14144 - An Ultraviolet View of Overluminous Type Ia Supernonovae

Cycle: 23, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Peter J. Brown (PI) (Contact)	**Texas A & M University**	**pbrown@physics.tamu.edu**

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(2) SN2016CCJ	STIS/CCD STIS/NUV-MAMA	2	08-May-2016 21:00:21.0	yes
02	(2) SN2016CCJ	STIS/CCD STIS/NUV-MAMA	2	08-May-2016 21:00:23.0	yes
03	(2) SN2016CCJ	STIS/CCD STIS/NUV-MAMA	3	08-May-2016 21:00:26.0	yes

7 Total Orbits Used

ABSTRACT

Type Ia supernova (SNe) are important cosmological tools because of their standardizable luminosities in the optical and near-infrared. Ultraviolet (UV) wavelengths, however, show a great diversity even in normal objects. Though all SNe Ia are UV-faint, a small and heterogeneous group of SNe have UV luminosities ten times larger than the brightest "normal" SNe Ia. We refer to these as UV-bright, even though the spectral energy distribution still peaks in the optical. The origin of this UV flux is uncertain but could result from hotter explosions (with reduced line opacities) or interaction with a companion star or the circumstellar medium. While evidence of such would be important for understanding these standard candles,

these scenarios cannot be distinguished by UV photometry alone. We propose to follow up a UV-bright SN Ia (to be identified by Swift/UVOT observations) with HST/STIS to obtain high quality UV spectra near peak brightness. We will use the HST spectra to search for a hot thermal component arising from ejecta-companion or ejecta-CSM interaction. If the UV excess is not caused by a thermal component, the HST spectra can be used to model the elements responsible for the excess UV emission (or lack of absorption). The origin of the UV flux is key to understanding the progenitor star, companion, local environment, or the explosion. The time to understand the physics behind the UV luminosity is now with Swift/UVOT and HST.

OBSERVING DESCRIPTION

We will observe for three epochs/visits separated by about 5 days, with 2,2, and 3 orbits.
Each epoch includes 1000 sec in STIS/CCD 52x0.2E1 and the rest in STIS/NUV-MAMA G230L 52x0.2.

The target will likely have an optical magnitude V ~16. For the case where the SN is especially nearby and bright, we would like to shorten the observation times in the other epochs and add an observation in the G140L filter to extend the observation to even shorter wavelengths as was done for SN~2011fe.

Visit

Proposal 14144, visit1 (01), implementation Mon May 09 01:00:27 GMT 2016

Diagnostic Status: No Diagnostics

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

Special Requirements: SCHED 100%; BETWEEN 05-MAY-2016:00:00:00 AND 15-MAY-2016:00:00:00

