



16714 - HST Spectroscopy of a Fast-Rising Luminous Ultraviolet Transient

Cycle: 29, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>
Dr. Daniel Perley (PI) (ESA Member) (Contact)	Liverpool John Moores University
Dr. Lin Yan (CoI) (AdminUSPI)	California Institute of Technology
Anna Yen Qin Ho (CoI)	Cornell University
Ms. Yuhan Yao (CoI)	California Institute of Technology
Prof. Shrinivas R. Kulkarni (CoI)	California Institute of Technology
Dr. Christoffer Fremling (CoI)	California Institute of Technology
Dr. Ragnhild Lunnan (CoI) (ESA Member)	Stockholm University

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	(2) AT2023IUC	COS/FUV COS/NUV	2	21-May-2023 20:00:14.0	yes
02	(2) AT2023IUC	COS/FUV COS/NUV	2	21-May-2023 20:00:15.0	yes
03	(2) AT2023IUC	STIS/CCD STIS/NUV-MAMA	2	21-May-2023 20:00:16.0	yes

6 Total Orbits Used

ABSTRACT

High-cadence time-domain surveys have unveiled a population of fast-evolving, luminous extragalactic transients with SEDs that remain dominated by ultraviolet emission for long after peak and also exhibit luminous X-ray and radio counterparts. While they show some observational similarities with strongly-interacting supernovae, optical follow-up has failed to identify any recognizable supernova features and the extreme properties of these events strain theoretical models for what is possible in a supernova explosion. Ultraviolet spectroscopy has the power to reveal similarities or differences between this event and other supernova classes not apparent from optical observations alone, and offers a means of identifying the progenitor star via transmission spectroscopy of the dense stellar wind before the explosion sweeps it up. We propose to obtain target-of-opportunity UV spectroscopy of a new event of this type in Cycle 29 to secure the physical origins of this class while HST's unique UV spectroscopic resource is still available.

OBSERVING DESCRIPTION

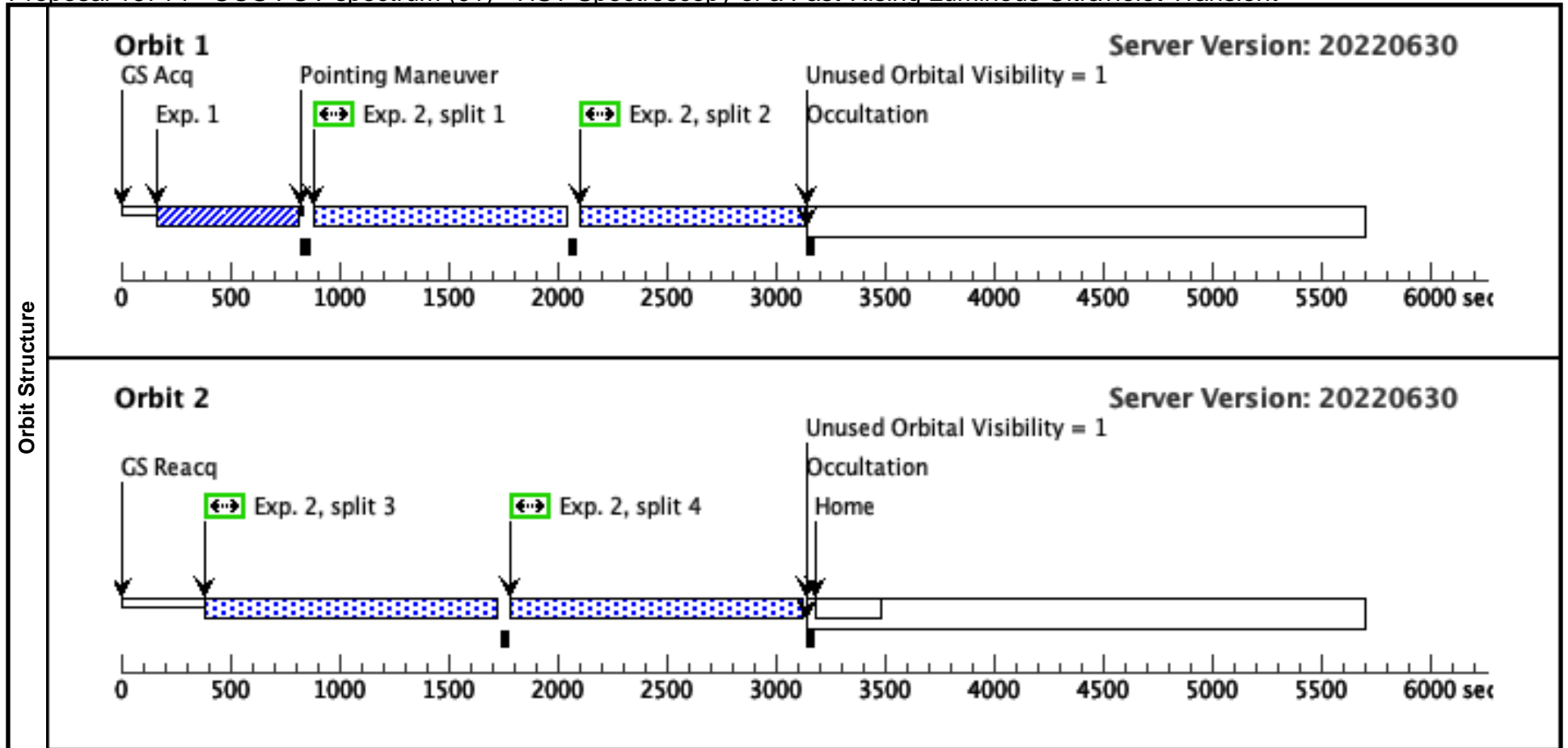
Our objective is to carry out low-resolution FUV and NUV spectroscopy of a fast-luminous UV transient with COS (G140L) and STIS (G230L). Fast turnaround is helpful for many reasons - both to optimize the S/N (the target will not be bright) and to decrease the risk of acquisition failure if the target's UV flux evolution is different than expected. A turnaround of up to 1 week is acceptable, although for a sufficiently nearby event we may accept a longer delay. Using fewer guide stars may be acceptable to achieve faster turnaround. It is desirable in principle to obtain the COS and STIS observations close in time to each other but observing sooner in one band will almost always be preferred if the option is available.

