



15359 - A highly dynamical debris disc in an evolved planetary system

Cycle: 25, Proposal Category: GO

(UV Initiative)

(Availability Mode: AVAILABLE)

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) SDSSJ1228+1040	COS/FUV COS/NUV	2	19-Jul-2017 11:11:32.0	yes

2 Total Orbits Used

ABSTRACT

Our HST/COS survey for the photospheric pollution by planetary debris undisputably demonstrates that at least 25% of white dwarfs host an evolved planetary system. The debris discs holding the material that accretes onto the white dwarf are produced by the tidal disruption of asteroids, and are observed in nearly 40 systems by infrared excess emission from micron-sized dust. In a small number of cases, we have also detected double-peaked Ca II 860 nm emission lines from a metal-rich gaseous disc in addition to photospheric pollution and circumstellar dust. Our ground-based monitoring of the brightest of these systems, SDSS J1228+1040, over the last eleven years shows a dramatic morphological change in the emission

line profiles on the time-scale of years. The evolution of the line profiles is consistent with the precession of an eccentric disc on a period of ~ 25 years, indicating a recent dynamical interaction within the underlying dust disc. This could either be related to the initial circularisation of the disc, or a secondary impact onto an existing disc. We expect that the accretion rate onto the white dwarf varies on the same timescale as the Ca II emission lines, and there is the tantalising possibility to detect changes in the bulk abundances, if the impact of a planetesimal with a different bulk abundance stirred up the disc. We request a small amount of COS time to monitor the debris abundances over the next three HST Cycles to test this hypothesis, and bolster our understanding of the late evolution of planetary systems.

OBSERVING DESCRIPTION

We request the 3 visits to be spaced as equally apart as possible over the 3 years, as we require the multiple observations for time-resolved spectroscopy of the absorption lines present in the UV.

Proposal 15359 - SDSS1228+1040 epoch 3 (01) - A highly dynamical debris disc in an evolved planetary system

Wed Jul 19 15:11:33 GMT 2017

Visit	Proposal 15359, SDSS1228+1040 epoch 3 (01), implementation Diagnostic Status: No Diagnostics Scientific Instruments: COS/FUV, COS/NUV Special Requirements: BETWEEN 01-APR-2018 AND 01-JUL-2018									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	SDSSJ1228+1040	RA: 12 28 59.9350 (187.2497292d) Dec: +10 40 33.25 (10.67590d) Equinox: J2000	Proper Motion RA: -36.7 mas/yr Proper Motion Dec: -26.7 mas/yr Epoch of Position: 2000	V=16.2 GALEX FUV=15.62 +/- 0.02 G ALEX NUV=15.85 +/- 0.02	Reference Frame: ICRS	<i>Comments: SDSSJ1228+1040 has been observed four times with COS (HST programs 11561, 12906, and the first two observations of this monitoring proposal in March 2016, April 2017) - no bright object limit concerns. Extended=NO</i>			
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(COS.ta.716 013)	(1) SDSSJ1228+1040	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				14 Secs (14 Secs) [==>]	[1]
	<i>Comments: Target acquisition based on an uploaded WD model spectrum that has been scale to the COS data from a previous observation.</i>									
	2	(COS.sp.716 014)	(1) SDSSJ1228+1040	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=11 19; FP-POS=1; LIFETIME-POS=L P3			1217 Secs (1217 Secs) [==>]	[1]
	3	(COS.sp.716 014)	(1) SDSSJ1228+1040	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=11 19; FP-POS=2; LIFETIME-POS=L P3			1217 Secs (1217 Secs) [==>]	[1]
	4	(COS.sp.716 014)	(1) SDSSJ1228+1040	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=65 1; FP-POS=3; LIFETIME-POS=L P3			1404 Secs (1404 Secs) [==>]	[2]
5	(COS.sp.716 014)	(1) SDSSJ1228+1040	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=65 1; FP-POS=4; LIFETIME-POS=L P3			1404 Secs (1404 Secs) [==>]	[2]	

