15351 - Continued Long-Term Ultraviolet Spectroscopy of a Tidal Disruption Event at only 90 Mpc

Cycle: 25, 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) LEDA-43234	STIS/CCD STIS/NUV-MAMA	2	20-Jul-2017 20:09:23.0	yes
02	(1) LEDA-43234	STIS/CCD STIS/FUV-MAMA	2	20-Jul-2017 20:09:24.0	yes
03	(1) LEDA-43234	STIS/CCD STIS/NUV-MAMA	2	20-Jul-2017 20:09:25.0	yes
04	(1) LEDA-43234	STIS/CCD STIS/FUV-MAMA	2	20-Jul-2017 20:09:27.0	yes

8 Total Orbits Used

ABSTRACT

We propose continued long-term multi-epoch ultraviolet spectroscopy of ASASSN-14li, a stellar tidal disruption event (TDE) at ~90 Mpc. Such a bright, nearby stellar TDEs provides an exceptional opportunity to study broad emission lines which describe the abundances and accretion flow of the stellar debris in one of the most important physical regimes for understanding basic TDE behavior. We also request brief XMM observations to constrain the high-energy spectral evolution on similar timescales. These observations will build upon surprising new results, and will provide an important foundation for follow-up of more ambiguous TDE candidates subsequently identified by LSST and WFIRST at higher redshifts.

OBSERVING DESCRIPTION

We are observing the UV-bright tidal disruption event (TDE) on extended baselines to study the spectroscopic evolution of this transient and how it relates to its accretion history. Complementary joint XMM-Newton observations have been granted to constrain the bolometric luminosity and relate high-energy emission to the UV. We will discuss XMM-Newton scheduling with the XMM-Newton team given the visibility windows available. <2 weeks separation is preferred, and the closer the better. Current predictions for XMM-Newton visibility look favorable for this strategy in June and July of 2018.

This program is essentially an extension of programs 14272 and 14812, so the instrumental requirements are similar. The TDE is fainter, so we have requested (and been granted) an additional orbit per grating per epoch, but only one epoch per year is necessary since the TDE is evolving slowly.

For the purposes of this program, LEDA-43234, PGC-043234 and ASASSN-14LI are effectively the same target. We kept the name "LEDA-43234" to agree with the Phase I proposal data in APT, but changing it to "ASASSN-14LI" would be more consistent with previous programs.

As before, we are taking spectroscopy in FUV (STIS-MAMA/G140L) and NUV (STIS-MAMA/G230L). TIME-TAG mode should still be practical. All visits are grouped within 6 days to measure broadly representative properties within that time. We have broken observations into 4 groups of 2 orbits each to allow more flexible scheduling than 2 groups of 4 orbits would allow. Under this configuration, the optimal monitoring strategy is to keep each FUV visit tightly grouped with a NUV visit (<2 days) to allow full-spectrum variability comparisons with timescales of ~days if the signal-to-noise ratio warrants it.

We have increased the acquisition times modestly per visit, but we expect most of the acquisition photons to come from the host galaxy at this point and not the transient. Since the transient is at the nucleus, identification of the nuclear peak is fine for acquisition and has been effective in the

previous cycle.

Visit

Proposal 15351, ASASSN-14li Epoch 5 NUV-1 (01) Fri Jul 21 00:09:27 GMT 2017

Diagnostic Status: No Diagnostics

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

Special Requirements: BETWEEN 10-APR-2018:00:00:00 AND 10-SEP-2018:00:00:00; GROUP 01,02 WITHIN 2D; GROUP 01,02,03,04 WITHIN 6D

Comments: Joint XMM observations have been awarded to complement the HST STIS observations. Although the transient is currently evolving slowly over years, coordination with XMM is preferred if possible, to minimize discrepencies due to short-timescale variability.

A gap of <2 weeks between XMM and HST would be representative, but ideally the shorter the better.

