13383 - Measuring the Properties of Dwarf Streams

Cycle: 21, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
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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) SDSSJ123235.82+060310.0	COS/FUV COS/NUV	4	11-Jul-2013 18:19:51.0	yes
02	(1) SDSSJ123235.82+060310.0	COS/FUV COS/NUV	4	11-Jul-2013 18:20:02.0	yes

8 Total Orbits Used

ABSTRACT

We propose to measure the metallicity and ionization conditions of a gaseous stream trailing behind a pair of dwarf galaxies in the local universe. The NGC 4532/DDO 137 system is a clear analog to the Milky Way's massive satellite galaxies, the Large and Small Magellanic Clouds; however, this system is not in close proximity to a massive spiral galaxy. Furthermore, it is the only other dwarf stream for which the metallicity and ionization conditions can be directly measured due to the fortuitous alignment of a bright background QSO with the HI stream. We will use the data to examine the properties and formation mechanisms of such streams and how they differ with environment. Such information can be used to

develop a method to discriminate between cold accreting filaments and streams stripped from low mass galaxies at all redshifts.

OBSERVING DESCRIPTION

These observations of the QSO probe on the HI stream will use COS in medium resolution mode using the G130M/G160M gratings to obtain the metallicity and ionization conditions of the stream.
With COS/G130M and G160M spectra, we will cover a wavelength range of 1150-1775 AA, where Ly-alpha and key strong metal transitions are accessible (OI, CII, CIV, SiII, SiIII, SiIV, NV). The observations will yield moderate S/N ~ 15, high resolution (~15 km/s) spectra for both gratings. The combination of resolution and signal-to-noise is designed to allow us to detect weak Ly-alpha and metal absorption features, W > 50 AA, at 5-sigma (at 1215 AA and 1550 AA, Ly-alpha and CIV, respectively).

The sightline was chosen from the Veron-Cetty QSO catalog 13th ed., and cross-matching it with the GALEX database. The GALEX data provide an estimate of the UV flux, with the FUV imaging band covering the range 1344 - 1786 AA (effective wavelength 1516 AA). This GALEX selection has proven to be highly successful, and ensures bright object protection screening. The SDSS images were checked to ensure there were no obvious stars or galaxies interfering with the GALEX flux.

We have an a priori expectation from 21-cm HI maps that we will probe N_HI > 10^(18.5) cm^(-2) gas, covering a wide range of absorption lines, similar to those seen in extra-galactic damped Ly-alpha systems. This background probe is also serendipitously bright (m_{FUV}=17.3), allowing us to obtain both G130M and G160M data in only 8 orbits. With sufficient separation from the MW Ly-alpha absorption, damping wings in the Ly-alpha profile will allow us to obtain the necessary HI column density, but as noted we already have a limit on this from the emission line observations. Our previous observations (Yoon et al. 2012), also show we will easily resolve numerous absorbers along a sightline.

The acquisition strategy (mirror A vs B) has been chosen using the COS Imaging Acquisition ETC and the Galex FUV fluxes to normalise a variety of input spectra (both flat spectra, and QSO spectra redshifted to the measured QSO redshift). To be conservative, we chose the longest suggested exposure time among the various results, while ensuring count-rate limits are not exceeded. Science exposure times were estimated with the COS spectroscopy ETC. They were broken up to cover two central wavelengths and multiple FP-POS and extended to fully pack the orbits.

Visit

Proposal 13383, Visit 01, implementation Thu Jul 11 22:20:10 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(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.

