



13752 - An autopsy of dead planetary systems with COS

Cycle: 22, 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	(2) WD-0420-731	COS/FUV COS/NUV	1	04-Nov-2014 21:05:10.0	yes
02	(1) KPD-0420+5203	COS/FUV COS/NUV	1	04-Nov-2014 21:05:11.0	yes
03	(3) WD-2329+407	COS/FUV COS/NUV	1	04-Nov-2014 21:05:13.0	yes

3 Total Orbits Used

ABSTRACT

We propose to use HST/COS to conduct autopsies of dead planetary systems around UV bright hydrogen-white dwarfs (WDs), which have dust disks found via their mid-IR emission in excess of that expected from the photosphere. As part of a WISE survey, and followed up with a combination of NASA Keck HIRES/Magellan MIKE optical spectroscopy, we have identified three new systems that are accreting dust. These WDs are bright in the mid-IR and UV, gold-standard targets for studies with HST/COS and later with JWST. The dusty material is debris resulting from the tidal disruption of exo-asteroids that accrete onto the WD surface. Many atomic elements from the accreted and dissociated dust particles are detectable with COS, enabling abundance determinations of exo-asteroidal material. Moreover, the photospheric abundances of this material can be directly compared with a determination of the dust mineralogy obtained with future JWST mid-IR spectroscopy-our proposed UV observations provide complementary constraints on mineralogical compositions of the accreting dust particles.

UV spectroscopy is crucial for cataloging elemental abundances for these exo-asteroids. For the majority of WDs, optical spectroscopy reveals only a couple of lines of Ca or Mg, while UV spectroscopy captures lines from Al, Fe, Si, C, Ni, O, S, Cr, P, and Ti. Obtaining the elemental abundances of exo-asteroids is comparable to the spectroscopic characterization of transiting exoplanets or protoplanetary disks-all of these techniques determine how the chemical diversity of planetary systems translate into planetary architectures and the probability of habitable planets around solar-type stars.

OBSERVING DESCRIPTION

We wish to acquire each object with an ACQ/IMAGE exposure, then followed by FP-POS=ALL observing at G130M/1291 within one orbit. Target S/N of at least 30 within an orbit.

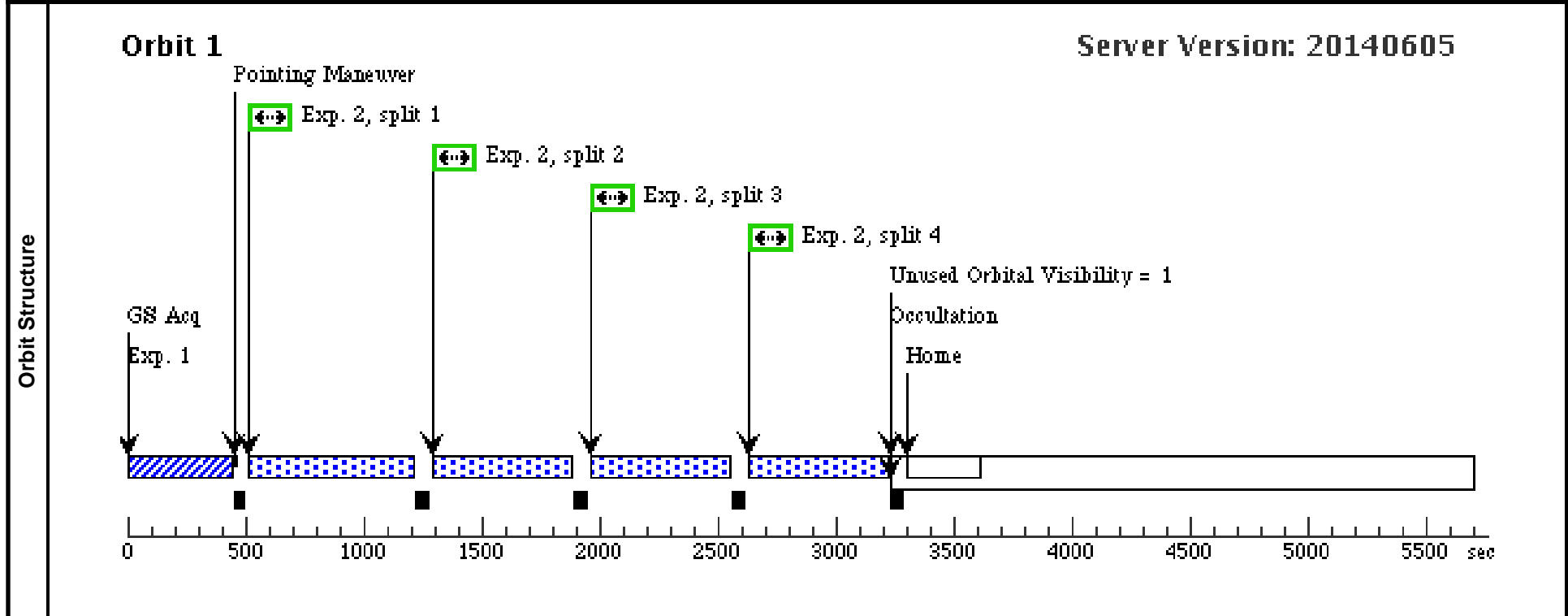
Proposal 13752 - WD0420-731 (01) - An autopsy of dead planetary systems with COS

