



14645 - The Stellar Origins of Supernovae

Cycle: 24, Proposal Category: GO

(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>
01	(1) AT2016JBU	WFC3/UVIS	1	29-Sep-2017 17:00:16.0	yes
02	(2) SN2017EAW	WFC3/UVIS	1	29-Sep-2017 17:00:21.0	yes
03	(3) SN2017EIN	WFC3/UVIS	1	29-Sep-2017 17:00:25.0	yes
04	(4) SN2017GAX	WFC3/UVIS	1	29-Sep-2017 17:00:29.0	yes

4 Total Orbits Used

ABSTRACT

Supernovae (SNe) have a profound effect on galaxies, and have been used as precise cosmological probes, resulting in the Nobel-distinguished discovery of the accelerating Universe. They are clearly very important events deserving of intense study. Yet, even with over 9100 classified SNe, we know relatively little about the stars which give rise to these powerful explosions. The main limitation has been the lack of spatial resolution in

pre-SN imaging data. However, since 1999 our team has been at the vanguard of directly identifying SN progenitor stars in HST images. From this exciting line of study, the emerging trend from 13 detections for Type II-Plateau SNe is that their progenitors appear to be relatively low mass (8 to 20 Msun) red supergiants, although more cases are needed. Additionally, evidence is accumulating that the progenitors of Type II-narrow SNe may be related to luminous blue variables. However, the nature of the progenitors of Type Ib/c SNe, a subset of which are associated with the amazing gamma-ray bursts, remains ambiguous. Furthermore, we remain in the continually embarrassing situation that we still do not yet know which progenitor systems explode as Type Ia SNe, which are being used for precision cosmology. In Cycles 16, 17, 20, 21, 22, and 23 we have had great success with our approved ToO programs. As of this proposal deadline, we have already triggered on two supernovae (SN 2016adj and SN 2016bkv) with our Cycle 23 program. We therefore propose to continue this project to determine the identities of the progenitors of 4 SNe within, generally, about 20 Mpc, which we expect during Cycle 24, through ToO observations using WFC3/UVIS.