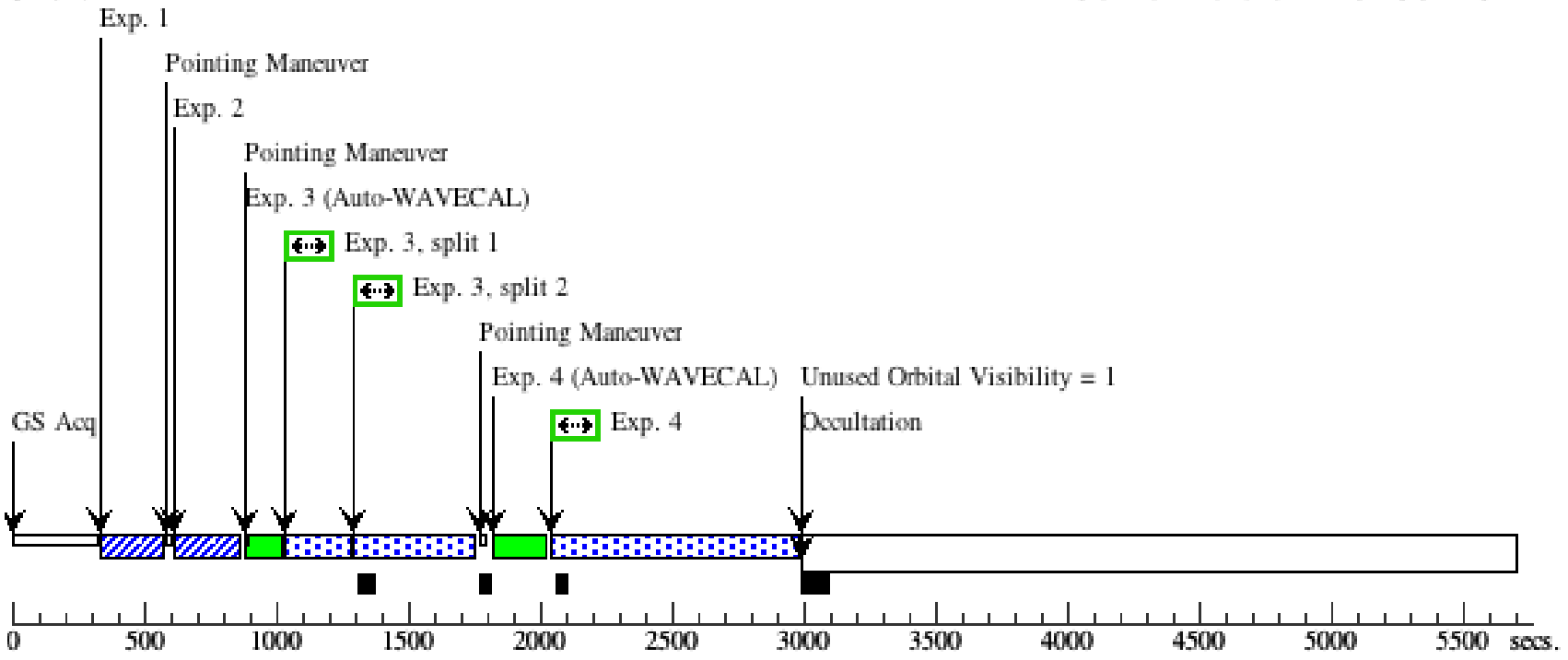
Fixed Targets

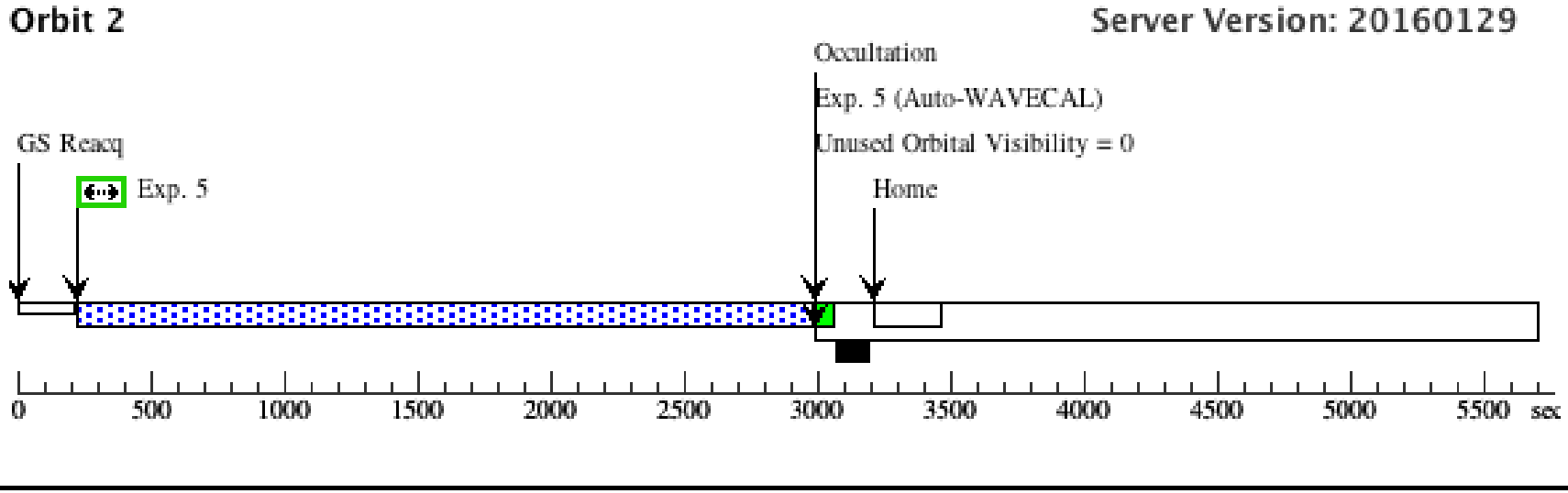
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SN2016CCJ Alt Name1: ASASSN-16EX Alt Name2: AT2016CCJ	RA: 17 10 23.9710 (257.5998792d) Dec: +26 23 48.85 (26.39690d) Equinox: J2000	Parallax: 0" Epoch of Position: 2000 Redshift: 0.03	V=17.1+/-0.1 uvm2=17.8 (Swift/UVOT)	Reference Frame: ICRS
Comments: Extended=NO					