Rapid two-way communication with STScI will be necessary to correctly configure the observations and perform all safety checks to ensure a successful acquisition. The PI's mobile number is +44 745 6339330 and can be contacted 24 hours a day.

Proposal 16714 - COS FUV spectrum (01) - HST Spectroscopy of a Fast-Rising Luminous Ultraviolet Transient

Mon May 22 00:00:16 GMT 2023

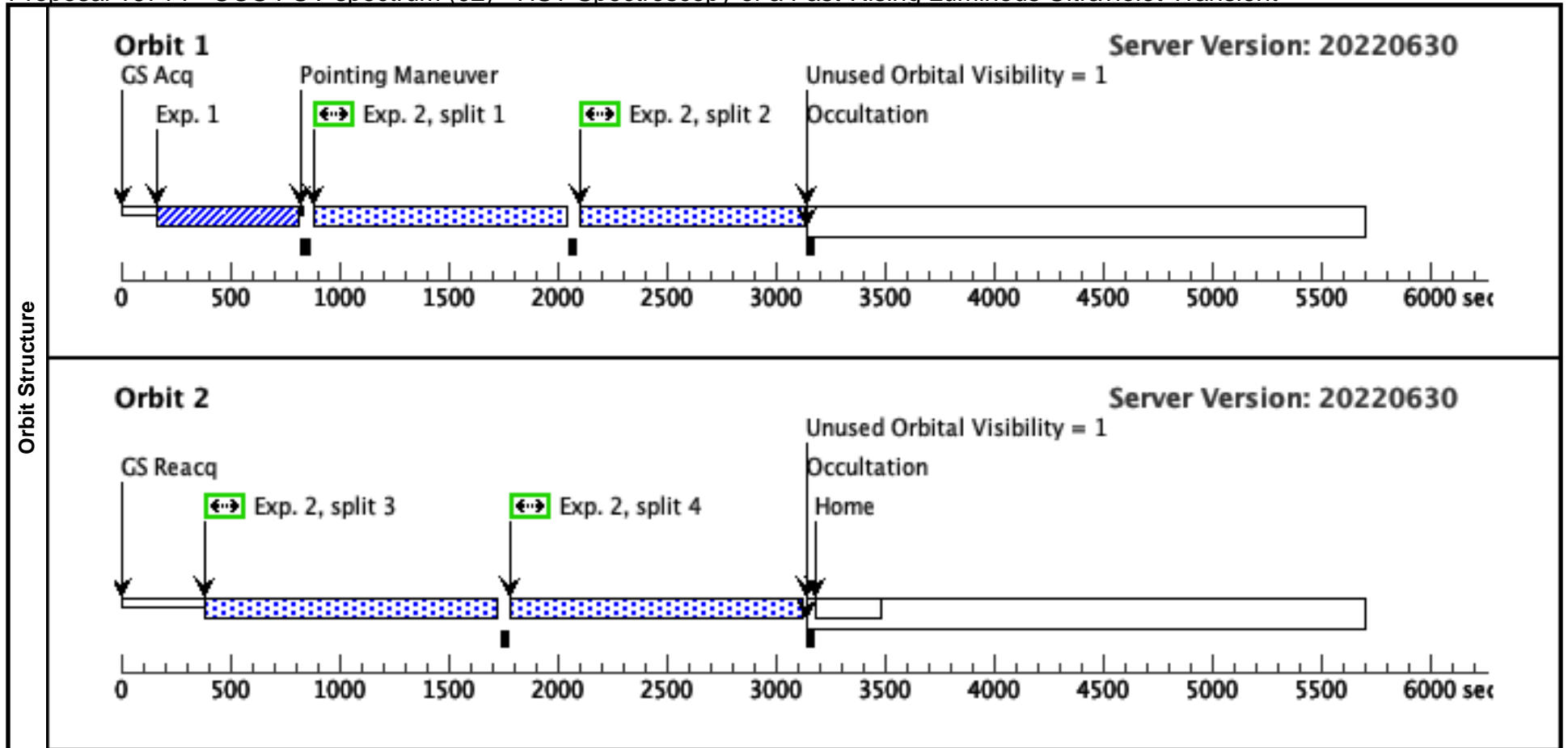
Visit	Proposal 16714, COS FUV spectrum (01), implementation Diagnostic Status: Warning Scientific Instruments: COS/FUV, COS/NUV Special Requirements: BEFORE 01-JUN-2023:00:00:00; TOO RESPONSE TIME 4.0D									
	(COS FUV spectrum (01)) Warning (Form): If the target position is not known to 0.4" (or better), an ACQ/SEARCH should precede the ACQ/IMAGE.									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	AT2023IUC Alt Name1: ZTF23AAKFYSP Alt Name2: SN2023IUC	RA: 14 38 55.6500 (219.7318750d) Dec: +02 17 14.14 (2.28726d) Equinox: J2000	Redshift: 0.07676	V=19+/-1	Reference Frame: ICRS				
Comments: Estimated magnitude is that in one week. The current (2023 May 21) magnitudes (AB) are ~18.0 in the UV bands, ~18.2 in u/g/r, and ~18.5 in i/z. The source is not currently fading significantly, although we expect it to begin fading soon. Category=STAR Description=[SUPERNOVA] Extended=NO										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Acquisition (COS.ta.152 9624)	(2) AT2023IUC	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				180 Secs (180 Secs)	
	Comments: The target is currently ~18 mag in the UV and ~18.3 mag in r-band. Over the past two nights its flux has not changed significantly in either band, although based on past similar objects fading is expected to set in soon. We are able to supply up-to-date magnitudes on request as needed.									
	2	COS spectru m (COS.sp.152 9625)	(2) AT2023IUC	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FLASH=YES; BUFFER-TIME=6400; FP-POS=ALL				1000 Secs (4516 Secs)
									[==>]	[1]
									[==>973.0 Secs (Split 1)]	[1]
									[==>973.0 Secs (Split 2)]	[1]
									[==>1285.0 Secs (Split 3)]	[2]
									[==>1285.0 Secs (Split 4)]	[2]



