13351 - UV Spectroscopy of a Peculiar White Dwarf Supernova

Cycle: 21, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Saurabh W. Jha (PI) (Contact)	**Rutgers the State University of New Jersey**	**saurabh@physics.rutgers.edu**
Mr. Curtis McCully (CoI)	Rutgers the State University of New Jersey	cmccully@physics.rutgers.edu
Dr. Ryan Foley (CoI)	University of Illinois at Urbana - Champaign	rfoley@illinois.edu
Dr. Peter Garnavich (CoI)	University of Notre Dame	pgarnavi@nd.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(2) SN-MRK1309 CCDFLAT	STIS/CCD STIS/NUV-MAMA	2	16-Mar-2014 21:22:55.0	yes
02	(2) SN-MRK1309 CCDFLAT	STIS/CCD STIS/NUV-MAMA	4	16-Mar-2014 21:23:13.0	yes

6 Total Orbits Used

ABSTRACT

While type Ia supernovae (SNe Ia) have been extremely useful for studying the cosmic expansion history, their explosion mechanism and progenitor system remain unsolved problems. Moreover, as large samples of SNe are observed, the diversity among these explosions has grown: not all exploding white dwarfs look like normal SNe Ia. Understanding why these "peculiar" objects are different from the normal ones can help explain the standard SN Ia scenario, as well as give us a better understanding of the many endpoints of stellar evolution. Connecting observations to physical models has been difficult for both normal and peculiar white dwarf supernovae. The ultraviolet is a largely unexplored wavelength region for peculiar

SNe Ia; the high opacity in the UV from typical thermonuclear burning products means that the UV flux in white dwarf supernovae is very sensitive to the outermost layers of ejecta. This material is the least processed, and is thus an ideal place to look for clues to progenitors and explosion mechanisms. Here we propose to take advantage of the Cycle 21 UV Initiative to obtain target-of-opportunity STIS UV spectroscopy of a peculiar white dwarf supernova to add a unique piece of the puzzle connecting peculiar SNe Ia and their progenitors.

OBSERVING DESCRIPTION

Our goal is to observe a single peculiar white-dwarf supernova using the STIS CCD for optical spectra and the STIS NUV_MAMA instrument for the near-UV. Many peculiar SNe Ia are faint, so we will restrict ourselves to low redshift events ($z < 0.03$). Peculiar SNe Ia evolve differently in the UV than their normal counterparts; we will therefore have two visits on our object. The first will be 2 of our 6 allotted orbits, with approximately half of an orbit being used for the optical spectrum using the STIS CCD, and the other 1.5 orbits being used for the STIS NUV-MAMA spectrum. This visit should cover the SN at maximum or prefereably a few days before maximum. By the time of the second visit, the SN will have faded considerably. The second visit will consist of 4 orbits: 0.5 orbits for the STIS CCD optical spectrum and 3.5 orbits with the NUV-MAMA instrument. We request that the second visit be scheduled approximately 1 week after the initial visit.

