



14850 - Identify the signature of neutron star mergers through rapid Chandra/Hubble observations of a short GRB

Cycle: 24, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Eleonora Troja (PI) (Contact)	University of Maryland	eleonora.troja@nasa.gov
Dr. Stephen Bradley Cenko (CoI) (Contact)	NASA Goddard Space Flight Center	brad.cenko@nasa.gov
Dr. Neil Gehrels (CoI)	NASA Goddard Space Flight Center	neil.gehrels@nasa.gov
Nobuyuki Kawai (CoI)	Tokyo Institute of Technology - TIT	nkawai@phys.titech.ac.jp
Dr. Amy Lien (CoI)	NASA Goddard Space Flight Center	amy.y.lien@nasa.gov
Dr. Taka Sakamoto (CoI)	Aoyama Gakuin University	tsakamoto@phys.aoyama.ac.jp

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) SHORT-GRB	WFC3/UVIS	1	23-Aug-2017 14:10:12.0	yes
02	(1) SHORT-GRB	WFC3/IR	1	23-Aug-2017 14:10:14.0	yes
03	(1) SHORT-GRB	WFC3/IR	1	23-Aug-2017 14:10:15.0	yes
04	(1) SHORT-GRB	WFC3/UVIS	1	23-Aug-2017 14:10:16.0	yes

4 Total Orbits Used

ABSTRACT

The afterglow of some short GRBs displays a late-time rebrightening, visible a few days after the gamma-ray burst. Recent HST observations provided tantalizing evidence that such late-time bump could be explained as the emergence of the underlying kilonova emission. This would

represent the incontrovertible signature of a neutron star merger, and the first direct link between short GRBs and their progenitors. Here we ask for a rapid and deep Chandra/HST follow-up observation of a short duration GRB in order to detect the expected kilonova bump, and to constrain the origin of the observed emission. Multi-band observations, and in particular X-rays, are critical to pin down the nature of the observed rebrightening, and to distinguish it from the standard afterglow emission.

