12252 - The Relative Kinematics of Galaxy Emission and Multiple Gas Phases in z~0.5 Extended Galaxy Halos

Cycle: 18, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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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) QSO-J0456-2159	COS/FUV COS/NUV	2	24-Jan-2011 21:15:32.0	yes
02	(2) 4C-06.41	COS/FUV COS/NUV	5	24-Jan-2011 21:15:39.0	yes

7 Total Orbits Used

ABSTRACT

Evidence abounds from quasar absorption line data that the extended gaseous halos of galaxies comprise multiple phases (densities, temperatures, ionization conditions). Developing a comprehensive and deeper understanding of the origin and persistence of extended galaxy halos, and their role in galaxy evolution, requires that these multiple phases be observed and analyzed. However, such studies that incorporate the host galaxies are virtually non-existent. The new COS instrument opens a new window in which the forest of FUV lines arising in neutral, low, AND high ionization

halo gas can be probed with high resolution and sensitivity for multiple chemical species. For intermediate redshift galaxies, these lines are free of Ly-alpha forest contamination.

We propose to obtain G160M COS/FUV high resolution spectra of the two quasars Q0454-220 (J0456-2159) and Q1038+064 (4c 06.41) in order to measure the neutral hydrogen Ly-beta, gamma, and delta transitions and the OVI 1031,1038 doublet and CII 1036 and CIII 977 transitions (as well as a few others that fall on the spectral format) in three intervening z~0.45 intervening gaseous halos. We augment the proposed observations with a similar pending COS spectrum (scheduled May 2010, PID 11667, PI Churchill) of the quasar TON 153, which will provide the multiphase absorption kinematics for two additional gaseous halos at z~0.67. The proposed observations will bring our final sample size to five.

For these five systems, we have quantified the host galaxy morphologies (WFCP-2/HST images), measured the galaxy emission lines and rotation curves (ESI/Keck spectra), and analyzed the MgII 2796,2803 and FeII multiplet absorption (HIRES/Keck spectra). Our goal is to undertake a comprehensive analysis of the multiphase physical conditions in these five galaxy-absorber pairs. We aim to perform the first ever quantitative comparison of the relative relationships between neutral, low, and high ionization absorbing halo gas kinematics with the galaxy kinematics and morphologies. We will interprete the data using synthetic absorption line data of the same transitions for "quasar sightlines" through a Eulerian adaptive resolution hydrodynamic cosmological simulation following the methods of Kacprzak etal. (2010).

OBSERVING DESCRIPTION

We planned G160M (centered at 1589 angstroms) spectra of the quasars QSO J0456-2159 (z=0.53) and 4C 06.41 (z=1.27). Accounting for overhead, we planned for total science exposure of 2 orbits for QSO J0456-2159 and 5 orbits for 4C 06.41. We use NUV ACQ/IMAGE acquisition with MIRROR B and TIME-TAG with FLASH=YES observations with manual FP-SPLITs (minimizing setup when possible while ensuring maximum spectral coverage). We assume the requested orbits are consecutive for a given target, such that each object requires one visit (for a total of two visits). Thus, target acquisition is required only on the first orbit of each visit. We manually shift FP-POS positions forward by one increment at a time to maximize orbital efficiency. For both visits, Orbit 1 requires setup overhead accounting for NUV AQC/IMAGE guide star and field acquisition, OSM1 movement to G160M from Mirror A, centering on central wavelength, and TIME-TAG setup, with no overhead charge starting at FP-POS=3 (default position).

DESCRIPTION OF ORBITS:

VISIT 1: 2 ORBITS: TARGET: QSO J0456-2159 (5 exposures)

VISIT 1 ORBIT 1: Guide star acquisition, followed by Exposure 1 - the acquisition image of the QSO, which are NUV/MIRROR B (to avoid the bright limit). Shuttle to FUV grating G160M centered on wavelength 1589. Exposure 2 is the first observation of the QSO at FP-POS=1. Shuttle to FP-POS=2. Obtain Exposure 3.

VISIT 1 ORBIT 2: Guide star acquisition. Exposure 4 is at FP-POS=3. Shuttle to FP-POS=4. Obtain Exposure 5.

VISIT 2: 5 ORBITS: TARGET: 4C 06.41 (6 exposures)

VISIT 2 ORBIT 1: Guide star acquisition, followed by Exposure 1 - the acquisition images of the QSO, which are NUV/MIRROR B (to avoid the bright limit). Shuttle to FUV grating G160M centered on wavelength 1589. Exposure 2 is the first G160M/1589 observation of the QSO at FP-POS=1.