OBSERVING DESCRIPTION

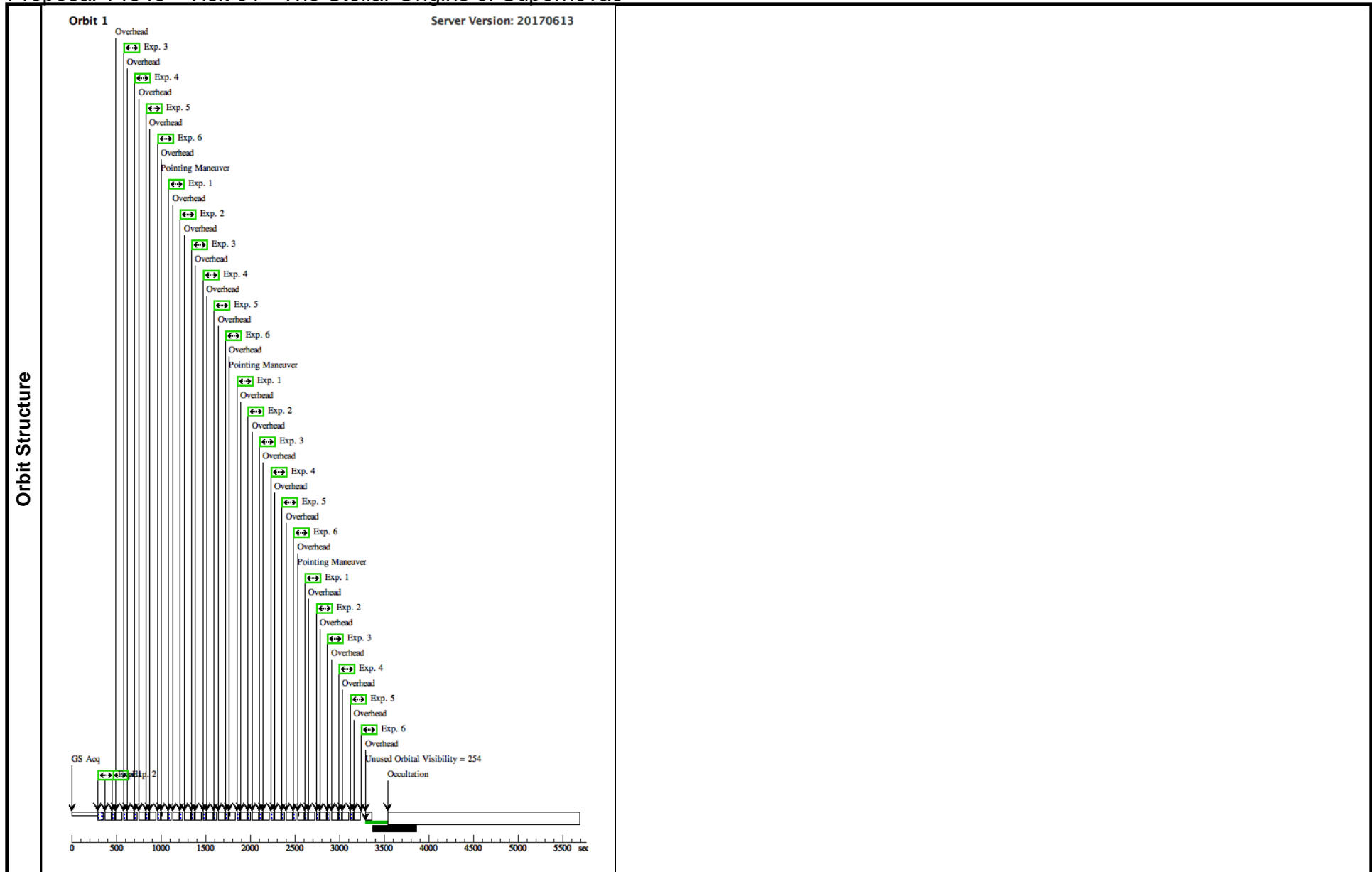
We plan for four ToO triggers during Cycle 24. If we detect one or more candidate stellar objects within a 1-sigma positional uncertainty in ACS, WFPC2, or WFC3 pre-supernova archival image(s), we will request a trigger to pinpoint the location of the SN in the pre-SN images and attempt to confirm the progenitor candidate. Our plan is to image with WFC3/UVIS, to provide the highest possible spatial resolution. Our strategy, generally, is to acquire several short-exposure dithered images in V (F555W, 10-s) or I (F814W, 30-s), for the 3 core-collapse visits (which will likely best match with the available archival image data), and in U (F336W, 20-s) or B (F438W, 20-s) for a putative, nearby (<10 Mpc) SN Ia visit, since these SNe will likely be too bright in redder bands, but fade more rapidly in the blue. We will be using the UVIS2 1Kx1K subarray near amplifier C. Since the exposures are quite short, we will also be using post-flash with 12 e- for each exposure, in order to mitigate against CTE losses. The initial Phase II observations are meant to be representative of a typical trigger. Each of the four possible ToOs has an initial placeholder position of RA(J2000)=0, Dec(J2000)=0. We will likely request triggers when the SN is still fairly bright, depending on its age at discovery, but limit this, generally, to $m > 14$ mag. We therefore may alter exposure times and bands, depending on the expected brightness of a given SN when it is scheduled and depending on the bands of the pre-SN images available for the SN site in the HST archive. This may also result in changes in the dither strategy for a given visit. The ToOs are not intended to be high-impact, and will be requested to occur after 2 to 3 weeks from discovery, so there should be no disruption of normal scheduling.

Proposal 14645 - Visit 01 - The Stellar Origins of Supernovae

Visit	Proposal 14645, Visit 01, completed Fri Sep 29 21:00:31 GMT 2017 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: (none)					
	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		(1-6)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	AT2016JBU	RA: 07 36 25.9550 (114.1081458d) Dec: -69 32 55.26 (-69.54868d) Equinox: J2000		V=14.0+/-1.0	Reference Frame: ICRS

Proposal 14645 - Visit 01 - The Stellar Origins of Supernovae

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	(1) AT2016JBU	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12		Pattern 1, Exps 1-6 in Visit 01 (1)	30 Secs (120 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	2	(1) AT2016JBU	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12		Pattern 1, Exps 1-6 in Visit 01 (1)	30 Secs (120 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	3	(1) AT2016JBU	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12		Pattern 1, Exps 1-6 in Visit 01 (1)	30 Secs (120 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	4	(1) AT2016JBU	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12		Pattern 1, Exps 1-6 in Visit 01 (1)	30 Secs (120 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	5	(1) AT2016JBU	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12		Pattern 1, Exps 1-6 in Visit 01 (1)	30 Secs (120 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	6	(1) AT2016JBU	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12		Pattern 1, Exps 1-6 in Visit 01 (1)	30 Secs (120 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]



Proposal 14645 - Visit 02 - The Stellar Origins of Supernovae

Visit	Proposal 14645, Visit 02, completed Fri Sep 29 21:00:31 GMT 2017 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: (none)					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(2)		SN2017EAW	RA: 20 34 44.2400 (308.6843333d) Dec: +60 11 35.90 (60.19331d) Equinox: J2000		V=13+/-1.0	Reference Frame: ICRS

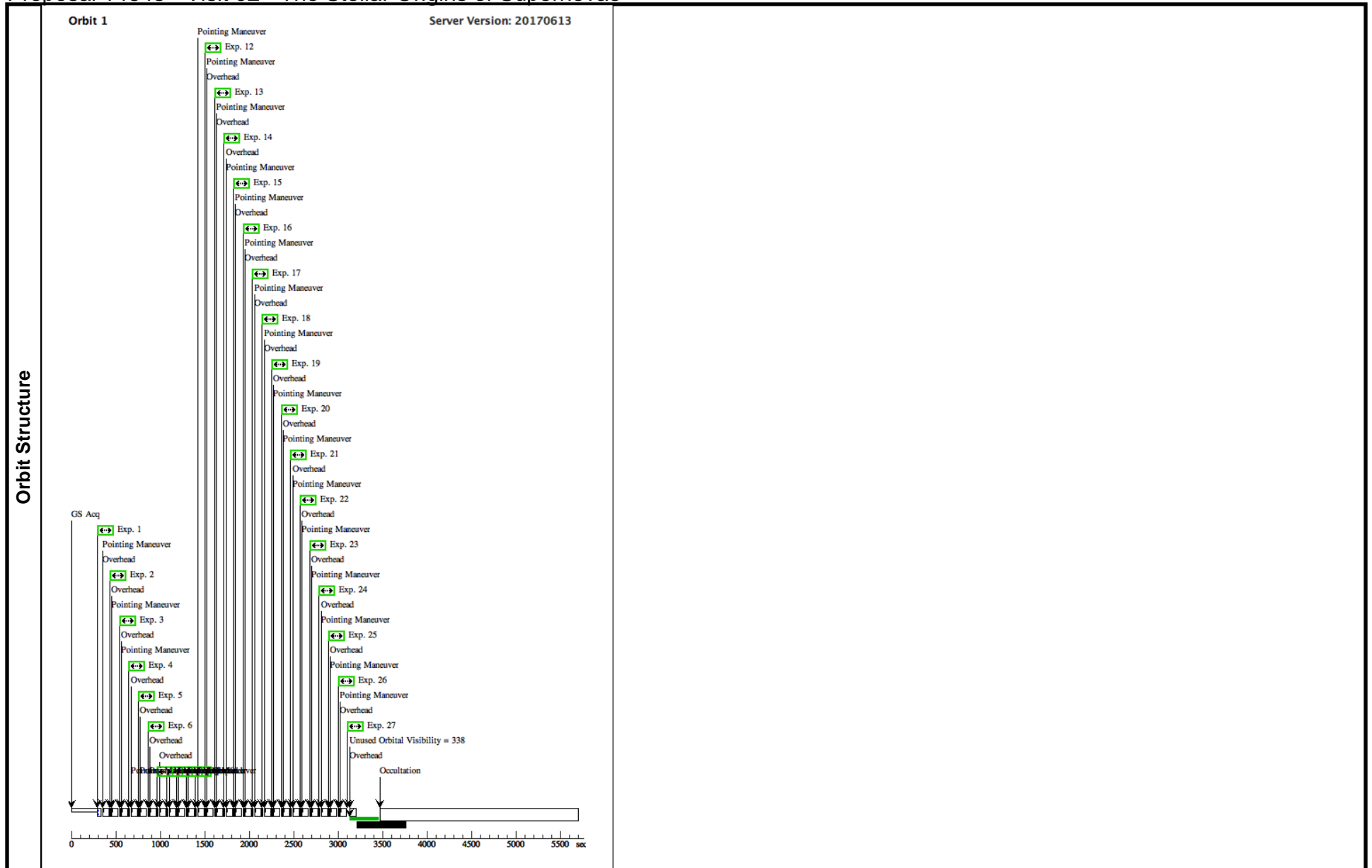
Proposal 14645 - Visit 02 - The Stellar Origins of Supernovae

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
Exposures	1	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0,0		10 Secs (10 Secs)	[1]	
								[==>]		
	2	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.04392, 0.17548		10 Secs (10 Secs)	[1]	
								[==>]		
	3	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.07988, 0.39030		10 Secs (10 Secs)	[1]	
								[==>]		
	4	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.13293, 0.08843		10 Secs (10 Secs)	[1]	
								[==>]		
	5	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.21273, 0.22644		10 Secs (10 Secs)	[1]	
								[==>]		
	6	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.25267, 0.44152		10 Secs (10 Secs)	[1]	
								[==>]		
	7	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.34603, 0.06265		10 Secs (10 Secs)	[1]	
								[==>]		
	8	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.38555, 0.19801		10 Secs (10 Secs)	[1]	
								[==>]		
	9	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.42549, 0.41309		10 Secs (10 Secs)	[1]	
								[==>]		
	10	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.65000, 0.00000		10 Secs (10 Secs)	[1]	
								[==>]		
	11	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.69392, 0.17548		10 Secs (10 Secs)	[1]	
								[==>]		
12	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.72988, 0.39030		10 Secs (10 Secs)	[1]		
							[==>]			
13	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.78293, 0.08843		10 Secs (10 Secs)	[1]		
							[==>]			
14	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.86273, 0.22644		10 Secs (10 Secs)	[1]		
							[==>]			
15	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.90267, 0.44152		10 Secs (10 Secs)	[1]		
							[==>]			
16	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.99603, 0.06265		10 Secs (10 Secs)	[1]		
							[==>]			
17	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 1.03555, 0.19801		10 Secs (10 Secs)	[1]		
							[==>]			
18	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 1.07549, 0.41309		10 Secs (10 Secs)	[1]		
							[==>]			
19	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.00000, 0.65000		10 Secs (10 Secs)	[1]		
							[==>]			
20	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.04392, 0.82548		10 Secs (10 Secs)	[1]		
							[==>]			
21	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.07988, 1.0403		10 Secs (10 Secs)	[1]		
							[==>]			
22	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.13293, 0.73843		10 Secs (10 Secs)	[1]		
							[==>]			

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23	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.21273, 0.87644	10 Secs (10 Secs)	
						[==>]	[1]
24	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.25267, 1.09152	10 Secs (10 Secs)	
						[==>]	[1]
25	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.34603, 0.71265	10 Secs (10 Secs)	
						[==>]	[1]
26	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.38555, 0.84801	10 Secs (10 Secs)	
						[==>]	[1]
27	(2) SN2017EAW	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F814W	FLASH=12	POS TARG 0.42549, 1.06309	10 Secs (10 Secs)	
						[==>]	[1]

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Proposal 14645 - Visit 03 - The Stellar Origins of Supernovae

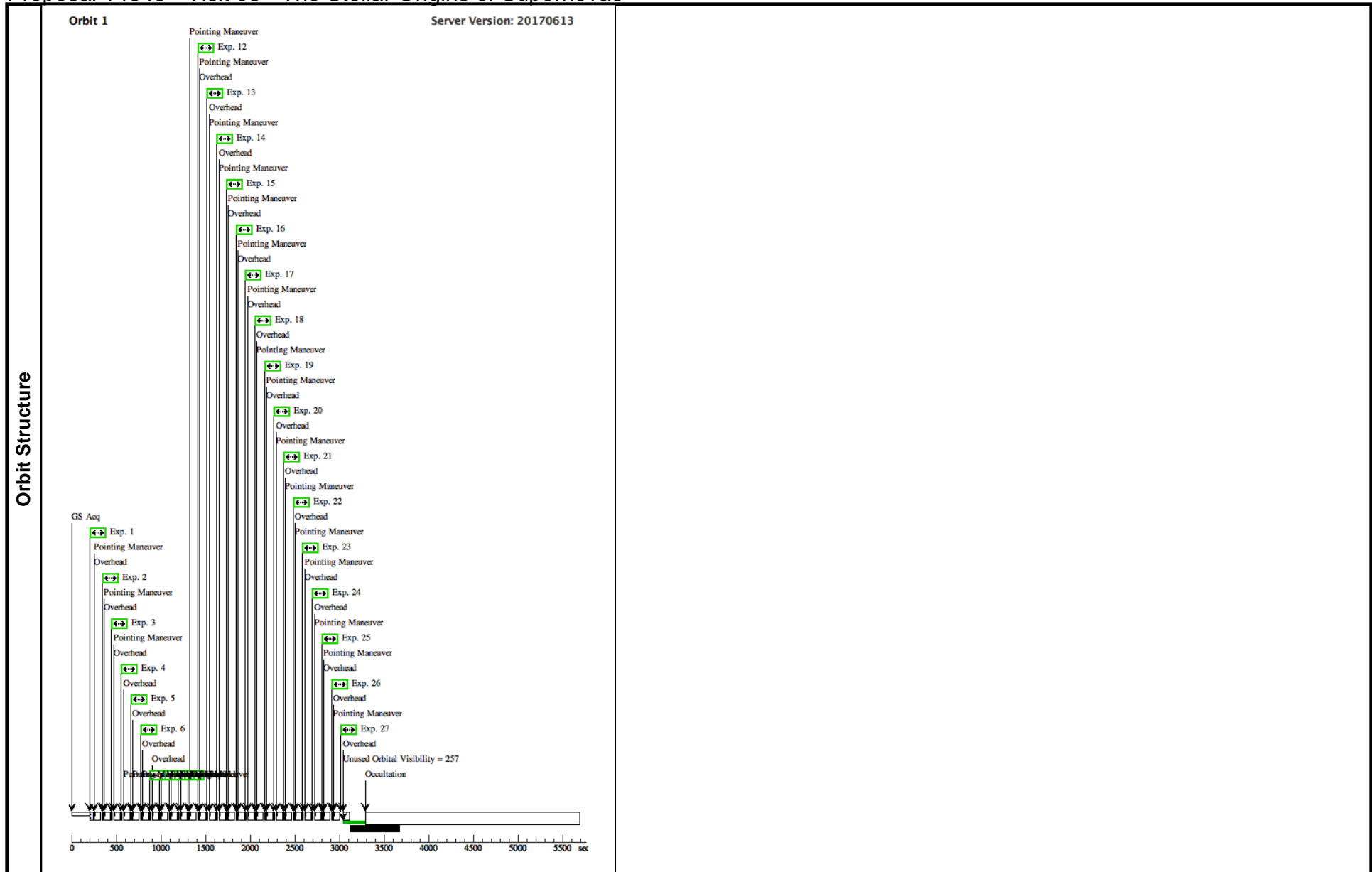
Visit	Proposal 14645, Visit 03, completed Fri Sep 29 21:00:31 GMT 2017 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: (none)					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(3)		SN2017EIN	RA: 11 52 53.2500 (178.2218750d) Dec: +44 07 26.20 (44.12394d) Equinox: J2000		V=13+/-1.0	Reference Frame: ICRS

Proposal 14645 - Visit 03 - The Stellar Origins of Supernovae

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0,0; GS ACQ SCENARI O SINGLE		10 Secs (10 Secs) [==>]	[1]
	2		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.04392, 0.17548		10 Secs (10 Secs) [==>]	[1]
	3		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.07988, 0.39030		10 Secs (10 Secs) [==>]	[1]
	4		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.13293, 0.08843		10 Secs (10 Secs) [==>]	[1]
	5		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.21273, 0.22644		10 Secs (10 Secs) [==>]	[1]
	6		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.25267, 0.44152		10 Secs (10 Secs) [==>]	[1]
	7		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.34603, 0.06265		10 Secs (10 Secs) [==>]	[1]
	8		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.38555, 0.19801		10 Secs (10 Secs) [==>]	[1]
	9		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.42549, 0.41309		10 Secs (10 Secs) [==>]	[1]
	10		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.65000, 0.00000		10 Secs (10 Secs) [==>]	[1]
	11		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.69392, 0.17548		10 Secs (10 Secs) [==>]	[1]
	12		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.72988, 0.39030		10 Secs (10 Secs) [==>]	[1]
	13		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.78293, 0.08843		10 Secs (10 Secs) [==>]	[1]
	14		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.86273, 0.22644		10 Secs (10 Secs) [==>]	[1]
	15		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.90267, 0.44152		10 Secs (10 Secs) [==>]	[1]
	16		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.99603, 0.06265		10 Secs (10 Secs) [==>]	[1]
	17		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 1.03555, 0.19801		10 Secs (10 Secs) [==>]	[1]
	18		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 1.07549, 0.41309		10 Secs (10 Secs) [==>]	[1]
	19		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.00000, 0.65000		10 Secs (10 Secs) [==>]	[1]
20		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.04392, 0.82548		10 Secs (10 Secs) [==>]	[1]	
21		(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.07988, 1.0403		10 Secs (10 Secs) [==>]	[1]	

