



# 13415 - The First Study of the Quasar Broad Line Region in the <550Å Extreme UV

Cycle: 21, 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) SDSS1006+3705	COS/FUV COS/NUV	5	26-Mar-2014 21:04:03.0	yes
11	(1) SDSS1006+3705	COS/FUV COS/NUV	3	26-Mar-2014 21:04:13.0	yes

8 Total Orbits Used

## ABSTRACT

Quasar emission in the extreme UV (EUV, blueward of the hydrogen Lyman limit) is poorly understood, and this is especially true for the shortest observable UV wavelengths (300-550Å rest). In particular, although some emission lines have been seen at very low resolution, none have been rigorously identified or studied well. We here propose the first study to definitively identify and characterize emission lines in this wavelength regime. We will observe the brightest quasar showing clear emission lines in the EUV, and compare to extant spectra for other quasars lacking such strong emission, in order to: (1) explore quasar diversity, investigating why the quasar emission spectrum varies so much between objects in the EUV

when it does not in the FUV through optical; (2) test photoionization models of the broad emission line region, particularly the existing tension between line production for helium and metal lines; (3) identify emission lines in this poorly understood wavelength regime, to enable inference of the underlying EUV spectral slope, important for quasar physics and ionization of the intergalactic medium.

### **OBSERVING DESCRIPTION**

We will conduct a detailed study for extreme UV emission lines in our target, previously observed in the FUV only with extremely low resolution ACS/SBC prism spectra. Most of the data will be taken in G130M, with a mix of central wavelengths to maximize wavelength coverage of the most interesting features. Some G140L data will be taken for continuum calibration and to search for emission lines lying redward of the G130M coverage. Accurate SDSS coordinates allow us to use ACQ/IMAGE only to acquire the target (to S/N=40 for the given time). The target does not come close to violating oversight safety, and GALEX imaging directly verifies no nearby UV-bright objects.

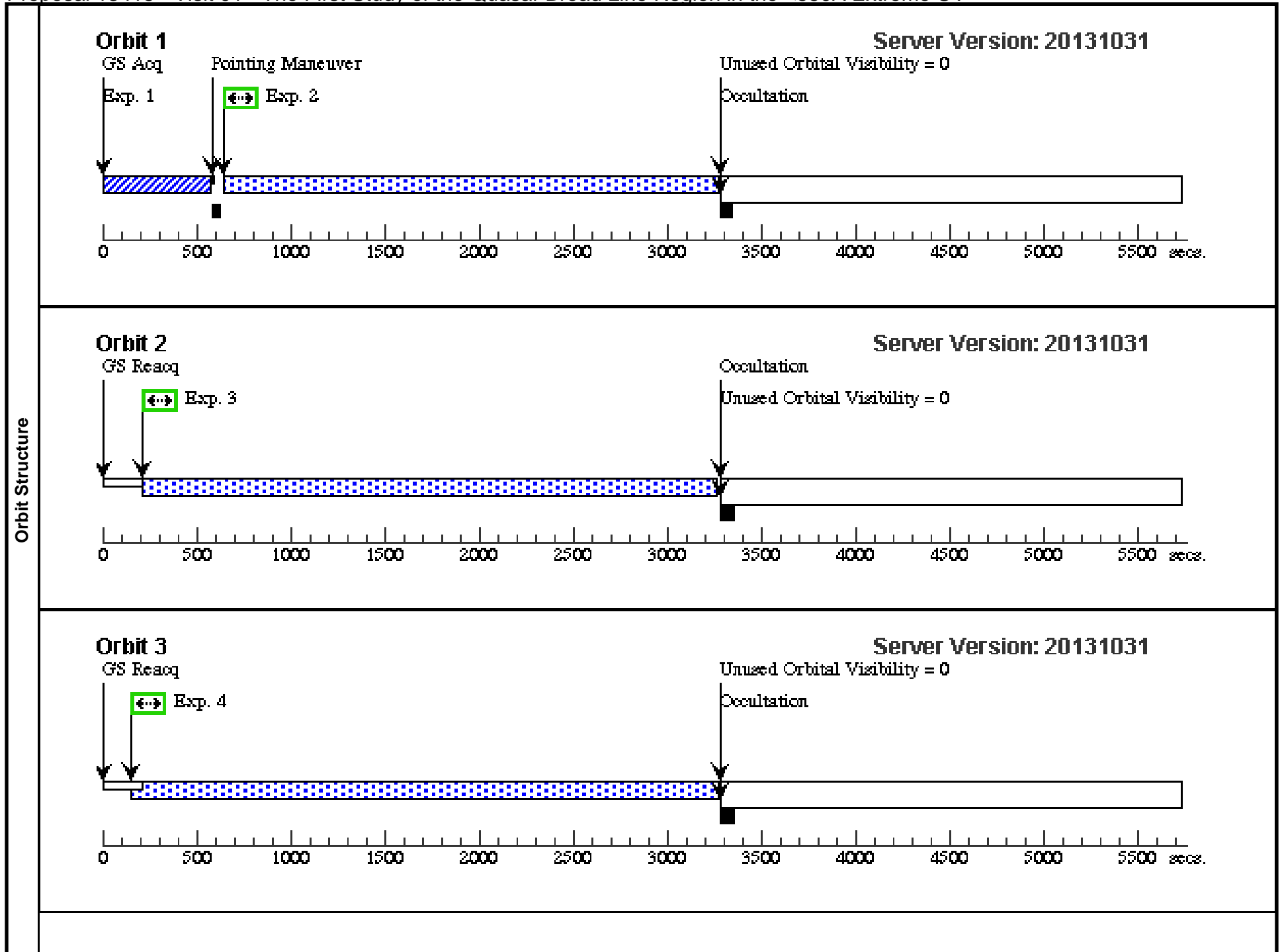
Proposal 13415 - Visit 01 - The First Study of the Quasar Broad Line Region in the <550A Extreme UV