VISIT 2 ORBIT 2: Guide star acquisition. Exposure 3 G160M/1589 observation of the QSO at FP-POS=2.

VISIT 2 ORBIT 3: Guide star acquisition. Exposure 4 G160M/1589 observation of the QSO at FP-POS=3.

VISIT 2 ORBIT 4: Guide star acquisition. Exposure 5 G160M/1589 observation of the QSO at FP-POS=4.

VISIT 2 ORBIT 5: Guide star acquisition. Exposure 6 G160M/1589 is the second observation of the QSO at FP-POS=3.

Visit

Proposal 12252, Visit 01, implementation Tue Jan 25 02:15:44 GMT 2011

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(Visit 01) Warning (Orbit Planner): VISIBILITY OVERRUN

(Visit 01) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.

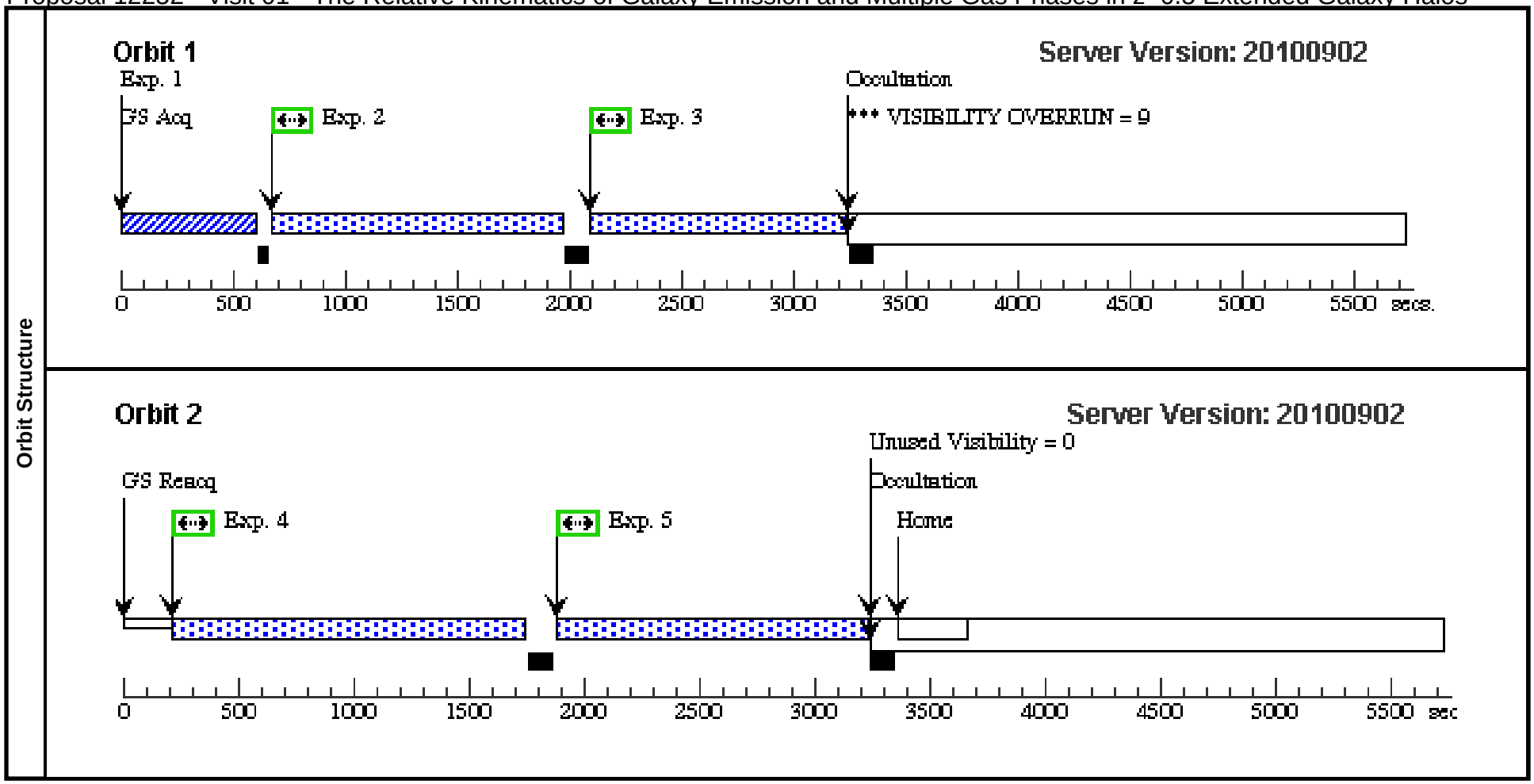
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	QSO-J0456-2159	RA: 04 56 8.9200 (74.0371667d) Dec: -21 59 9.40 (-21.98594d) Equinox: J2000		V=16.1 FUV(1500A) F_lam=6.8E-15	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	NUV_AQC-IMAGE	(1) QSO-J0456-2159	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				90 Secs *[==>]*	***[1]***
Comments: Exposure time gives SNR=10; MIRROR B required to avoid bright count limit									
2	FUV1589_FP1-1	(1) QSO-J0456-2159	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=1; SEGMENT=BOTH; BUFFER-TIME=1090; FLASH=YES			1090 Secs *[==>]*	***[1]***
3	FUV1589_FP2-1	(1) QSO-J0456-2159	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=2; SEGMENT=BOTH; BUFFER-TIME=1090; FLASH=YES			1090 Secs *[==>]*	***[1]***
4	FUV1589_FP3-1	(1) QSO-J0456-2159	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=3; SEGMENT=BOTH; BUFFER-TIME=1478; FLASH=YES			1478 Secs *[==>]*	***[2]***
5	FUV1589_FP4-1	(1) QSO-J0456-2159	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=4; SEGMENT=BOTH; BUFFER-TIME=1300; FLASH=YES			1300 Secs *[==>]*	***[2]***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GS Acq
Exp. 2
Exp. 3
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4000
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secs.
Orbit 2
Server Version: 20100902
Unused Visibility = 0
GS Reacq
Exp. 4
Exp. 5
Occultation
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sec