Visit

Proposal 13351, Visit 01, implementation Mon Mar 17 01:23:25 GMT 2014

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/NUV-MAMA

Special Requirements: SCHED 90%; ON HOLD ; TOO RESPONSE TIME 2.0D

On Hold Comments: Target of Opportunity

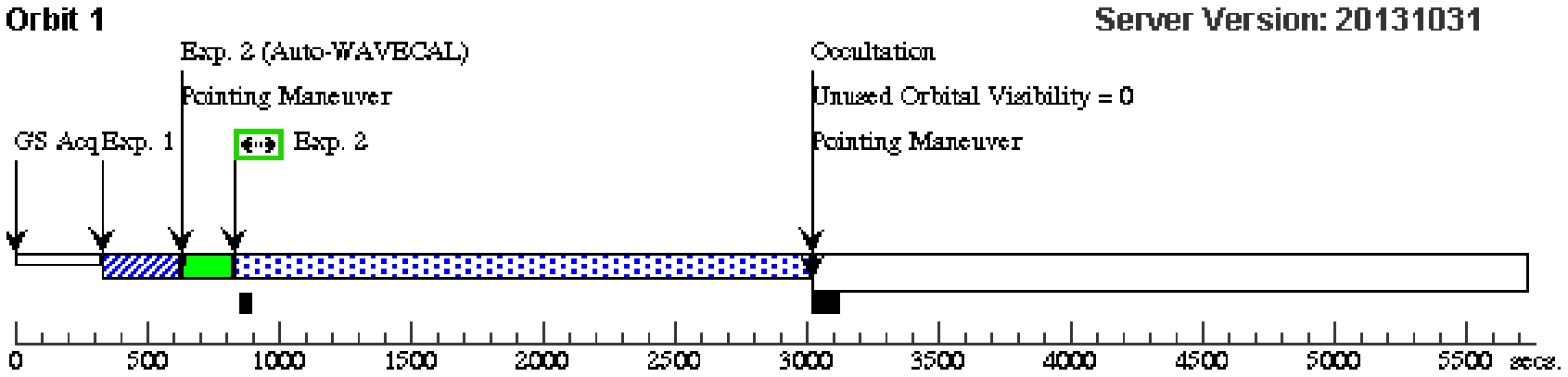
Fixed Targets

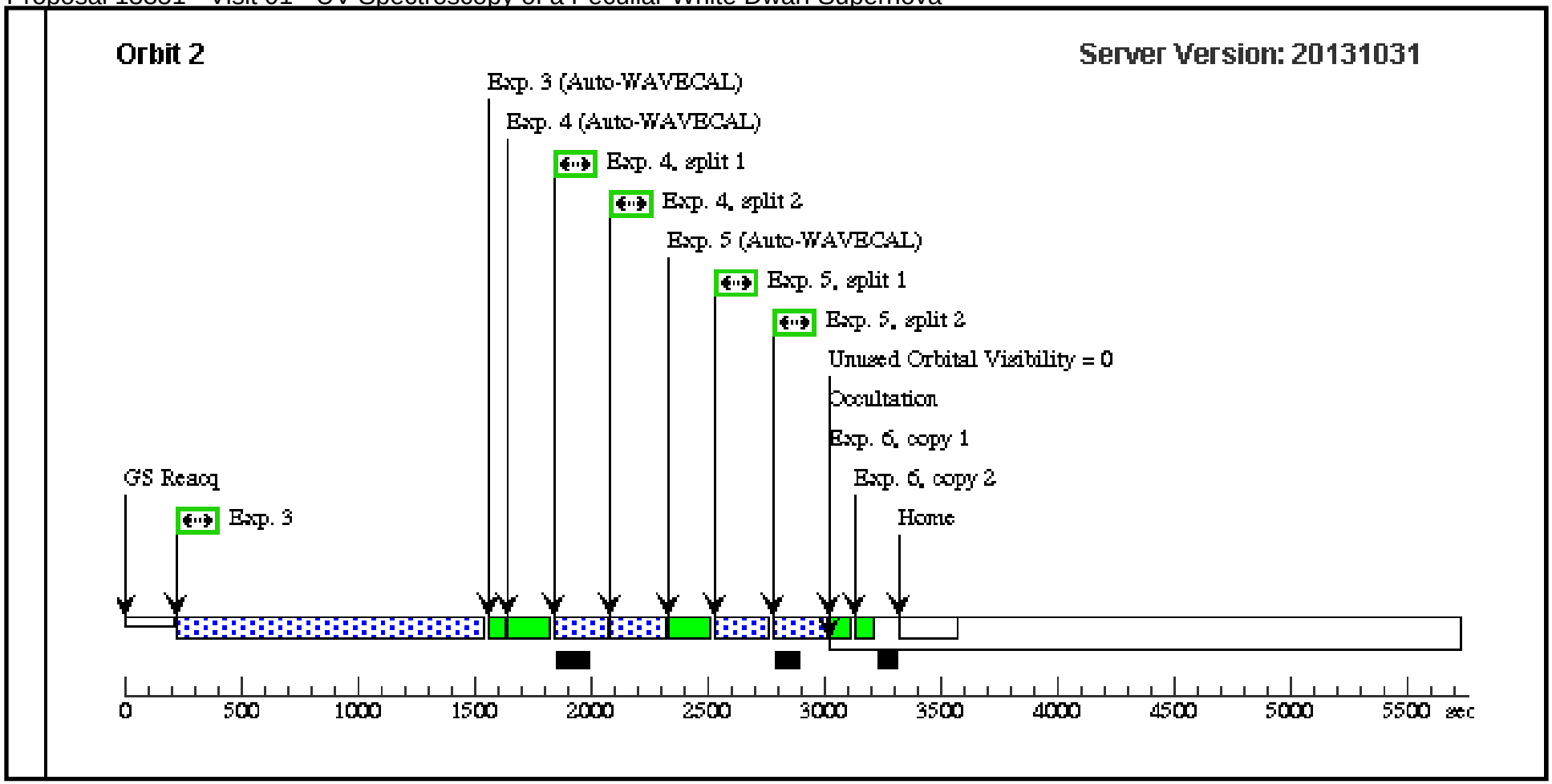
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SN-MRK1309 Alt Name1: SN-J1144	RA: 11 57 44.4400 (179.4351667d) Dec: -10 10 15.70 (-10.17103d) Equinox: J2000		V=15+/-1.0	Reference Frame: ICRS