Thu Mar 27 01:04:22 GMT 2014

<b>Visit</b>	<p><b>Proposal 13415, Visit 01, failed</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Scientific Instruments: COS/NUV, COS/FUV</p> <p>Special Requirements: (none)</p>					
<b>Diagnostics</b>	<p>(Visit 01) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting.</p>					
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(1)	SDSS1006+3705	<p>RA: 10 06 10.5514 (151.5439642d)</p> <p>Dec: +37 05 13.86 (37.08718d)</p> <p>Equinox: J2000</p>		<p>V=17.8</p> <p>f_lambda(1315A)=1.9e-16 (AC</p> <p>S prism spectrum)</p>	Reference Frame: ICRS

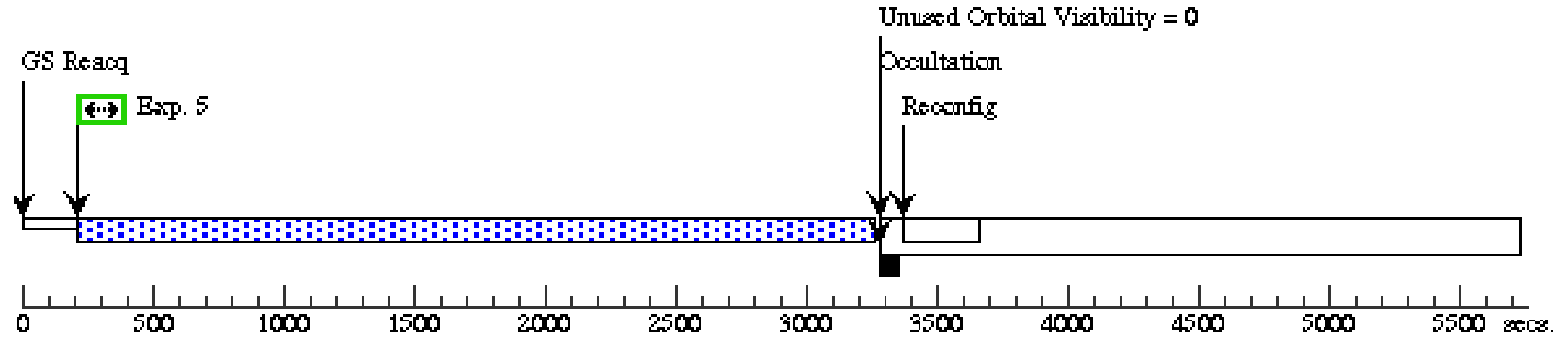
Proposal 13415 - Visit 01 - The First Study of the Quasar Broad Line Region in the <550A Extreme UV

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
<b>Exposures</b>	1	(COS.ta.508 193)	(1) SDSS1006+3705	COS/NUV, ACQ/IMAGE, PSA	MIRRORA			85 Secs (85 Secs) [==>]	[1]	
	<i>Comments: ACQ/IMAGE time estimated using the faintest NUV GALEX flux observed.</i>									
	2	(COS.sp.513 838)	(1) SDSS1006+3705	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=1; BUFFER-TIME=48 33; SEGMENT=BOTH		2200 Secs (2447 Secs) [==>2447.0 Secs ]	[1]	
	<i>Comments: ETC buffer time is 7250s.</i>									
	3	(COS.sp.513 838)	(1) SDSS1006+3705	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=48 33; SEGMENT=BOTH		2200 Secs (3001 Secs) [==>3001.0 Secs ]	[2]	
	<i>Comments: ETC buffer time is 7250s.</i>									
	4	(COS.sp.513 842)	(1) SDSS1006+3705	COS/FUV, TIME-TAG, PSA	G130M 1300 A	FP-POS=1; BUFFER-TIME=48 33; SEGMENT=BOTH		2900 Secs (3001 Secs) [==>3001.0 Secs ]	[3]	
<i>Comments: ETC buffer time is 7249s.</i>										
5	(COS.sp.513 842)	(1) SDSS1006+3705	COS/FUV, TIME-TAG, PSA	G130M 1300 A	FP-POS=2; BUFFER-TIME=48 33; SEGMENT=BOTH		2900 Secs (3001 Secs) [==>3001.0 Secs ]	[4]		
<i>Comments: ETC buffer time is 7249s.</i>										
6	(COS.sp.508 218)	(1) SDSS1006+3705	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=3; BUFFER-TIME=86 77; SEGMENT=A		1450 Secs (1442 Secs) [==>1442.0 Secs ]	[5]		
<i>Comments: ETC buffer time is 13.0 ks.</i>										
7	(COS.sp.508 218)	(1) SDSS1006+3705	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=4; BUFFER-TIME=86 77; SEGMENT=A		1450 Secs (1442 Secs) [==>1442.0 Secs ]	[5]		
<i>Comments: ETC buffer time is 13.0 ks.</i>										