Fixed Targets

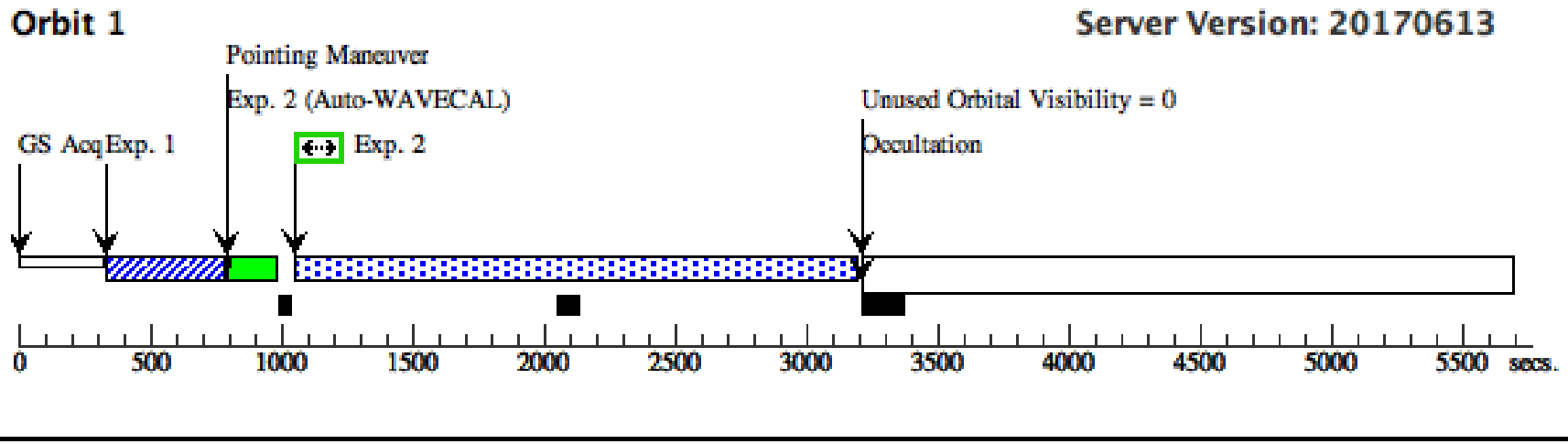
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	LEDA-43234 Alt Name1: PGC-043234 Alt Name2: ASASSN-14LI	RA: 12 48 15.2300 (192.0634583d) Dec: +17 46 26.56 (17.77404d) Equinox: J2000	Redshift: 0.0206	V=16.1 Currently AB mag ~16.4 at 1500 AA. Host GALEX baseline is (2 1.7, 19.0) for (FUV, NUV).	Reference Frame: ICRS

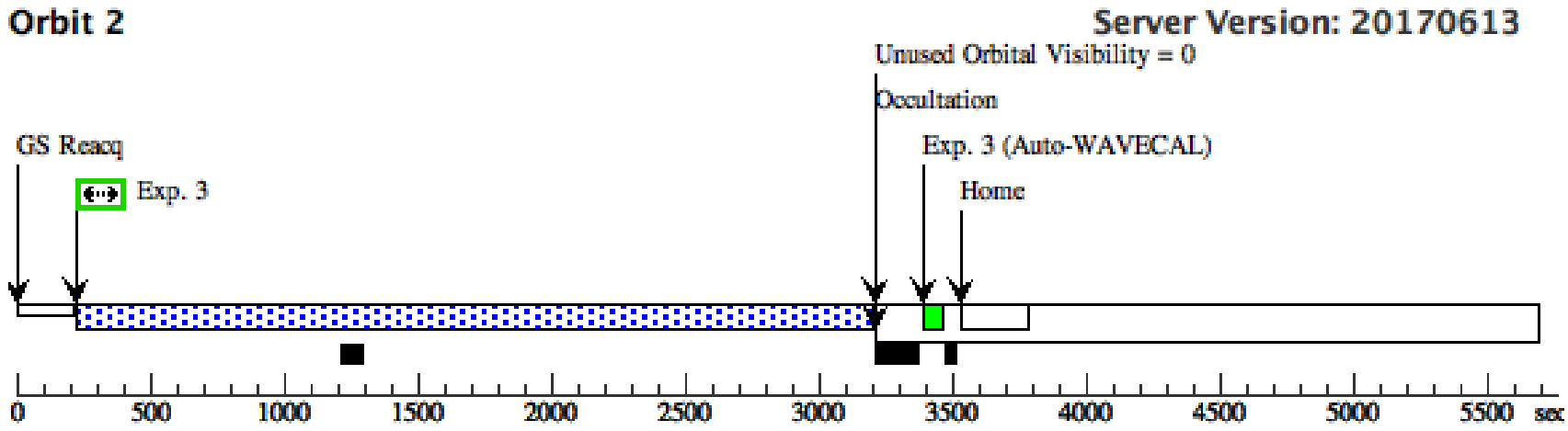
Comments: Phase I coordinates in Cycle 25 were taken using SIMBAD. Phase II coordinates are adjusted to match those of Cycle 24 observations.
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ASASSN-14li Epoch 5 Acqusition NUV-1	(1) LEDA-43234	STIS/CCD, ACQ, 50CCD	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=5; DIFFUSE-CENTER=FLUX-CENTROID			50 Secs (50 Secs) *[==>]*	***[1]***
2	ASASSN-14li Epoch 5 NUV-1 Sci 1 (STIS.sp.10 13321)	(1) LEDA-43234	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=1000			1000 Secs (2131 Secs) *[==>2131.0 Secs]*	***[1]***
3	ASASSN-14li Epoch 5 NUV-1 Sci 2 (STIS.sp.10 13321)	(1) LEDA-43234	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=1000			1000 Secs (2966 Secs) *[==>2966.0 Secs]*	***[2]***