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquisition	(2) SN-MRK1309	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=POINT			15 Secs (15 Secs) *[==>]*	 ***[1]***
2	UV1 (STIS.sp.51 5496)	(2) SN-MRK1309	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A		POS TARG 0.0,0.5		2167 Secs (2167 Secs) *[==>]*	 ***[1]***
3	UV2 (STIS.sp.51 5496)	(2) SN-MRK1309	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A		POS TARG 0.0,0.0		1311 Secs (1311 Secs) *[==>]*	 ***[2]***
4	OPT-430	(2) SN-MRK1309	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			400 Secs (400 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	 ***[2]***
5	OPT-750	(2) SN-MRK1309	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			400 Secs (400 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	 ***[2]***
6	FLAT-750	CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20131031
Exp. 3 (Auto-WAVECAL)
Exp. 4 (Auto-WAVECAL)
Exp. 4, split 1
Exp. 4, split 2
Exp. 5 (Auto-WAVECAL)
Exp. 5, split 1
Exp. 5, split 2
Unused Orbital Visibility = 0
Occultation
Exp. 6, copy 1
Exp. 6, copy 2
GS Reacq
Exp. 3
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13351, Visit 02, implementation Mon Mar 17 01:23:27 GMT 2014

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/NUV-MAMA

Special Requirements: SCHED 90%; AFTER 01 BY 4 D TO 9 D; ON HOLD ; TOO RESPONSE TIME 2.0D