Wed Nov 05 02:05:14 GMT 2014

Visit	Proposal 13752, WD0420-731 (01), implementation Diagnostic Status: No Diagnostics Scientific Instruments: COS/NUV, COS/FUV Special Requirements: SCHED 80% <i>Comments: GALEX FUV=14.95, NUV=15.154--will achieve S/N=25 @ longer wavelengths</i> 4 FP-POS after ACQ/IMAGE with MIRRORB/PSA				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(2)	WD-0420-731	RA: 04 19 37.7172 (64.9071550d) Dec: -73 03 44.18 (-73.06227d) Equinox: J2000	Proper Motion RA: 33.2 mas/yr Proper Motion Dec: 20.4 mas/yr Epoch of Position: 1998.925	V=15.44 FUV=14.94	Reference Frame: ICRS
<i>Comments: PM from UCAC4, position from 2MASS, PM uncertainty ~0.06" from epoch.</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.617 831)	(2) WD-0420-731	COS/NUV, ACQ/IMAGE, PSA	MIRRORB					7.2 Secs (7.2 Secs)
2	(COS.sp.617 834)	(2) WD-0420-731	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=12 80; FP-POS=ALL				536 Secs (2144 Secs)	[1]
									[==>]	
									[==>(Split 1)] [==>(Split 2)] [==>(Split 3)] [==>(Split 4)]	



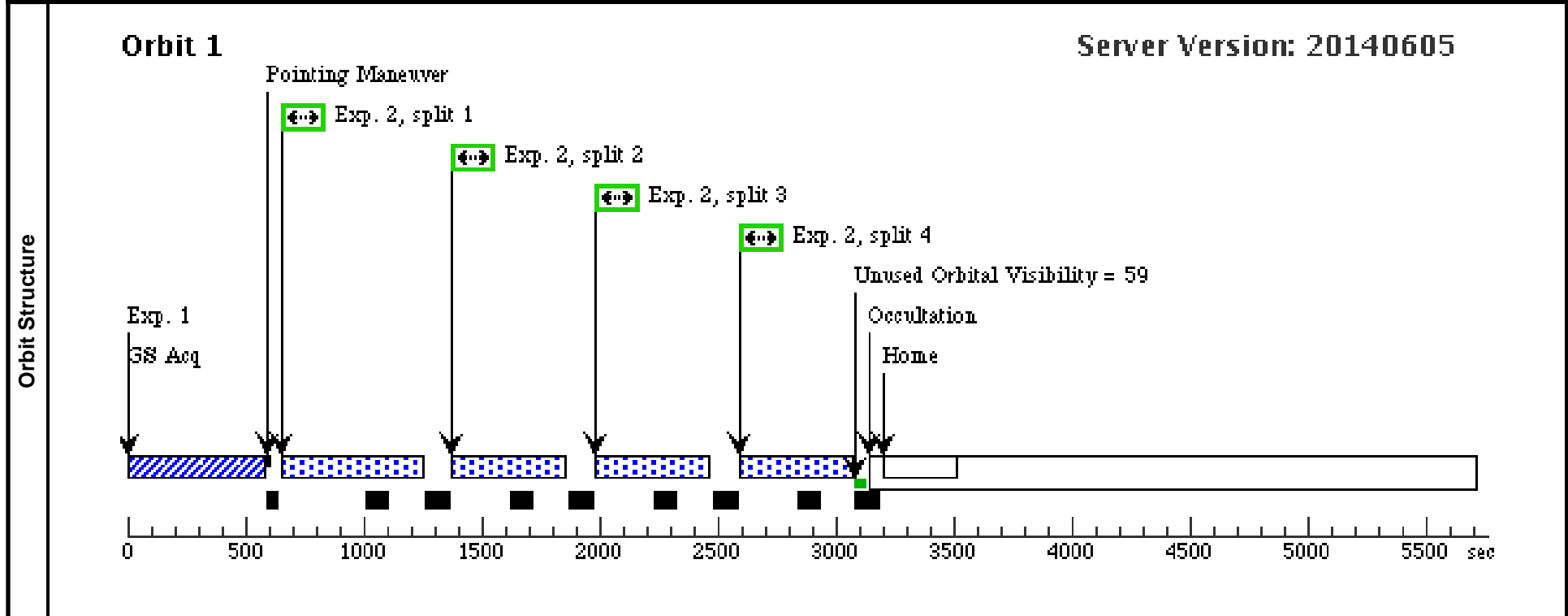
Proposal 13752 - WD0420+520 (02) - An autopsy of dead planetary systems with COS