Visit

Proposal 12252, Visit 02, implementation Tue Jan 25 02:15:46 GMT 2011

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(Visit 02) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.

(Visit 02) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS

(Visit 02) Warning (Orbit Planner): VISIBILITY OVERRUN

Fixed Targets

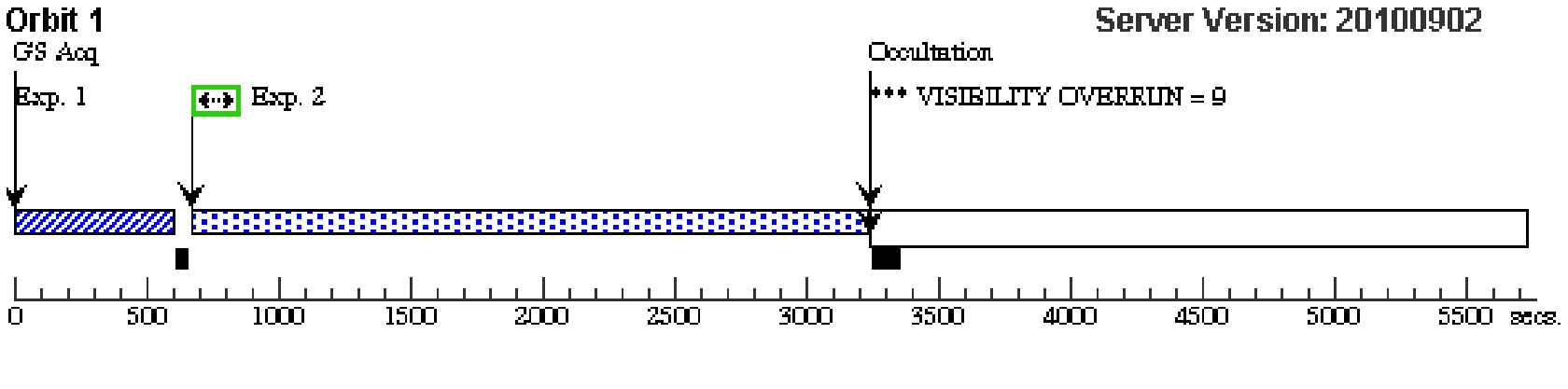
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	4C-06.41	RA: 10 41 17.1625 (160.3215104d) Dec: +06 10 16.92 (6.17137d) Equinox: J2000		V=16.7 FUV(1500A) F_lam=2.5E-15	Reference Frame: ICRS