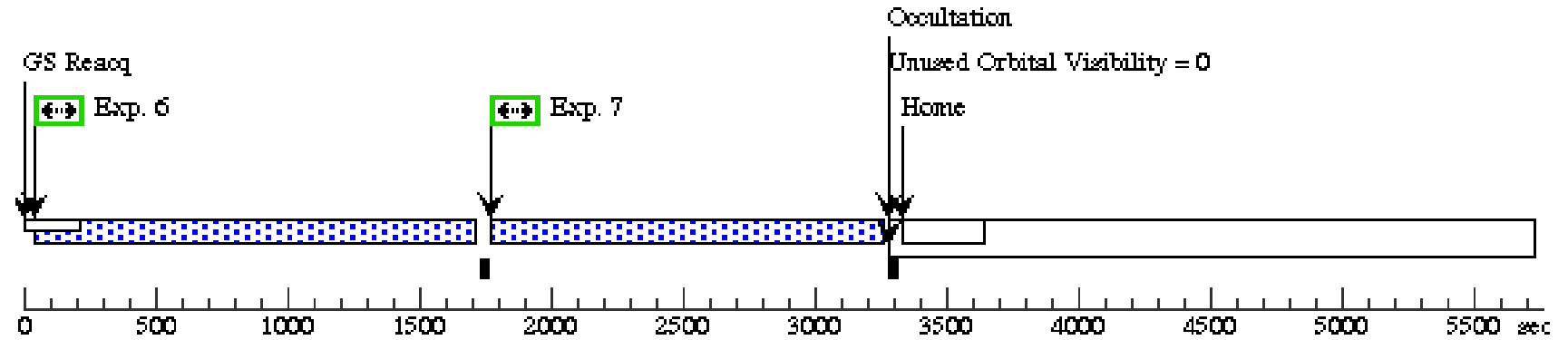
### Orbit 4

Server Version: 20131031



### Orbit 5

Server Version: 20131031



Proposal 13415 - Visit 11 - The First Study of the Quasar Broad Line Region in the <550A Extreme UV

Thu Mar 27 01:04:25 GMT 2014

<b>Visit</b>	<b>Proposal 13415, Visit 11, implementation</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: COS/NUV, COS/FUV Special Requirements: (none)										
	(Visit 11) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting.										
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>					
	(1)	SDSS1006+3705	RA: 10 06 10.5514 (151.5439642d) Dec: +37 05 13.86 (37.08718d) Equinox: J2000		V=17.8 f_lambda(1315A)=1.9e-16 (AC S prism spectrum)	Reference Frame: ICRS					
<b>Exposures</b>	<b>#</b>	<b>Label (ETC Run)</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time (Total)/[Actual Dur.]</b>	<b>Orbit</b>	
	1	(COS.ta.508 193)	(1) SDSS1006+3705	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				85 Secs (85 Secs) [==>]	[1]	
	<i>Comments: ACQ/IMAGE time estimated using the faintest NUV GALEX flux observed.</i>										
	2	(COS.sp.571 096)	(1) SDSS1006+3705	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=1; BUFFER-TIME=99 57; SEGMENT=BOTH			1450 Secs (2447 Secs) [==>2447.0 Secs ]	[1]	
	<i>Comments: ETC buffer time is 14.9 ks.</i>										
3	(COS.sp.571 096)	(1) SDSS1006+3705	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=2; BUFFER-TIME=99 57; SEGMENT=BOTH			1450 Secs (3001 Secs) [==>3001.0 Secs ]	[2]		
<i>Comments: ETC buffer time is 14.9 ks.</i>											
4	(COS.sp.508 218)	(1) SDSS1006+3705	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=3; BUFFER-TIME=86 77; SEGMENT=A			3000 Secs (2999 Secs) [==>2999.0 Secs ]	[3]		
<i>Comments: ETC buffer time is 13.0 ks.</i>											