Orbit Structure





Visit

Proposal 15351, ASASSN-14li Epoch 5 FUV-1 (02) Fri Jul 21 00:09:28 GMT 2017

Diagnostic Status: No Diagnostics

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

Special Requirements: BETWEEN 10-APR-2018:00:00:00 AND 10-SEP-2018:00:00:00; GROUP 02,01 WITHIN 2D; GROUP 02,01,03,04 WITHIN 6D

Comments: Joint XMM observations have been awarded to complement the HST STIS observations. Although the transient is currently evolving slowly over years, coordination with XMM is preferred if possible, to minimize discrepencies due to short-timescale variability.

A gap of <2 weeks between XMM and HST would be representative, but ideally the shorter the better.

Fixed Targets

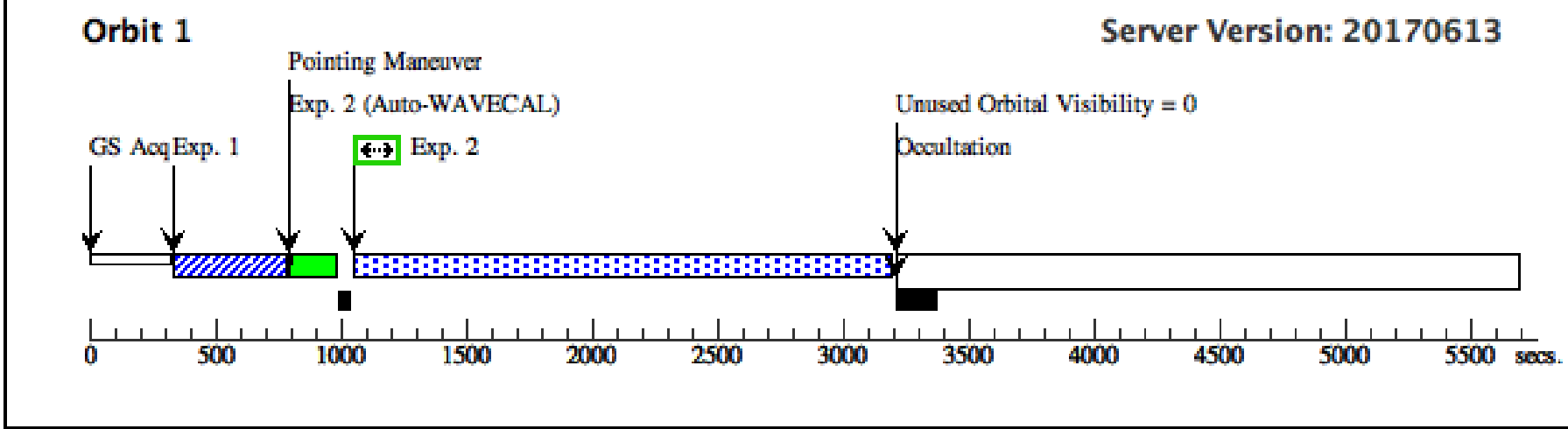
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	LEDA-43234 Alt Name1: PGC-043234 Alt Name2: ASASSN-14LI	RA: 12 48 15.2300 (192.0634583d) Dec: +17 46 26.56 (17.77404d) Equinox: J2000	Redshift: 0.0206	V=16.1 Currently AB mag ~16.4 at 1500 AA. Host GALEX baseline is (2 1.7, 19.0) for (FUV, NUV).	Reference Frame: ICRS