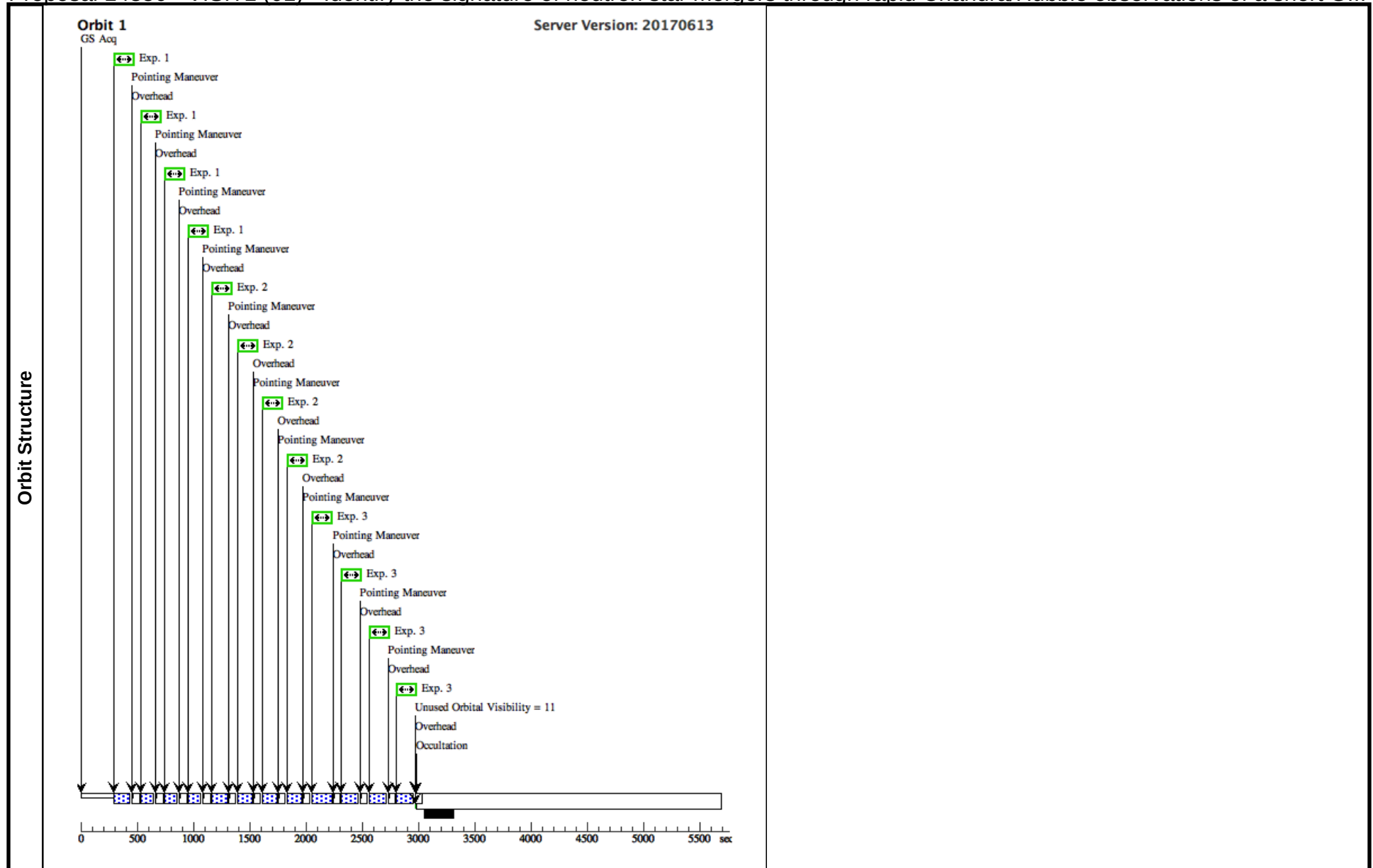
OBSERVING DESCRIPTION

Below we provide an illustrative description of our observational strategy. Given the broad range of short GRB redshifts, afterglow and host properties, the exact details of the observations (response time, cadence, and filters) will be determined on a case by case basis.

We request three epochs of observations, the exact times will be scaled according to the observed afterglow decay, the GRB distance scale, and the total time span of the ground-based data. We will plan our observations in order to require a reaction time >2 days. Each epoch will consist of three orbits in order to image the target in different colors. In case of a rare nearby $z \sim 0.1$ event we may request to perform spectroscopic observations. We remark that the choice of UVIS and IR filters reported in this observing form is preliminary, and the final selection will be made at the time of the ToO in order to match the best sampled light curves from the ground.

Proposal 14850 - VISIT1 (01) - Identify the signature of neutron star mergers through rapid Chandra/Hubble observations of a short G...

Visit	Proposal 14850, VISIT1 (01), scheduled										Wed Aug 23 18:10:17 GMT 2017	
	Diagnostic Status: Warning											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: SCHED 100%; ON HOLD ; TOO RESPONSE TIME 3.0D											
On Hold Comments: ToO Activation												
Diagnostics	(UVIS (01.002)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser											
	(UVIS (01.003)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser											
Patterns	#	Primary Pattern					Secondary Pattern				Exposures	
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112									(1), (2), (3)	
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	SHORT-GRB		RA: 13 09 48.0900 (197.4503750d) Dec: -23 22 53.35 (-23.38149d) Equinox: J2000				V=18.5		Reference Frame: optical		
Comments: Extended=NO												
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	UVIS	(1) SHORT-GRB	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB		F606W	CR-SPLIT=NO; FLASH=9		Pattern 1, Exps 1-1 i n VISIT1 (01) (1)	90 Secs (452 Secs)		[1]
										[==>113.0 Secs (Pattern 1)]		
										[==>113.0 Secs (Pattern 2)]		
										[==>113.0 Secs (Pattern 3)]		
										[==>113.0 Secs (Pattern 4)]		
	2	UVIS	(1) SHORT-GRB	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB		F475W	CR-SPLIT=NO		Pattern 1, Exps 2-2 i n VISIT1 (01) (1)	130 Secs (520 Secs)		[1]
									[==>(Pattern 1)]			
									[==>(Pattern 2)]			
									[==>(Pattern 3)]			
									[==>(Pattern 4)]			
3	UVIS	(1) SHORT-GRB	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB		F275W			Pattern 1, Exps 3-3 i n VISIT1 (01) (1)	155 Secs (620 Secs)		[1]	
									[==>(Pattern 1)]			
									[==>(Pattern 2)]			
									[==>(Pattern 3)]			
									[==>(Pattern 4)]			



Proposal 14850 - VISIT_IR (02) - Identify the signature of neutron star mergers through rapid Chandra/Hubble observations of a short ...

Visit	Proposal 14850, VISIT_IR (02), implementation										Wed Aug 23 18:10:17 GMT 2017	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/IR											
	Special Requirements: SCHED 100%; ON HOLD ; TOO RESPONSE TIME 3.0D											
On Hold Comments: ToO Activation												
Patterns	#	Primary Pattern					Secondary Pattern			Exposures		
	(3)	Pattern Type=WFC3-IR-DITHER-LINE Coordinate Frame=POS-TARG Pattern Orientation=41.788 Purpose=DITHER Angle Between Sides= Number Of Points=2 Center Pattern=false Point Spacing=0.636 Line Spacing=								(1), (2)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(1)	SHORT-GRB	RA: 13 09 48.0900 (197.4503750d) Dec: -23 22 53.35 (-23.38149d) Equinox: J2000				V=18.5		Reference Frame: optical			
Comments: Extended=NO												
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	IR1	(1) SHORT-GRB	WFC3/IR, MULTIACCUM, IR		F110W	NSAMP=13; SAMP-SEQ=SPAR S50		Pattern 3, Exps 1-1 i n VISIT_IR (02) (3)	602.937703 Secs (1205.875 Secs)		
										[==>(Pattern 1)] [==>(Pattern 2)]		[1]
	2	IR1	(1) SHORT-GRB	WFC3/IR, MULTIACCUM, IR		F160W	NSAMP=13; SAMP-SEQ=SPAR S50		Pattern 3, Exps 2-2 i n VISIT_IR (02) (3)	602.937703 Secs (1205.875 Secs)		
										[==>(Pattern 1)] [==>(Pattern 2)]		[1]
Orbit Structure	Orbit 1											
	Server Version: 20170613											

Proposal 14850 - VISIT_IR (03) - Identify the signature of neutron star mergers through rapid Chandra/Hubble observations of a short ...

Visit	Proposal 14850, VISIT_IR (03), implementation					Wed Aug 23 18:10:17 GMT 2017				
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: WFC3/IR									
	Special Requirements: SCHED 100%; ON HOLD ; TOO RESPONSE TIME 3.0D									
On Hold Comments: ToO Activation										
Patterns	#	Primary Pattern				Secondary Pattern				Exposures
	(3)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.636 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false						(1-2)
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(1)	SHORT-GRB	RA: 13 09 48.0900 (197.4503750d) Dec: -23 22 53.35 (-23.38149d) Equinox: J2000				V=18.5		Reference Frame: optical	
Comments: Extended=NO										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	IRGRISM1	(1) SHORT-GRB	WFC3/IR, MULTIACCUM, GRISM1024	G102	NSAMP=13; SAMP-SEQ=SPAR S50		Pattern 3, Exps 1-2 in VISIT_IR (03) (3)	602.937703 Secs (1205.875 Secs) [>=>(Pattern 1)] [>=>(Pattern 2)]	[1]
	2	IRGRISM2	(1) SHORT-GRB	WFC3/IR, MULTIACCUM, GRISM1024	G141	NSAMP=13; SAMP-SEQ=SPAR S50		Pattern 3, Exps 1-2 in VISIT_IR (03) (3)	602.937703 Secs (1205.875 Secs) [>=>(Pattern 1)] [>=>(Pattern 2)]	[1]
Orbit Structure	Orbit 1 Server Version: 20170613 Unused Orbital Visibility = 74 GS Acq Exp. 1 Exp. 2 Pointing Maneuver Exp. 1 Exp. 2 Reconfig Occultation <									

Proposal 14850 - VISIT1B (04) - Identify the signature of neutron star mergers through rapid Chandra/Hubble observations of a short ...

Visit	Proposal 14850, VISIT1B (04), implementation										Wed Aug 23 18:10:17 GMT 2017	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: SCHED 100%; ON HOLD ; TOO RESPONSE TIME 3.0D											
	On Hold Comments: ToO Activation											
Patterns	#	Primary Pattern					Secondary Pattern				Exposures	
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112									(1), (2), (3)	
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	SHORT-GRB	RA: 13 09 48.0900 (197.4503750d) Dec: -23 22 53.35 (-23.38149d) Equinox: J2000					V=18.5		Reference Frame: optical		
	Comments: Extended=NO											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1	UVIS	(1) SHORT-GRB	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F606W	CR-SPLIT=NO; FLASH=10		Pattern 1, Exps 1-1 i n VISIT1B (04) (1)	90 Secs (408 Secs)			
									[==>102.0 Secs (Pattern 1)] [==>102.0 Secs (Pattern 2)] [==>102.0 Secs (Pattern 3)] [==>102.0 Secs (Pattern 4)]		[1]	
	2	UVIS	(1) SHORT-GRB	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F475W	CR-SPLIT=NO; FLASH=12		Pattern 1, Exps 2-2 i n VISIT1B (04) (1)	130 Secs (520 Secs)			
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]	
	3	UVIS	(1) SHORT-GRB	WFC3/UVIS, ACCUM, UVIS2-C1K1C-SUB	F275W	FLASH=14; CR-SPLIT=NO		Pattern 1, Exps 3-3 i n VISIT1B (04) (1)	155 Secs (620 Secs)			
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]	