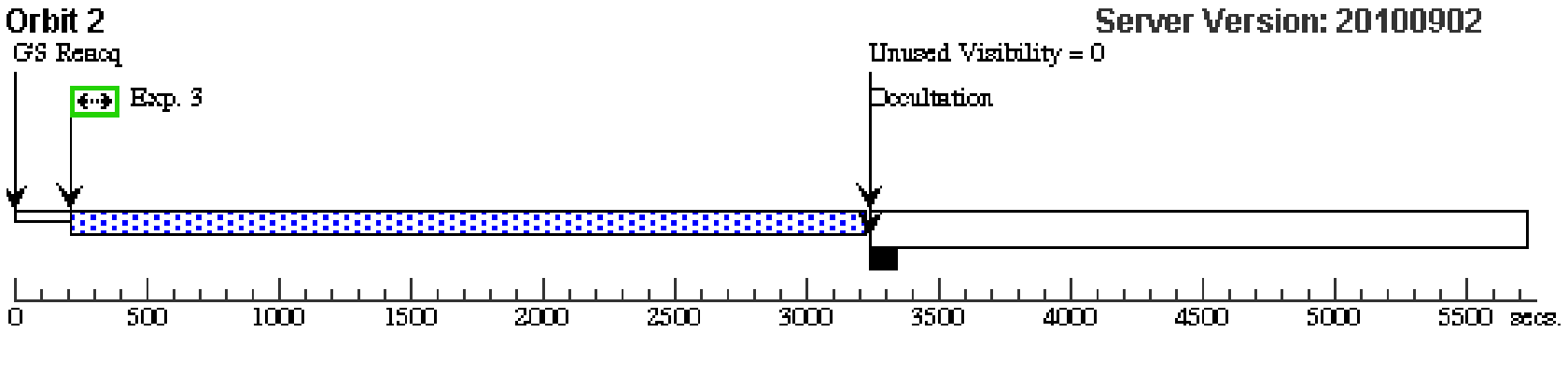
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