Wed Nov 05 02:05:14 GMT 2014

Visit	Proposal 13752, WD0420+520 (02), implementation Diagnostic Status: No Diagnostics Scientific Instruments: COS/NUV, COS/FUV Special Requirements: SCHED 80% <i>Comments: GALEX FUV=13.64, brightest target. Exposure time selected to match 2x recommended buffer time. Can be shortened to enhance scheduling flexibility.</i> 4 FP-POS after ACQ/IMAGE with MIRRORA/BOA				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	KPD-0420+5203	RA: 04 24 15.7280 (66.0655333d) Dec: +52 10 10.59 (52.16961d) Equinox: J2000	Proper Motion RA: -46.4 mas/yr Proper Motion Dec: -6.0 mas/yr Epoch of Position: 1999.87	V=15.02	Reference Frame: ICRS
	<i>Comments: PM from UCAC4, position from 2MASS, uncertainty on proper motion is ~0.06" from the epoch (1-sigma)</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.644 128)	(1) KPD-0420+5203	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				90 Secs (90 Secs)	
	2	(COS.sp.617 905)	(1) KPD-0420+5203	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=21 4; FP-POS=ALL			428 Secs (1712 Secs)	[1]
									[==>(Split 1)] [==>(Split 2)] [==>(Split 3)] [==>(Split 4)]	



Proposal 13752 - WD2329+407 (03) - An autopsy of dead planetary systems with COS

Wed Nov 05 02:05:14 GMT 2014

Visit	<p>Proposal 13752, WD2329+407 (03), implementation</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: COS/NUV, COS/FUV</p> <p>Special Requirements: SCHED 80%</p> <p><i>Comments: GALEX FUV=13.93, exposure time chosen to fill standard orbit. Can be shortened to accomodate additional scheduling flexibility.</i></p> <p>4 FP-POS after ACQ/IMAGE with MIRRORA/BOA</p>

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(3)	WD-2329+407	RA: 23 31 35.6500 (352.8985417d) Dec: +41 01 30.75 (41.02521d) Equinox: J2000	Proper Motion RA: 267 mas/yr Proper Motion Dec: -108 mas/yr Epoch of Position: 1999.79	V=13.82 FUV=13.93	Reference Frame: ICRS
	<i>Comments: coordinates taken from 2MASS, proper motion from UCAC4. uncertainty in proper motion may place star up to ~0.1" away from expected position (1-sigma), still within 0.4" error budget</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.617 903)	(3) WD-2329+407	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				32 Secs (32 Secs)	
	2	(COS.sp.617 904)	(3) WD-2329+407	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=39 0; FP-POS=ALL			500 Secs (2000 Secs)	[1]
									[==>(Split 1)] [==>(Split 2)] [==>(Split 3)] [==>(Split 4)]	