On Hold Comments: Target of Opportunity

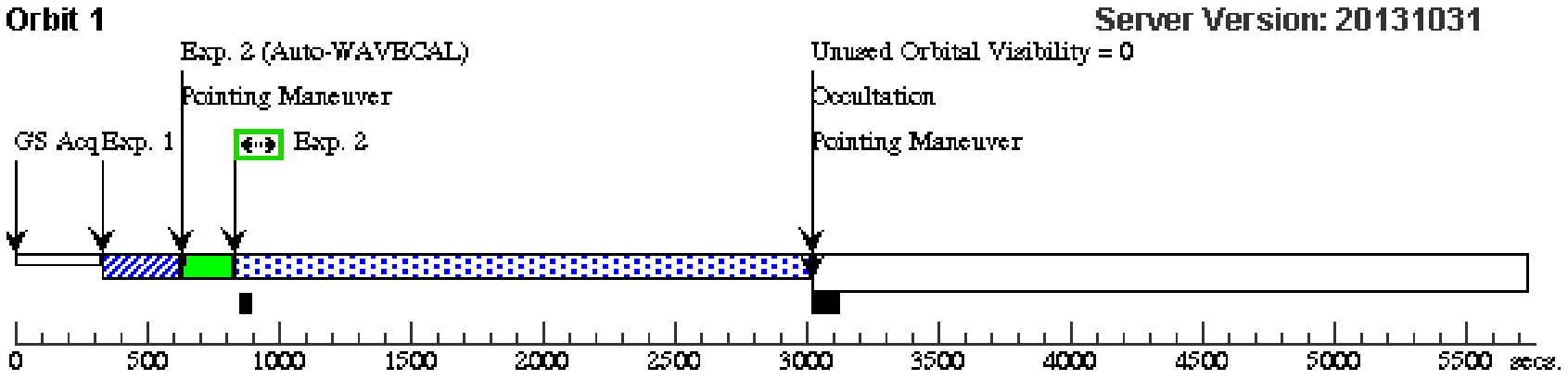
Fixed Targets

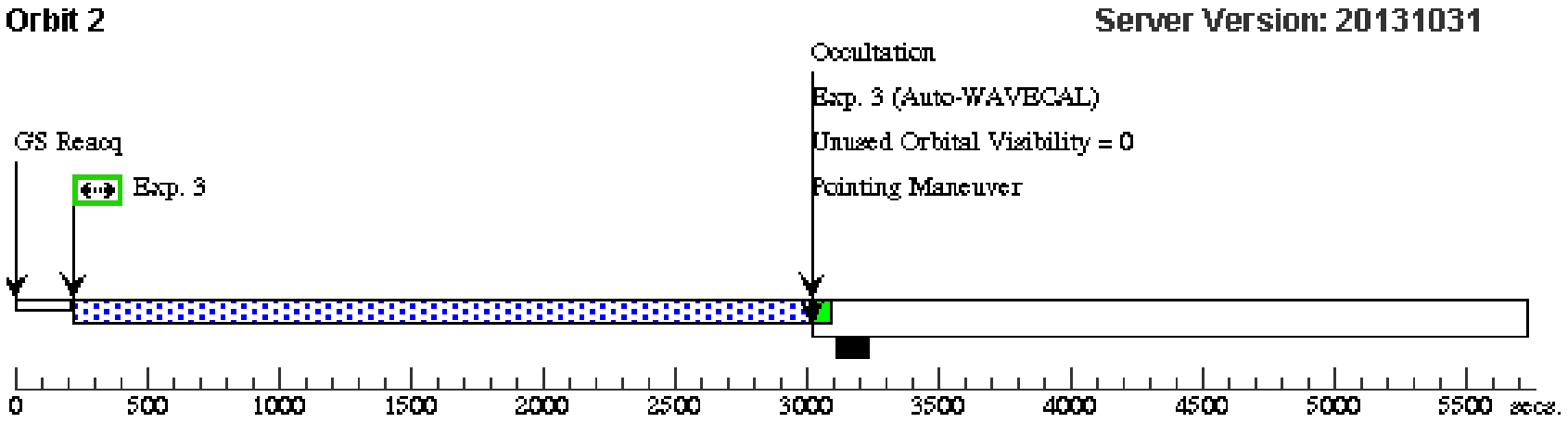
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SN-MRK1309 Alt Name1: SN-J1144	RA: 11 57 44.4400 (179.4351667d) Dec: -10 10 15.70 (-10.17103d) Equinox: J2000		V=15+/-1.0	Reference Frame: ICRS