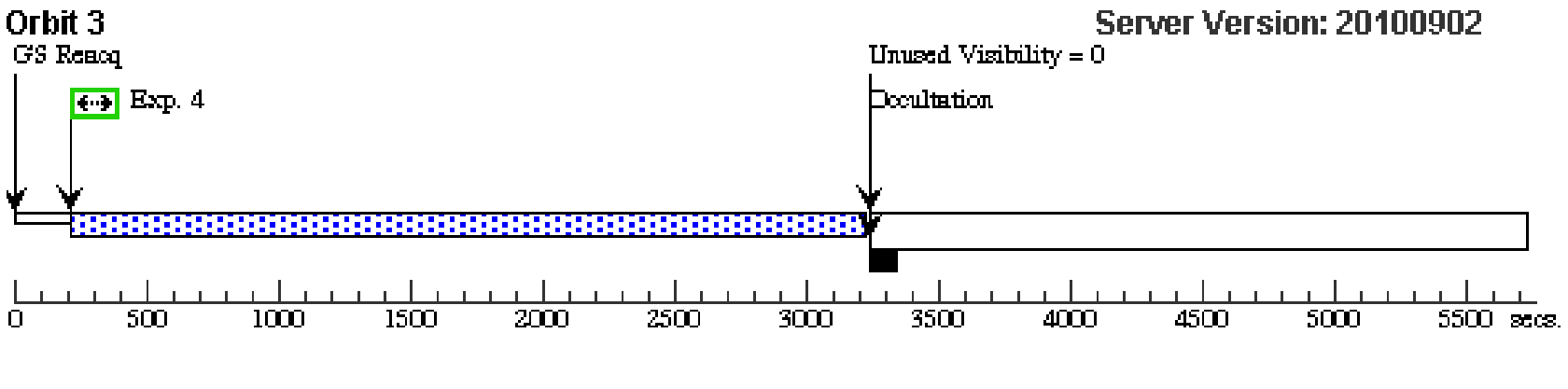
Exposures

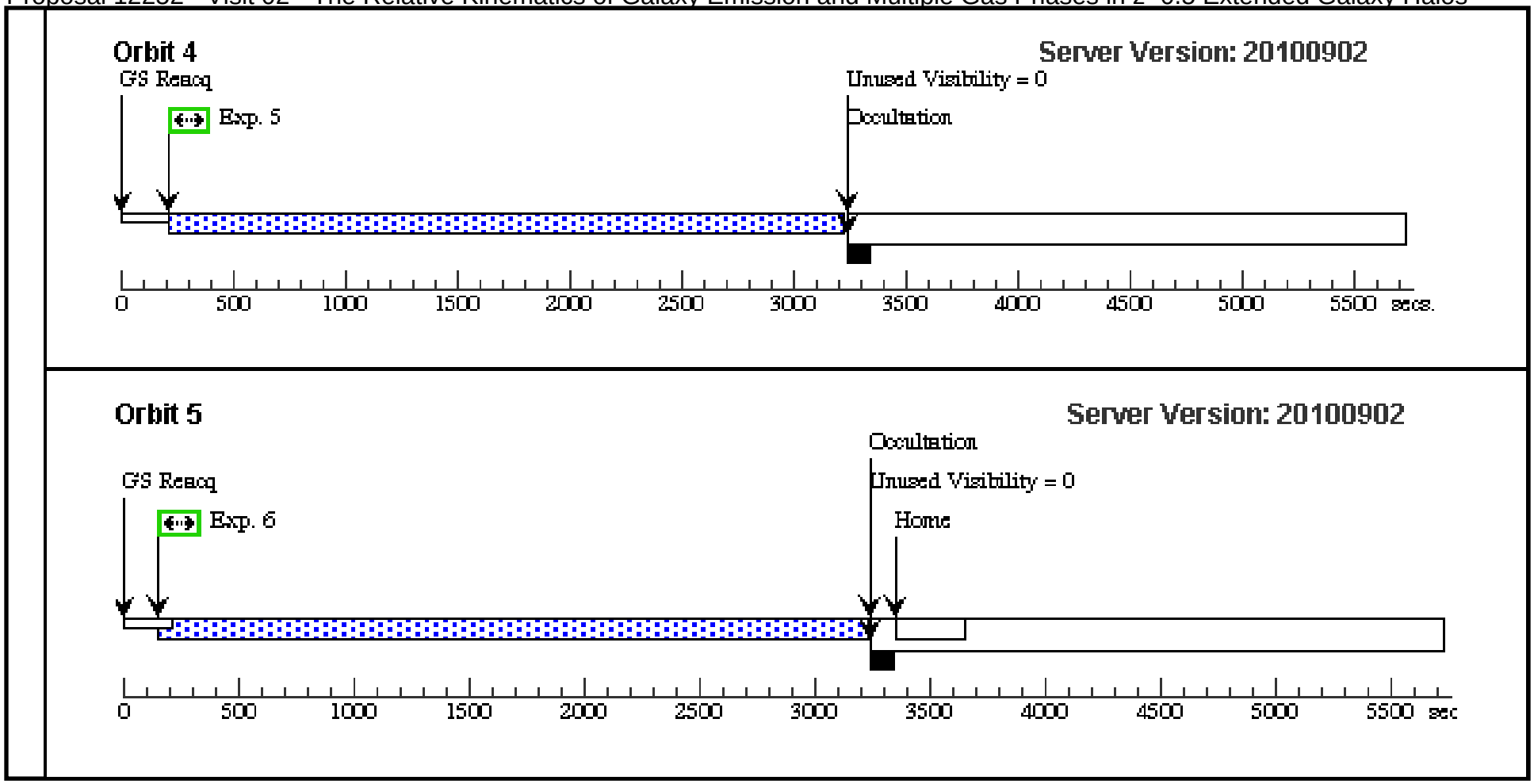
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	NUV_AQC-IMAGE	(2) 4C-06.41	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				90 Secs *[==>]*	***[1]***
Comments: Exposure times gives SNR=10; MIRROR B required to avoid bright limit									
2	FUV1589_FP1-1	(2) 4C-06.41	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=1; SEGMENT=BOTH; BUFFER-TIME=2358; FLASH=YES			2358 Secs *[==>]*	***[1]***
3	FUV1589_FP2-1	(2) 4C-06.41	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=2; SEGMENT=BOTH; BUFFER-TIME=2956; FLASH=YES			2956 Secs *[==>]*	***[2]***
4	FUV1589_FP3-1	(2) 4C-06.41	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=3; SEGMENT=BOTH; BUFFER-TIME=2956; FLASH=YES			2956 Secs *[==>]*	***[3]***
5	FUV1589_FP4-1	(2) 4C-06.41	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=4; SEGMENT=BOTH; BUFFER-TIME=2956; FLASH=YES			2956 Secs *[==>]*	***[4]***
6	FUV1589_FP3-2	(2) 4C-06.41	COS/FUV, TIME-TAG, PSA	G160M 1589 A	FP-POS=3; SEGMENT=BOTH; BUFFER-TIME=2956; FLASH=YES			2956 Secs *[==>]*	***[5]***

Orbit Structure





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secs.
Orbit 5
Server Version: 20100902
Occultation
GS Reacq
Unused Visibility = 0
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