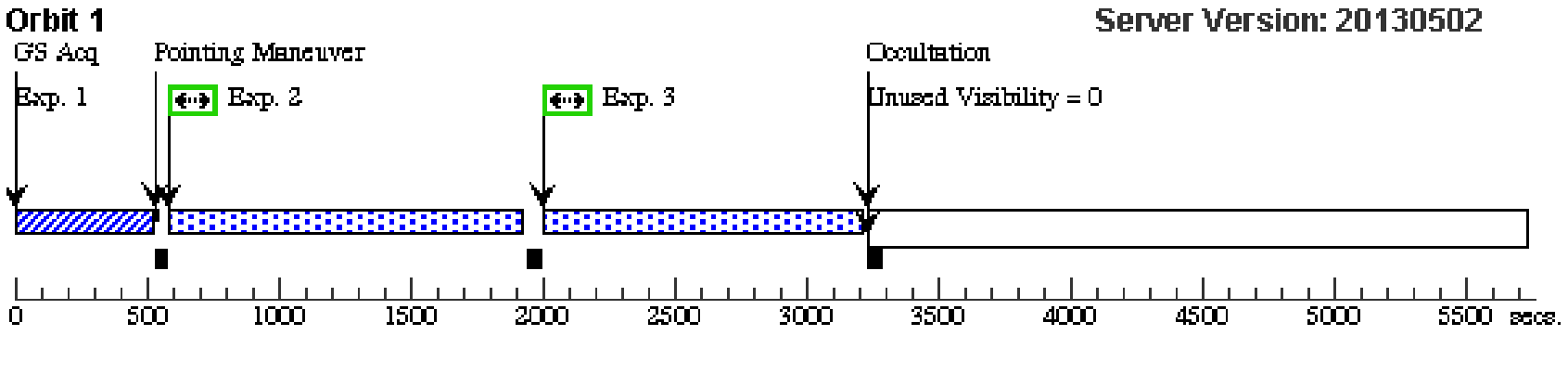
Fixed Targets

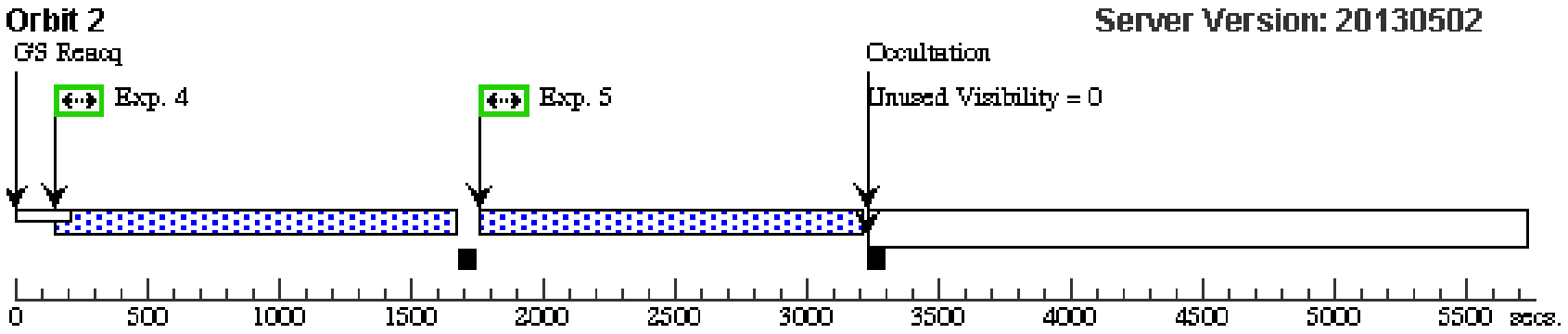
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SDSSJ123235.82+060310.0	RA: 12 32 35.8200 (188.1492500d) Dec: +06 03 9.97 (6.05277d) Equinox: J2000		V=16.57 m_FUV=17.31	Reference Frame: ICRS