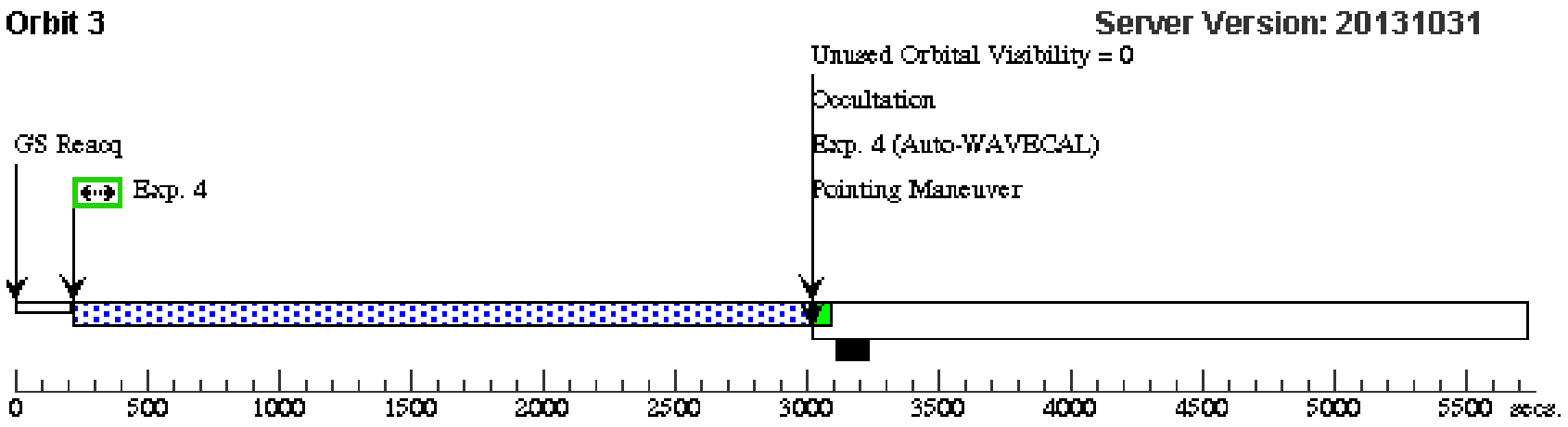
Exposures

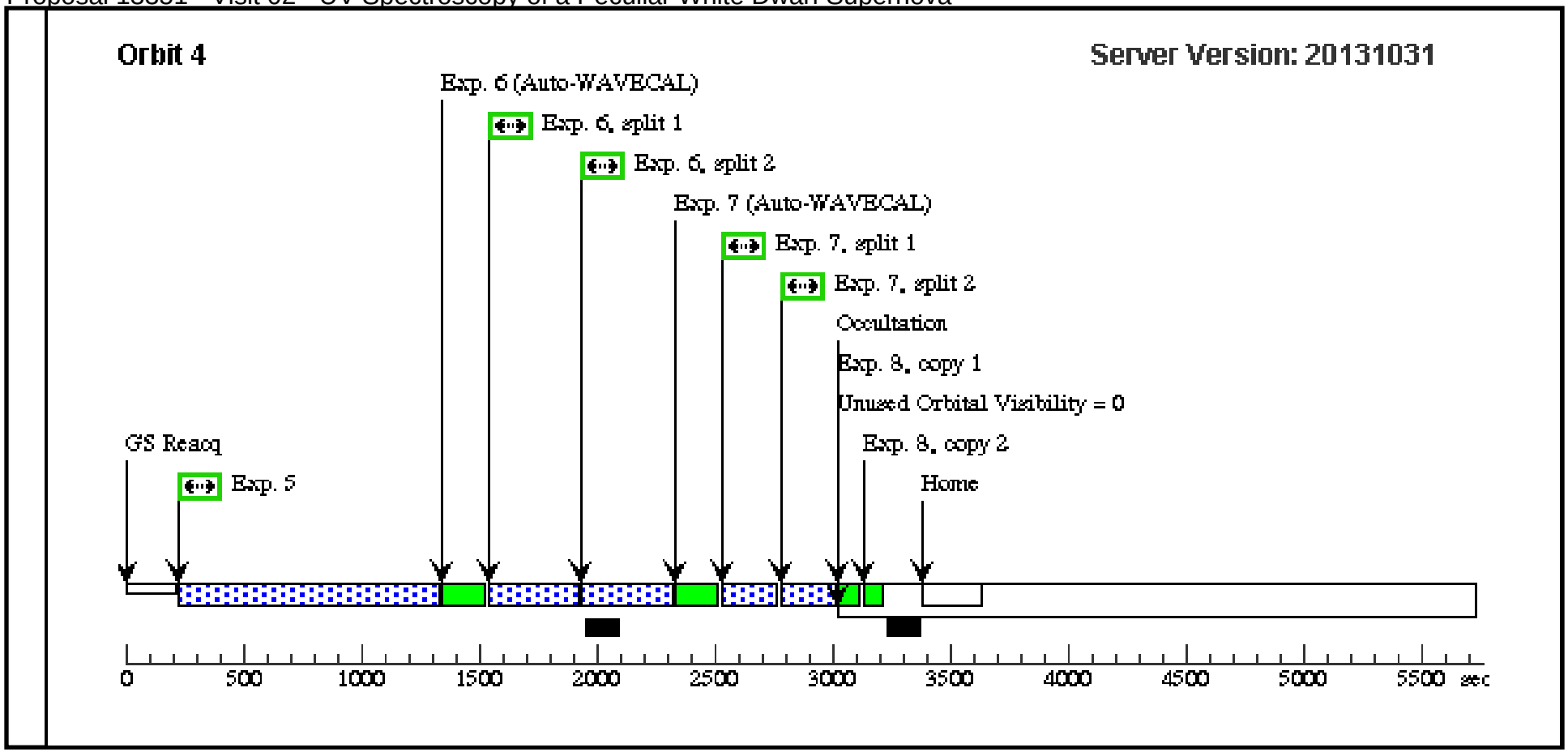
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquisition	(2) SN-MRK1309	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=POINT			15 Secs (15 Secs) *[==>]*	***[1]***
2	UV1 (STIS.sp.51 5497)	(2) SN-MRK1309	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A		POS TARG 0.0,0.0		2167 Secs (2167 Secs) *[==>]*	***[1]***
3	UV2 (STIS.sp.51 5497)	(2) SN-MRK1309	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A		POS TARG 0.0,-0.5		2779 Secs (2779 Secs) *[==>]*	***[2]***
4	UV3 (STIS.sp.51 5497)	(2) SN-MRK1309	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A		POS TARG 0.0,0.5		2779 Secs (2779 Secs) *[==>]*	***[3]***
5	UV4 (STIS.sp.51 5497)	(2) SN-MRK1309	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A		POS TARG 0.0,0.0		1096 Secs (1096 Secs) *[==>]*	***[4]***
6	OPT-430	(2) SN-MRK1309	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			700 Secs (700 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[4]***
7	OPT-750	(2) SN-MRK1309	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			400 Secs (400 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	***[4]***
8	FLAT-750	CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				*[==>(Copy 1)]* *[==>(Copy 2)]*	***[4]***

Orbit Structure






Orbit 3
Server Version: 20131031
Unused Orbital Visibility = 0
Occultation
Exp. 4 (Auto-WAVECAL)
Pointing Maneuver
GS Reacq
Exp. 4
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 4
Server Version: 20131031
Exp. 6 (Auto-WAVECAL)
Exp. 6, split 1
Exp. 6, split 2
Exp. 7 (Auto-WAVECAL)
Exp. 7, split 1
Exp. 7, split 2
Occultation
Exp. 8, copy 1
Unused Orbital Visibility = 0
GS Reacq
Exp. 5
Exp. 8, copy 2
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec