



14346 - Constraining the Position of the Most Luminous Supernova Ever Found

Cycle: 23, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
04	(1) ASASSN-15LH	WFC3/UVIS	1	19-Dec-2015 21:01:57.0	yes
02	(1) ASASSN-15LH	WFC3/UVIS	1	19-Dec-2015 21:01:59.0	yes

2 Total Orbits Used

ABSTRACT

In ASASSN-15lh we appear to have found the most superluminous supernova discovered to date, with a peak luminosity in excess of 10^{45} ergs/s. It is an SLSN-I with no hydrogen or helium emission -- its only spectral feature is an absorption trough attributed to OII. While its properties match other SLSN-I and do not match any known AGN, including known tidal disruption events, its position is very close to the core of its host galaxy. We propose HST observations to measure

or constrain the offset down to scales under 10~pc. DD time is required because the transient will not be present by the time any Cycle 24 observations are scheduled.

OBSERVING DESCRIPTION

We will obtain two WFC3/UVIS F606W images of the target. One while the transient is present but neither too bright nor too faint, one one when the transient is gone. The estimated time frames are October/November 2015 for the first and February 2016 or later for the second. Each visit will be done using six position sub-pixel dithers to control for cosmic rays/hot pixels and produce a clean, sub-sampled PSF.

****READ CAREFULLY FOR EPOCH1 ****

We have updated the slope of the light curve, and also note that it closely matches the decay rate of another SLSN-I, iPTF13ajg, which seems to have maintained this slope out to the time scales needed for these observations.

Following a discussion with Alison Vick, the exposure times for epoch 1 were reduced by 15-20% over the maximum possible, which opened up the scheduling window to cover Sept 1 to November 30 rather than the original windows of Sept 7-26 and Oct 31-Nov 19. The reduction in the S/N of the observations should have no significant impact on the results

The ****ESTIMATED**** magnitude of the transient is

Sept 1 19.1
Oct 1 19.9
Nov 1 20.8
Dec 1 21.6

so I have set the timing constraint to be the month of October -- in September it is too bright and as we reduce the exposure times there will be fewer background sources

(to ensure good registration to epoch #2) and in November it is getting too faint (and the reliability of these estimates is increasingly dubious). Should more scheduling flexibility be needed, please contact me and we can try to adjust the strategy.

***END READ CAREFULLY FOR EPOCH2 ***

The extrapolated magnitude is predicted to be faint enough for the 2nd observation in February 2016 or later, as included in the proposal. However, if you want to schedule it early in this period, we should use the results of the first epoch (and other monitoring data) to verify that the extrapolation remains valid. Since there was no reason not to simply use windows that maximize the total integration time, "auto-adjust" was used to optimize the exposure times.

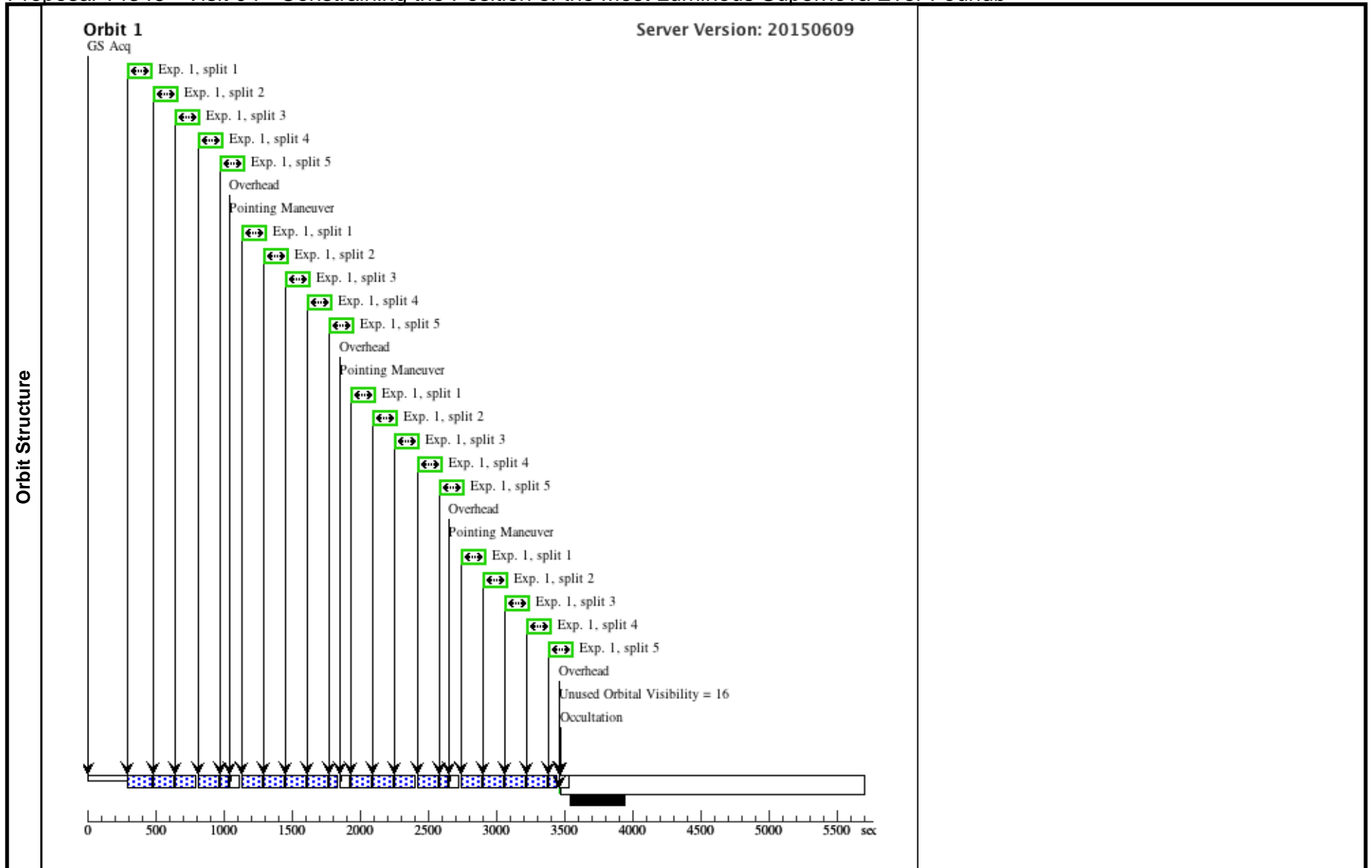
now back to just description of process**

Difference imaging methods will then be used to remove the host from the epoch with the transient and ensure proper alignment of the two epochs, and then we will measure the relative positions of the transient and the galaxy core to determine the offset.

Proposal 14346 - Visit 04 - Constraining the Position of the Most Luminous Supernova Ever Found

Sun Dec 20 02:02:00 GMT 2015

Visit	Proposal 14346, Visit 04 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: BETWEEN 01-OCT-2015:00:00:00 AND 01-MAR-2016:00:00:00									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	ASASSN-15LH	RA: 22 02 15.4500 (330.5643750d) Dec: -61 39 34.64 (-61.65962d) Equinox: J2000		V=20	Reference Frame: astrometry.net solutions				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) ASASSN-15LH	(1) ASASSN-15LH	WFC3/UVIS, ACCUM, UVIS2-MIK1C-SUB	F606W	FLASH=10; CR-SPLIT=5			Pattern 1, Exps 1-1 i n Visit 04 (1)	300 Secs (1240 Secs) [=>62.0 Secs (Pattern 1, Split 1)] [=>62.0 Secs (Pattern 1, Split 2)] [=>62.0 Secs (Pattern 1, Split 3)] [=>62.0 Secs (Pattern 1, Split 4)] [=>62.0 Secs (Pattern 1, Split 5)] [=>62.0 Secs (Pattern 2, Split 1)] [=>62.0 Secs (Pattern 2, Split 2)] [=>62.0 Secs (Pattern 2, Split 3)] [=>62.0 Secs (Pattern 2, Split 4)] [=>62.0 Secs (Pattern 2, Split 5)] [=>62.0 Secs (Pattern 3, Split 1)] [=>62.0 Secs (Pattern 3, Split 2)] [=>62.0 Secs (Pattern 3, Split 3)] [=>62.0 Secs (Pattern 3, Split 4)] [=>62.0 Secs (Pattern 3, Split 5)] [=>62.0 Secs (Pattern 4, Split 1)] [=>62.0 Secs (Pattern 4, Split 2)] [=>62.0 Secs (Pattern 4, Split 3)] [=>62.0 Secs (Pattern 4, Split 4)] [=>62.0 Secs (Pattern 4, Split 5)]



Proposal 14346 - Visit 02 - Constraining the Position of the Most Luminous Supernova Ever Found

Sun Dec 20 02:02:00 GMT 2015

Visit	Proposal 14346, Visit 02, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: AFTER 01-JUL-2016:00:00:00									
	#	Primary Pattern	Secondary Pattern	Exposures						
Patterns	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112 Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1)						
	(3)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(2)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	ASASSN-15LH	RA: 22 02 15.4500 (330.5643750d) Dec: -61 39 34.64 (-61.65962d) Equinox: J2000		V=20	Reference Frame: astrometry.net solutions				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) ASASSN-15LH	WFC3/UVIS, ACCUM, UVIS2	F606W				Pattern 1, Exps 1-1 in Visit 02 (1) 350 Secs (1664 Secs) [=>416.0 Secs (Pattern 1)] [=>416.0 Secs (Pattern 2)] [=>416.0 Secs (Pattern 3)] [=>416.0 Secs (Pattern 4)]	[1]
2		(1) ASASSN-15LH	WFC3/UVIS, ACCUM, UVIS2	F606W				Pattern 3, Exps 2-2 in Visit 02 (3) 350 Secs (832 Secs) [=>416.0 Secs (Pattern 1)] [=>416.0 Secs (Pattern 2)]	[1]	