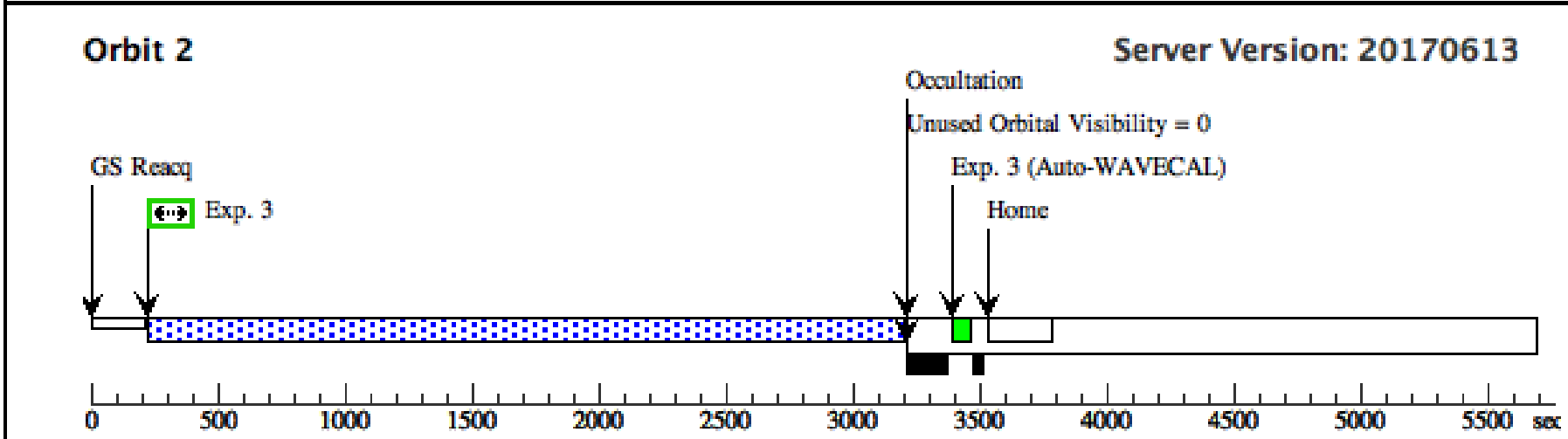
Comments: Phase I coordinates in Cycle 25 were taken using SIMBAD. Phase II coordinates are adjusted to match those of Cycle 24 observations.
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ASASSN-14li Epoch 5 Acqusition FUV-1	(1) LEDA-43234	STIS/CCD, ACQ, 50CCD	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=5; DIFFUSE-CENTER=FLUX-CENTROID			50 Secs (50 Secs) *[==>]*	***[1]***
2	ASASSN-14li Epoch 5 FUV-1 Sci 1 (STIS.sp.10 13402)	(1) LEDA-43234	STIS/FUV-MAMA, TIME-TAG, 52X0.2	G140L 1425 A	BUFFER-TIME=1500			1000 Secs (2131 Secs) *[==>2131.0 Secs]*	***[1]***
3	ASASSN-14li Epoch 5 FUV-1 Sci 2 (STIS.sp.10 13402)	(1) LEDA-43234	STIS/FUV-MAMA, TIME-TAG, 52X0.2	G140L 1425 A	BUFFER-TIME=1500			1000 Secs (2966 Secs) *[==>2966.0 Secs]*	***[2]***