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	visit1acq (732247)	(2) SN2016CCJ	STIS/CCD, ACQ, F28X50LP	MIRROR				3 Secs (3 Secs) *[==>]*	 ***[1]***
2	visit1acqpeak (732247)	(2) SN2016CCJ	STIS/CCD, ACQ/PEAK, 52X0.1E1	MIRROR				3 Secs (3 Secs) *[==>]*	 ***[1]***
3	visit1nuv	(2) SN2016CCJ	STIS/CCD, ACCUM, 52X0.2E1	G430L 4300 A	CR-SPLIT=2			1000 Secs (637 Secs) *[==>215.0 Secs (Split 1)]* *[==>422.0 Secs (Split 2)]*	 ***[1]***
4	visit1nuvmama (732239)	(2) SN2016CCJ	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1000 Secs (922 Secs) *[==>922.0 Secs]*	 ***[1]***
5	visit1bnuvmama (732239)	(2) SN2016CCJ	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2700 Secs (2743 Secs) *[==>2743.0 Secs]*	 ***[2]***

Orbit Structure





Visit

Proposal 14144, visit2 (02), implementation Mon May 09 01:00:27 GMT 2016

Diagnostic Status: No Diagnostics

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

Special Requirements: SCHED 100%; AFTER 01 BY 5 D TO 8 D

Fixed Targets

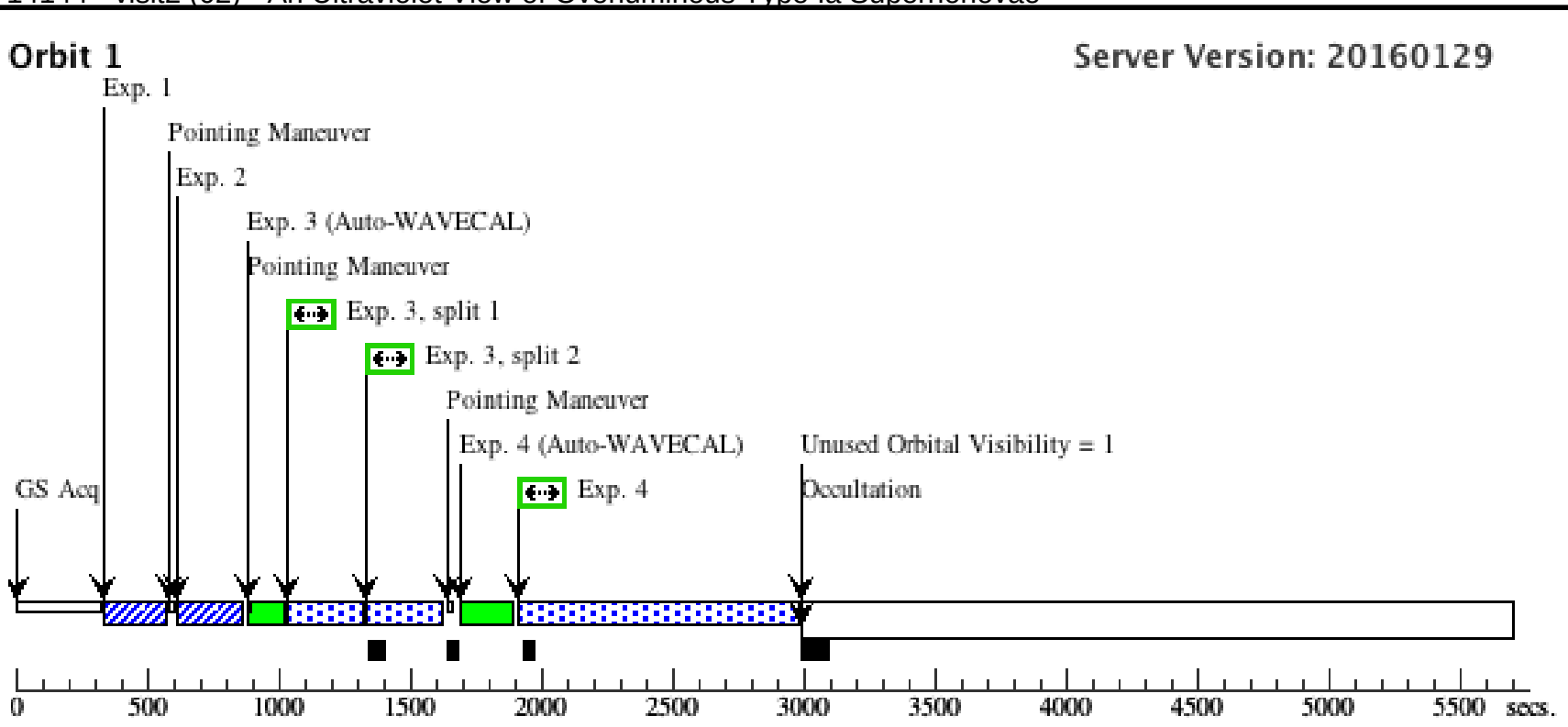
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SN2016CCJ Alt Name1: ASASSN-16EX Alt Name2: AT2016CCJ	RA: 17 10 23.9710 (257.5998792d) Dec: +26 23 48.85 (26.39690d) Equinox: J2000	Parallax: 0" Epoch of Position: 2000 Redshift: 0.03	V=17.1+/-0.1 uvm2=17.8 (Swift/UVOT)	Reference Frame: ICRS

