Secs)	
									[==>]	[1]
	2	(STIS.sp.13 67858)	(1) J1825-3757	STIS/NUV-MAMA, TIME-TAG, 52X2	G230L 2376 A	BUFFER-TIME=20 0			2218 Secs (2218 Secs)	
									[==>]	[1]
3	(STIS.sp.13 67860)	(1) J1825-3757	STIS/FUV-MAMA, TIME-TAG, 52X2	G140L 1425 A	BUFFER-TIME=60 0			2830 Secs (2830 Secs)		
								[==>]	[2]	
4	(STIS.sp.13 67860)	(1) J1825-3757	STIS/FUV-MAMA, TIME-TAG, 52X2	G140L 1425 A	BUFFER-TIME=60 0			2830 Secs (2830 Secs)		
								[==>]	[3]	