Orbit Structure





Visit

Proposal 15351, ASASSN-14li Epoch 5 NUV-2 (03) Fri Jul 21 00:09:28 GMT 2017

Diagnostic Status: No Diagnostics

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

Special Requirements: BETWEEN 10-APR-2018:00:00:00 AND 10-SEP-2018:00:00:00; GROUP 03,04 WITHIN 2D; GROUP 03,01,02,04 WITHIN 6D

Comments: Joint XMM observations have been awarded to complement the HST STIS observations. Although the transient is currently evolving slowly over years, coordination with XMM is preferred if possible, to minimize discrepencies due to short-timescale variability.

A gap of <2 weeks between XMM and HST would be representative, but ideally the shorter the better.

Fixed Targets

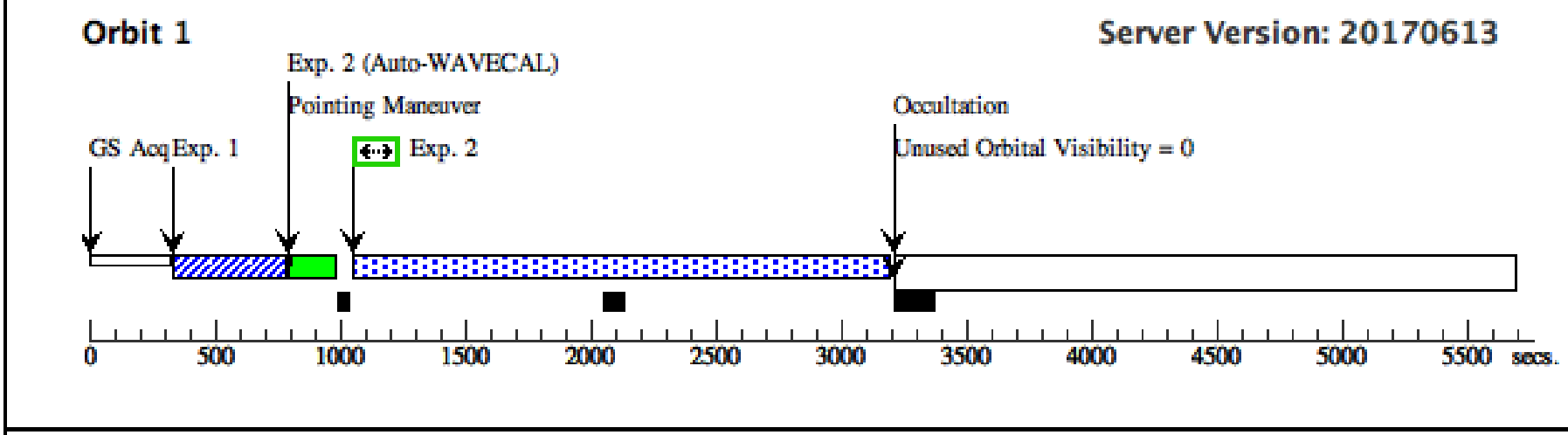
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	LEDA-43234 Alt Name1: PGC-043234 Alt Name2: ASASSN-14LI	RA: 12 48 15.2300 (192.0634583d) Dec: +17 46 26.56 (17.77404d) Equinox: J2000	Redshift: 0.0206	V=16.1 Currently AB mag ~16.4 at 1500 AA. Host GALEX baseline is (2 1.7, 19.0) for (FUV, NUV).	Reference Frame: ICRS