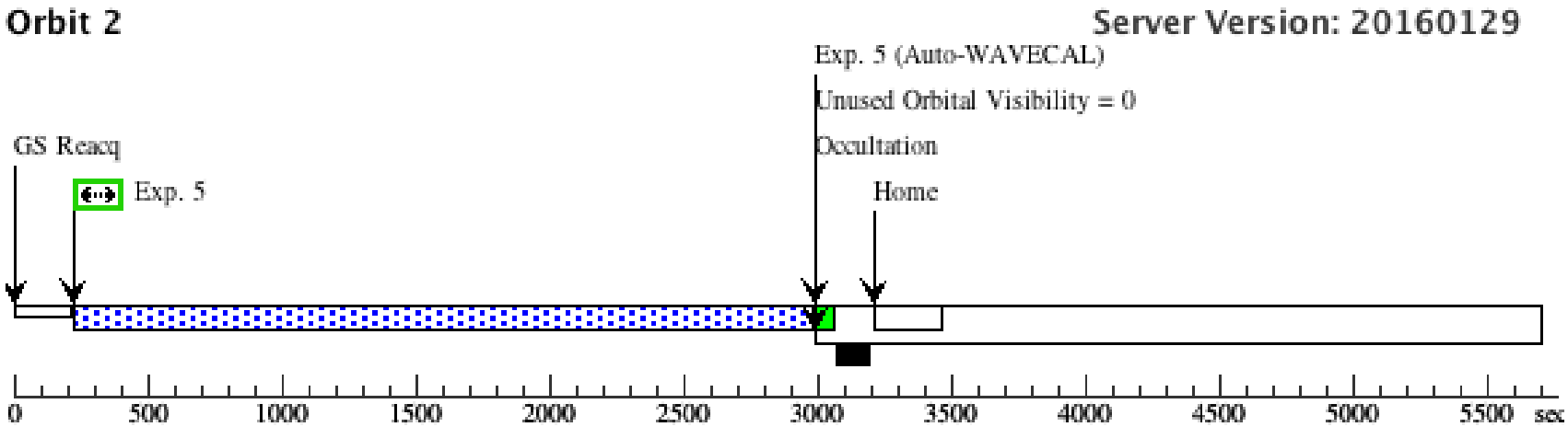
Comments: Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	visit2acq (732247)	(2) SN2016CCJ	STIS/CCD, ACQ, F28X50LP	MIRROR				3 Secs (3 Secs) *[==>]*	 ***[1]***
2	visit2acqpeak (732247)	(2) SN2016CCJ	STIS/CCD, ACQ/PEAK, 52X0.1E1	MIRROR				3 Secs (3 Secs) *[==>]*	 ***[1]***
3	visit2nuv	(2) SN2016CCJ	STIS/CCD, ACCUM, 52X0.2E1	G430L 4300 A	CR-SPLIT=2			800 Secs (506 Secs) *[==>253.0 Secs (Split 1)]* *[==>253.0 Secs (Split 2)]*	 ***[1]***
4	visit2nuvmama (732239)	(2) SN2016CCJ	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1200 Secs (1053 Secs) *[==>1053.0 Secs]*	 ***[1]***
5	visit2bnuvmama (732239)	(2) SN2016CCJ	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2700 Secs (2743 Secs) *[==>2743.0 Secs]*	 ***[2]***