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22	(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.13293, 0.73843	10 Secs (10 Secs)	
						[==>]	[1]
23	(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.21273, 0.87644	10 Secs (10 Secs)	
						[==>]	[1]
24	(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.25267, 1.09152	10 Secs (10 Secs)	
						[==>]	[1]
25	(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.34603, 0.71265	10 Secs (10 Secs)	
						[==>]	[1]
26	(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.38555, 0.84801	10 Secs (10 Secs)	
						[==>]	[1]
27	(3) SN2017EIN	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F438W	FLASH=12	POS TARG 0.42549, 1.06309	10 Secs (10 Secs)	
						[==>]	[1]



Proposal 14645 - Visit 04 - The Stellar Origins of Supernovae

Visit	Proposal 14645, Visit 04, implementation Fri Sep 29 21:00:32 GMT 2017 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: (none)					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(4)		SN2017GAX	RA: 04 45 49.4400 (71.4560000d) Dec: -59 14 42.60 (-59.24517d) Equinox: J2000		V=14.0+/-1.0	Reference Frame: ICRS

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#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
Exposures	1	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0,0		20 Secs (20 Secs)	[1]	
								[==>]		
	2	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.04392, 0.17548		20 Secs (20 Secs)	[1]	
								[==>]		
	3	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.07988, 0.39030		20 Secs (20 Secs)	[1]	
								[==>]		
	4	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.13293, 0.08843		20 Secs (20 Secs)	[1]	
								[==>]		
	5	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.21273, 0.22644		20 Secs (20 Secs)	[1]	
								[==>]		
	6	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.25267, 0.44152		20 Secs (20 Secs)	[1]	
								[==>]		
	7	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.34603, 0.06265		20 Secs (20 Secs)	[1]	
								[==>]		
	8	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.38555, 0.19801		20 Secs (20 Secs)	[1]	
								[==>]		
	9	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.42549, 0.41309		20 Secs (20 Secs)	[1]	
								[==>]		
	10	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.65000, 0		20 Secs (20 Secs)	[1]	
								[==>]		
	11	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.69392, 0.17548		20 Secs (20 Secs)	[1]	
								[==>]		
12	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.72988, 0.39030		20 Secs (20 Secs)	[1]		
							[==>]			
13	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.78293, 0.08843		20 Secs (20 Secs)	[1]		
							[==>]			
14	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.86273, 0.22644		20 Secs (20 Secs)	[1]		
							[==>]			
15	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.90267, 0.44152		20 Secs (20 Secs)	[1]		
							[==>]			
16	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.99603, 0.06265		20 Secs (20 Secs)	[1]		
							[==>]			
17	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 1.03555, 0.19801		20 Secs (20 Secs)	[1]		
							[==>]			
18	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 1.07549, 0.41309		20 Secs (20 Secs)	[1]		
							[==>]			
19	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.00000, 0.65000		20 Secs (20 Secs)	[1]		
							[==>]			
20	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.04392, 0.82548		20 Secs (20 Secs)	[1]		
							[==>]			
21	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.07988, 1.04030		20 Secs (20 Secs)	[1]		
							[==>]			
22	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.13293, 0.73843		20 Secs (20 Secs)	[1]		
							[==>]			

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23	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.21273, 0.87644	20 Secs (20 Secs)	
						[==>]	[1]
24	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.25267, 1.09152	20 Secs (20 Secs)	
						[==>]	[1]
25	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.34603, 0.71265	20 Secs (20 Secs)	
						[==>]	[1]
26	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.38555, 0.84801	20 Secs (20 Secs)	
						[==>]	[1]
27	(4) SN2017GAX	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F555W	FLASH=12	POS TARG 0.42549, 1.06309	20 Secs (20 Secs)	
						[==>]	[1]