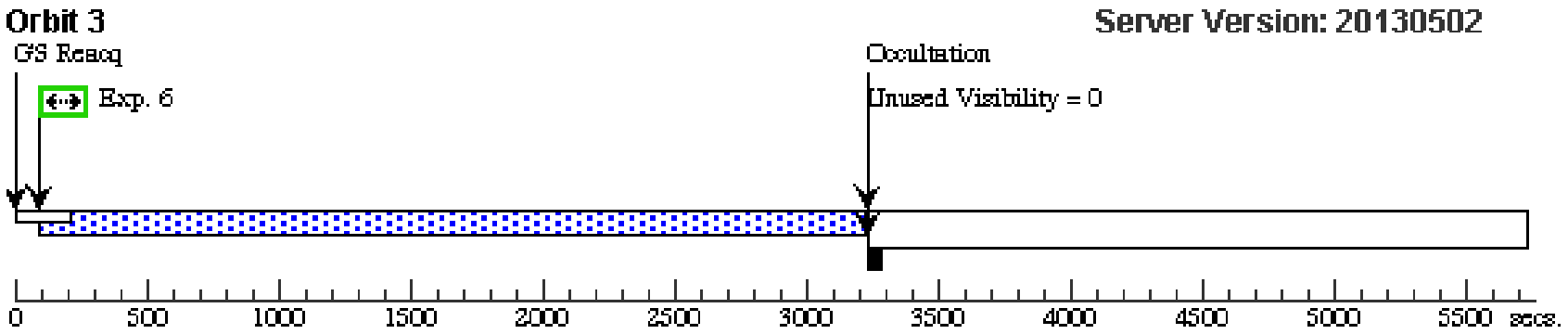
Exposures

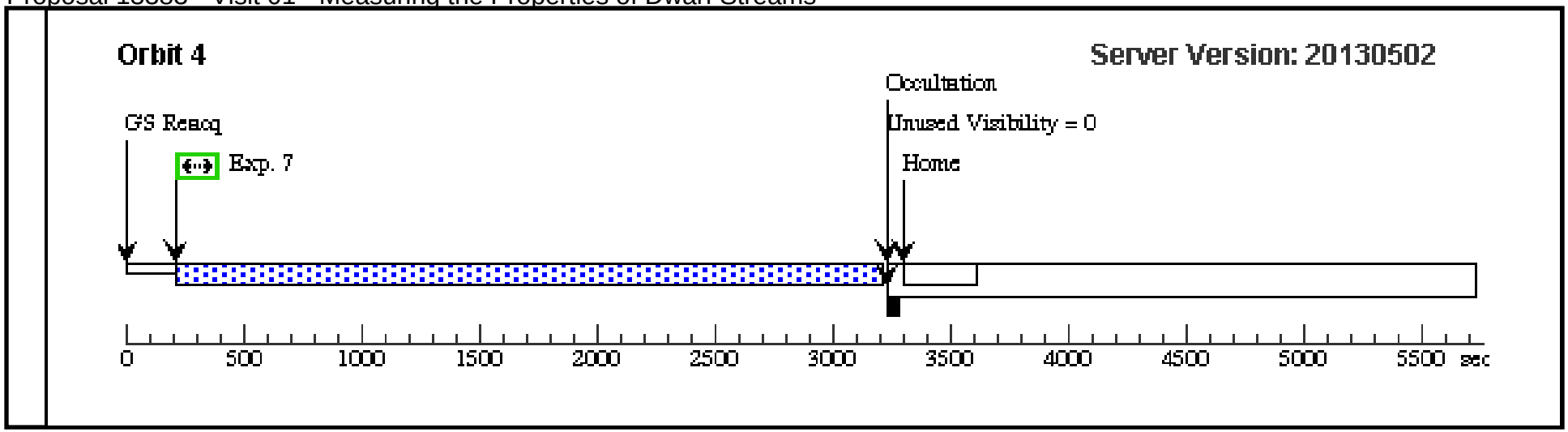
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(516403)	(1) SDSSJ123235.82+060310.0	COS/NUV, ACQ/IMAGE, PSA	MIRRORB		GS ACQ SCENARIO BASE1B3		42.9 Secs (42.9 Secs) *[==>]*	*[1]*
2	(516425)	(1) SDSSJ123235.82+060310.0	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=1; BUFFER-TIME=2985			1157 Secs (1157 Secs) *[==>]*	*[1]*
3	(516425)	(1) SDSSJ123235.82+060310.0	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=2; BUFFER-TIME=2985			1157 Secs (1157 Secs) *[==>]*	*[1]*
4	(516415)	(1) SDSSJ123235.82+060310.0	COS/FUV, TIME-TAG, PSA	G130M 1309 A	FP-POS=3; BUFFER-TIME=3105			1402 Secs (1402 Secs) *[==>]*	*[2]*
5	(516415)	(1) SDSSJ123235.82+060310.0	COS/FUV, TIME-TAG, PSA	G130M 1309 A	FP-POS=4; BUFFER-TIME=3105			1402 Secs (1402 Secs) *[==>]*	*[2]*
6	(516418)	(1) SDSSJ123235.82+060310.0	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=1; BUFFER-TIME=8644			2900 Secs (2945 Secs) *[==>2945.0 Secs]*	*[3]*
7	(516418)	(1) SDSSJ123235.82+060310.0	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=2; BUFFER-TIME=8644			2900 Secs (2947 Secs) *[==>2947.0 Secs]*	*[4]*

Orbit Structure





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Visit

Proposal 13383, Visit 02, implementation Thu Jul 11 22:20:14 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(Visit 02) 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.