Orbit Structure





Visit

Proposal 14144, visit3 (03), implementation Mon May 09 01:00:27 GMT 2016

Diagnostic Status: No Diagnostics

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

Special Requirements: SCHED 100%; AFTER 02 BY 5 D TO 8 D

Fixed Targets

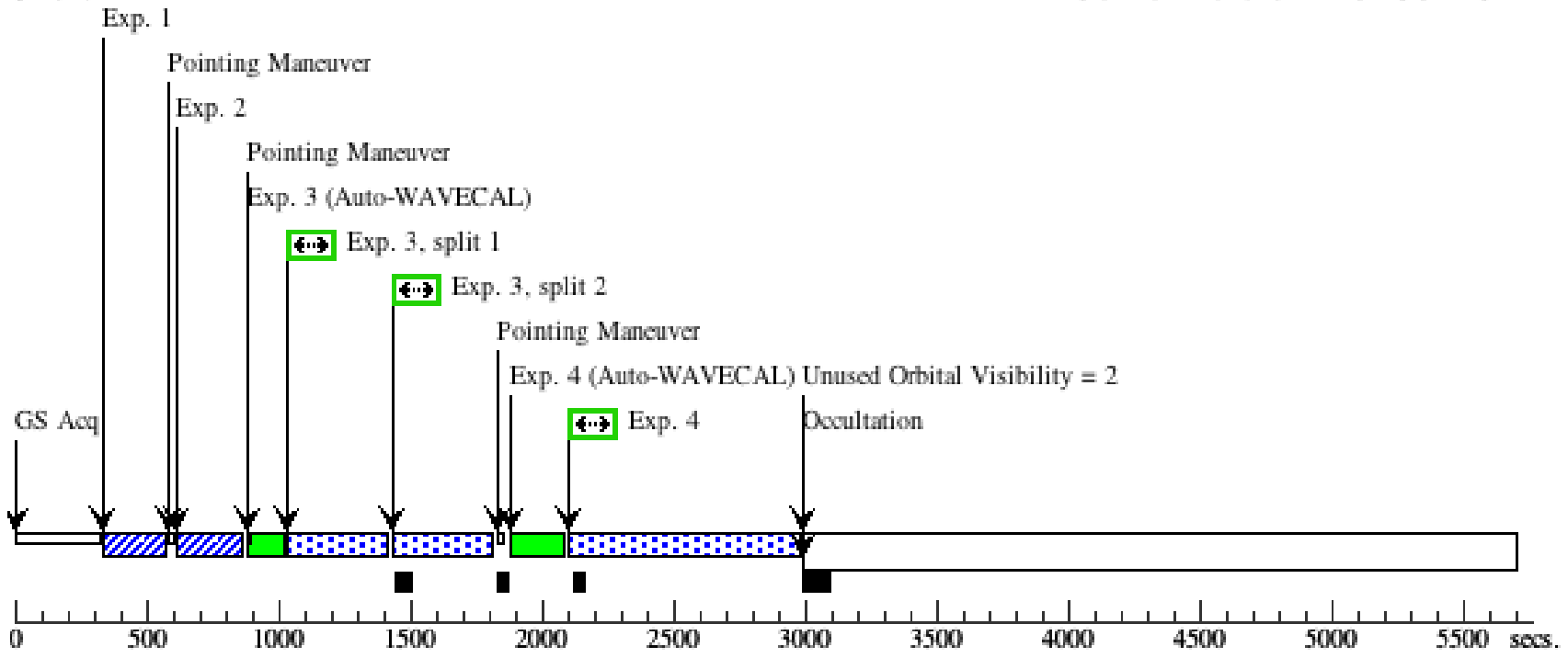
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SN2016CCJ Alt Name1: ASASSN-16EX Alt Name2: AT2016CCJ	RA: 17 10 23.9710 (257.5998792d) Dec: +26 23 48.85 (26.39690d) Equinox: J2000	Parallax: 0" Epoch of Position: 2000 Redshift: 0.03	V=17.1+/-0.1 uvm2=17.8 (Swift/UVOT)	Reference Frame: ICRS