Proposal 16714 - COS FUV spectrum (02) - HST Spectroscopy of a Fast-Rising Luminous Ultraviolet Transient

Mon May 22 00:00:17 GMT 2023

Visit	Proposal 16714, COS FUV spectrum (02), implementation Diagnostic Status: Warning Scientific Instruments: COS/FUV, COS/NUV Special Requirements: BEFORE 01-JUN-2023:00:00:00; TOO RESPONSE TIME 4.0D <i>Comments: If the target remains bright we may request a time constraint on the second visit to delay the observation for a few days to study time evolution. (For now, we are not requesting this.)</i>																																																																																										
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Proposal 16714 - STIS NUV spectrum (03) - HST Spectroscopy of a Fast-Rising Luminous Ultraviolet Transient

Mon May 22 00:00:17 GMT 2023

Visit	Proposal 16714, STIS NUV spectrum (03), implementation Diagnostic Status: No Diagnostics Scientific Instruments: STIS/NUV-MAMA, STIS/CCD Special Requirements: BEFORE 01-JUN-2023:00:00:00; TOO RESPONSE TIME 4.0D <i>Comments: It is preferable, but not required, to execute this close in time with the COS observations.</i>										
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(2)		AT2023IUC Alt Name1: ZTF23AAKFYSP Alt Name2: SN2023IUC	RA: 14 38 55.6500 (219.7318750d) Dec: +02 17 14.14 (2.28726d) Equinox: J2000	Redshift: 0.07676	V=19+/-1	Reference Frame: ICRS					
<i>Comments: Estimated magnitude is that in one week. The current (2023 May 21) magnitudes (AB) are ~18.0 in the UV bands, ~18.2 in u/g/r, and ~18.5 in i/z. The source is not currently fading significantly, although we expect it to begin fading soon.</i> Category=STAR Description=[SUPERNOVA] Extended=NO											
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	1	Acquisition (STIS.ta.152 7037)	(2) AT2023IUC	STIS/CCD, ACQ, F28X50LP	MIRROR				60 Secs (60 Secs)		
										[==>]	[1]
	<i>Comments: The target is currently ~18 mag in the UV and ~18.3 mag in r-band. Over the past two nights its flux has not changed significantly in either band, although based on past similar objects fading is expected to set in soon. We are able to supply up-to-date magnitudes on request as needed.</i>										
2	STIS orbit 1 (STIS.sp.15 27040)	(2) AT2023IUC	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A		BUFFER-TIME=66 3			2100 Secs (1982 Secs)		
									[==>1982.0 Secs]	[1]	
3	STIS orbit 2 (STIS.sp.15 27040)	(2) AT2023IUC	STIS/NUV-MAMA, TIME-TAG, 52X0.2	G230L 2376 A		BUFFER-TIME=66 3			2100 Secs (2722 Secs)		
									[==>2722.0 Secs]	[2]	