Fixed Targets

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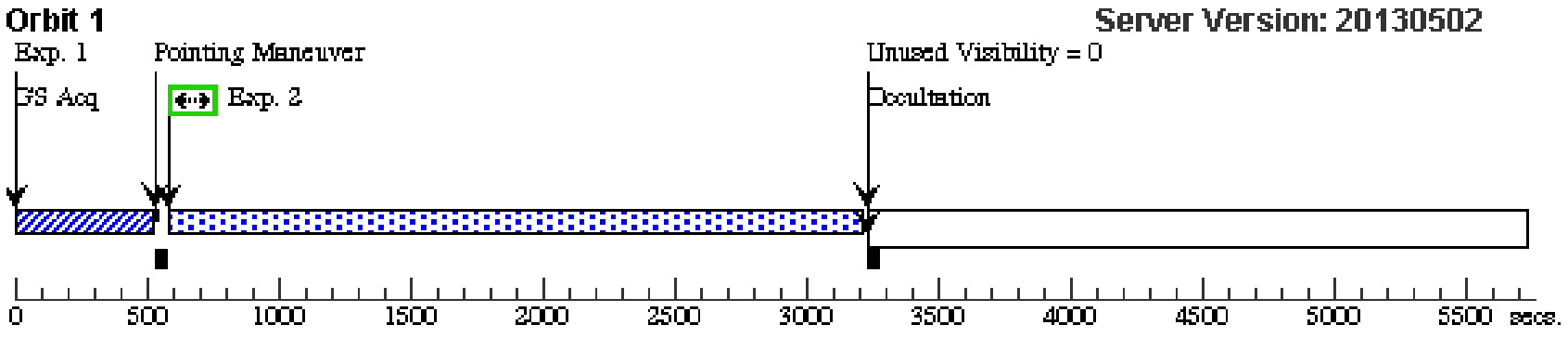
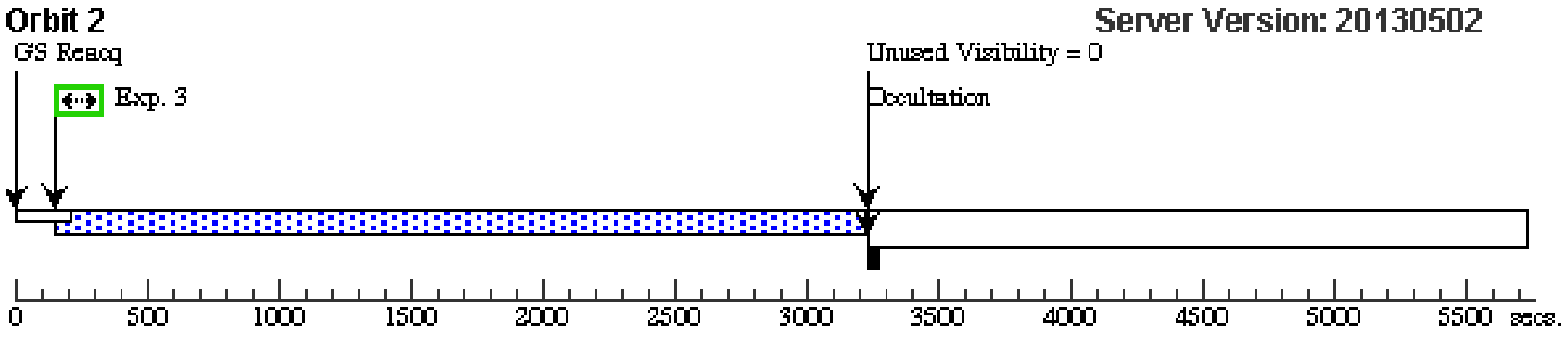
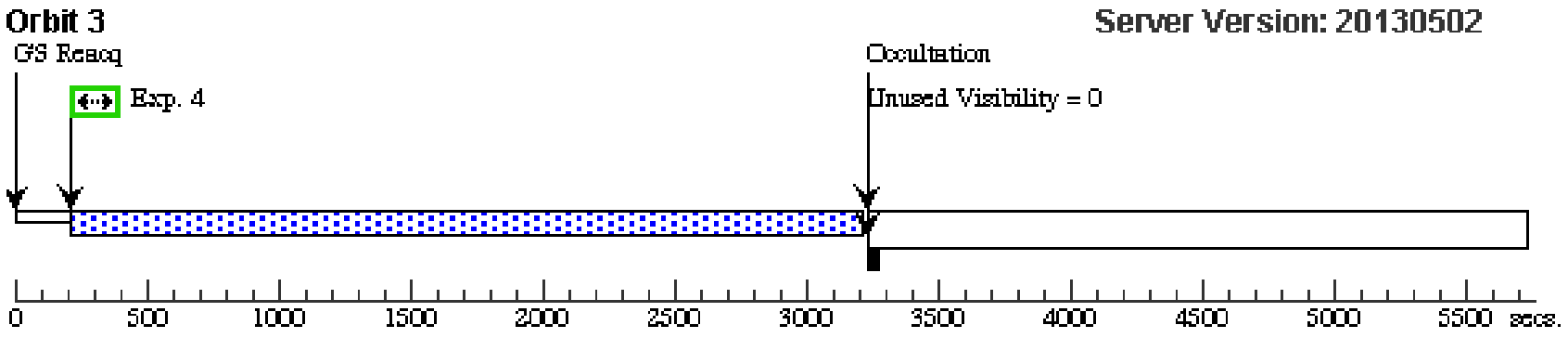
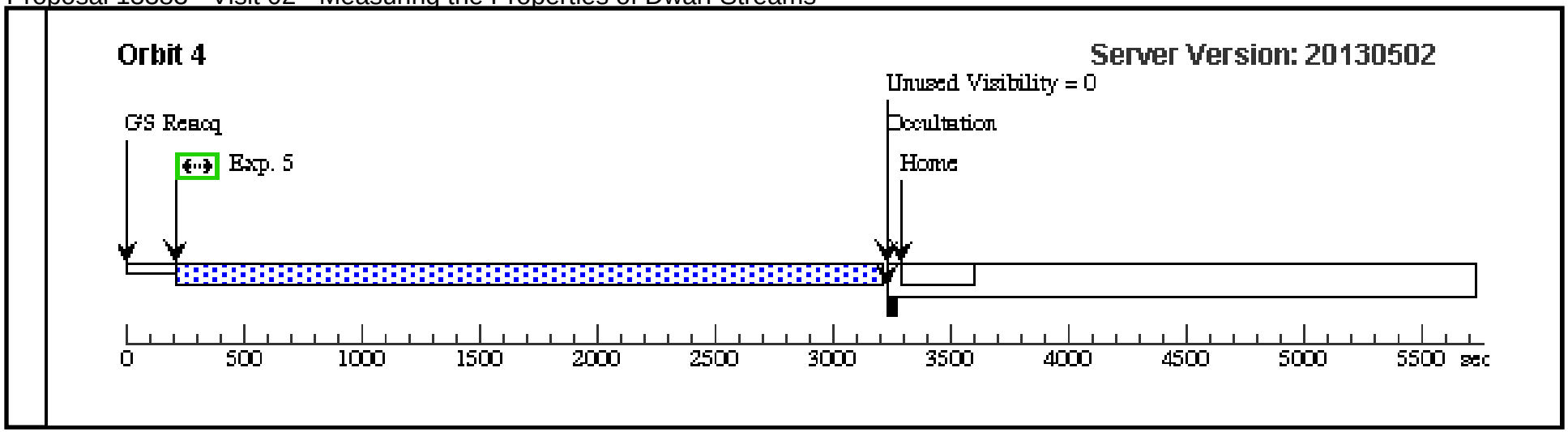
2	(516418)	(1) SDSSJ123235.82+060310.0	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=1; BUFFER-TIME=8644			2400 Secs (2414 Secs) *[==>2414.0 Secs]*	***[1]***
3	(516435)	(1) SDSSJ123235.82+060310.0	COS/FUV, TIME-TAG, PSA	G160M 1611 A	FP-POS=2; BUFFER-TIME=9274			2900 Secs (2947 Secs) *[==>2947.0 Secs]*	***[2]***
4	(516435)	(1) SDSSJ123235.82+060310.0	COS/FUV, TIME-TAG, PSA	G160M 1611 A	FP-POS=3; BUFFER-TIME=9274			2900 Secs (2947 Secs) *[==>2947.0 Secs]*	***[3]***
5	(516435)	(1) SDSSJ123235.82+060310.0	COS/FUV, TIME-TAG, PSA	G160M 1611 A	FP-POS=4; BUFFER-TIME=9274			2900 Secs (2947 Secs) *[==>2947.0 Secs]*	***[4]***

Orbit Structure





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