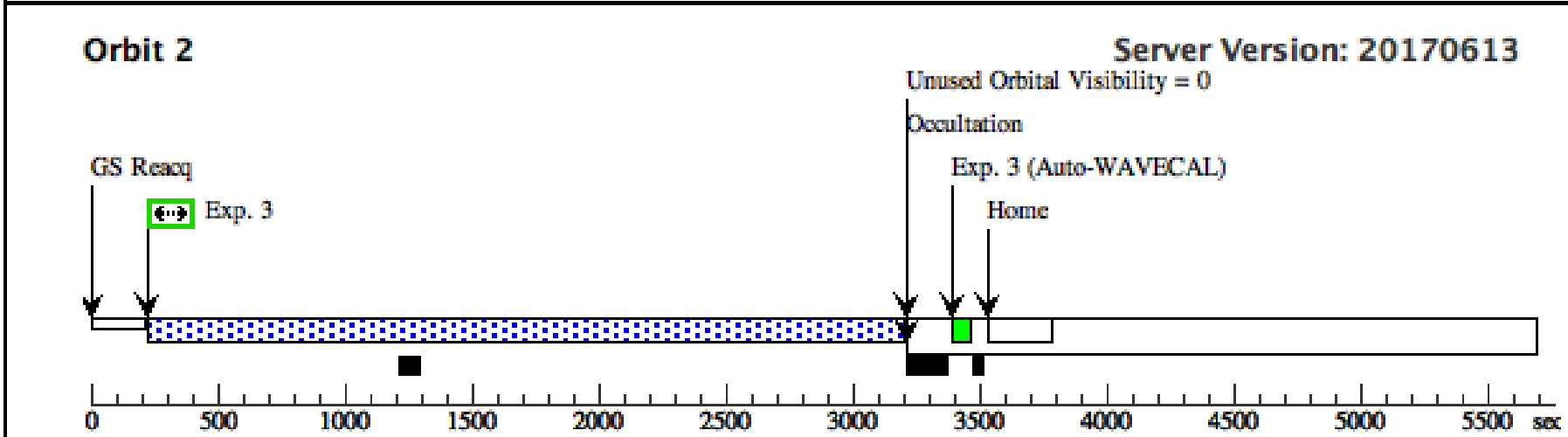
Comments: Phase I coordinates in Cycle 25 were taken using SIMBAD. Phase II coordinates are adjusted to match those of Cycle 24 observations.
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ASASSN-14li Epoch 5 Acqusition NUV-2	(1) LEDA-43234	STIS/CCD, ACQ, 50CCD	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=5; DIFFUSE-CENTER=FLUX-CENTROID			50 Secs (50 Secs) *[==>]*	***[1]***
2	ASASSN-14li Epoch 5 NUV-2 Sci 1 (STIS.sp.10 13321)	(1) LEDA-43234	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=1000			1000 Secs (2131 Secs) *[==>2131.0 Secs]*	***[1]***
3	ASASSN-14li Epoch 5 NUV-2 Sci 2 (STIS.sp.10 13321)	(1) LEDA-43234	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A	BUFFER-TIME=1000			1000 Secs (2966 Secs) *[==>2966.0 Secs]*	***[2]***

Orbit Structure





Visit

Proposal 15351, ASASSN-14li Epoch 5 FUV-2 (04) Fri Jul 21 00:09:28 GMT 2017

Diagnostic Status: No Diagnostics

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

Special Requirements: BETWEEN 10-APR-2018:00:00:00 AND 10-SEP-2018:00:00:00; GROUP 04,03 WITHIN 2D; GROUP 04,01,02,03 WITHIN 6D

Comments: Joint XMM observations have been awarded to complement the HST STIS observations. Although the transient is currently evolving slowly over years, coordination with XMM is preferred if possible, to minimize discrepencies due to short-timescale variability.

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Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ASASSN-14li Epoch 5 Acqusition FUV-2	(1) LEDA-43234	STIS/CCD, ACQ, 50CCD	MIRROR	ACQTYPE=DIFFUSE; CHECKBOX=5; DIFFUSE-CENTER=FLUX-CENTROID			50 Secs (50 Secs) *[==>]*	***[1]***
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3	ASASSN-14li Epoch 5 FUV-2 Sci 2 (STIS.sp.10 13402)	(1) LEDA-43234	STIS/FUV-MAMA, TIME-TAG, 52X0.2	G140L 1425 A	BUFFER-TIME=1500			1000 Secs (2966 Secs) *[==>2966.0 Secs]*	***[2]***

Orbit Structure