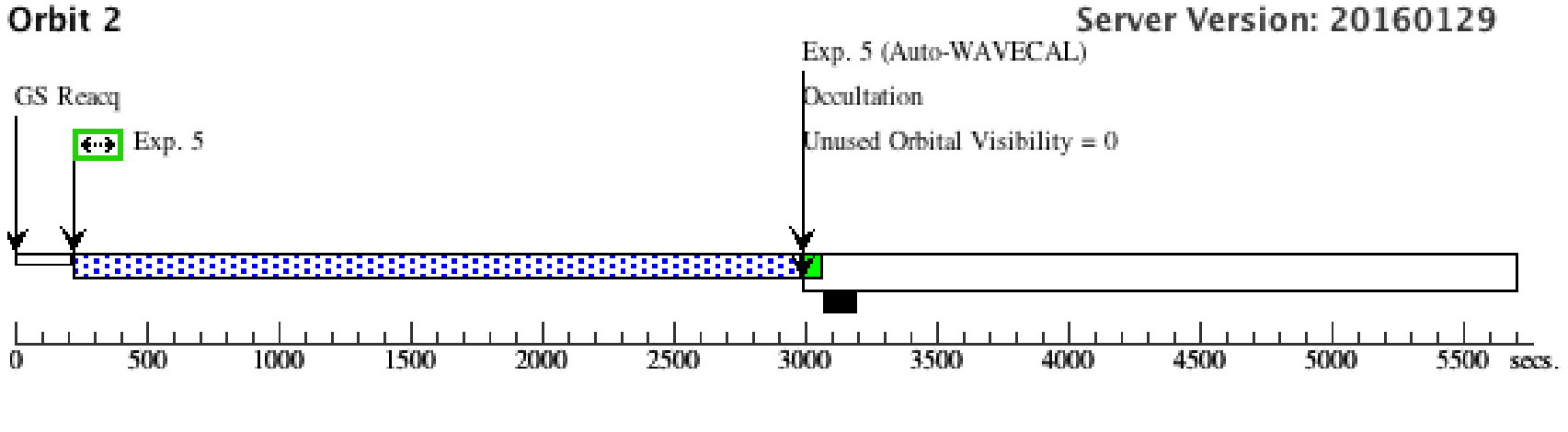
Comments: Extended=NO

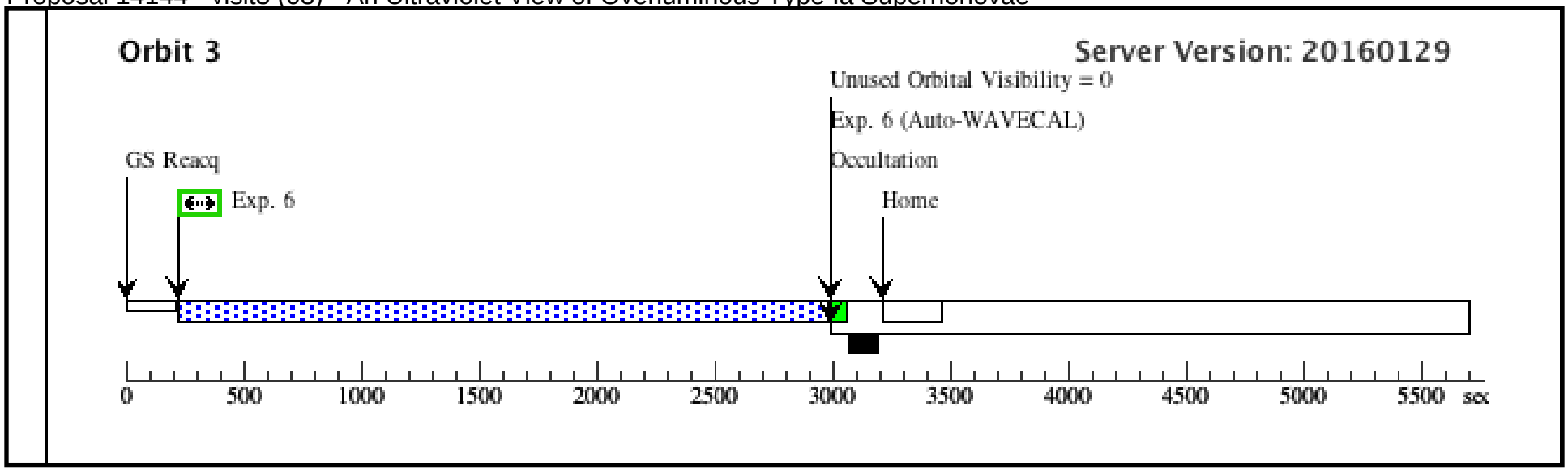
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	visit3acq (732247)	(2) SN2016CCJ	STIS/CCD, ACQ, F28X50LP	MIRROR				3 Secs (3 Secs) *[==>]*	 ***[1]***
2	visit3acqpeak (732247)	(2) SN2016CCJ	STIS/CCD, ACQ/PEAK, 52X0.1E1	MIRROR				3 Secs (3 Secs) *[==>]*	 ***[1]***
3	visit3nuv	(2) SN2016CCJ	STIS/CCD, ACCUM, 52X0.2E1	G430L 4300 A	CR-SPLIT=2			1000 Secs (696 Secs) *[==>348.0 Secs (Split 1)]* *[==>348.0 Secs (Split 2)]*	 ***[1]***
4	visit3nuvmama (732239)	(2) SN2016CCJ	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				1000 Secs (862 Secs) *[==>862.0 Secs]*	 ***[1]***
5	visit3bnuvmama (732239)	(2) SN2016CCJ	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2700 Secs (2743 Secs) *[==>2743.0 Secs]*	 ***[2]***
6	visit3bnuvmama (732239)	(2) SN2016CCJ	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				2700 Secs (2743 Secs) *[==>2743.0 Secs]*	 ***[3]***

Orbit Structure



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