



15708 - Unpicking the exceptional properties of the first TeV emitting gamma-ray burst

Cycle: 26, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Prof. Andrew James Levan (PI) (ESA Member) (Contact)	Radboud Universiteit Nijmegen	a.levan@astro.ru.nl
Prof. Nial Rahil Tanvir (CoI) (ESA Member)	University of Leicester	nrt3@star.le.ac.uk
Prof. Ralph A.M.J. Wijers (CoI) (ESA Member)	Universiteit van Amsterdam	rwijers@uva.nl
Dr. Jonatan Selsing (CoI) (ESA Member)	University of Copenhagen, Niels Bohr Institute	jselsing@nbi.ku.dk
Mr. Kasper Elm Heintz (CoI)	University of Iceland	heintz@dark-cosmology.dk
Dr. Darach Watson (CoI) (ESA Member)	University of Copenhagen, Niels Bohr Institute	darach@nbi.ku.dk
Prof. Johan P. U. Fynbo (CoI) (ESA Member)	University of Copenhagen, Niels Bohr Institute	jfynbo@nbi.ku.dk
Dr. Palle Moller (CoI) (ESA Member)	European Southern Observatory - Germany	pmoller@eso.org
Dr. Christina Thoene (CoI) (ESA Member)	Instituto de Astrofísica de Andalucía (IAA)	cthoene@iaa.es
Dr. Antonio de Ugarte Postigo (CoI) (ESA Member)	Instituto de Astrofísica de Andalucía (IAA)	adeugartepostigo@gmail.com
Dr. Valerio D'Elia (CoI) (ESA Member)	INAF, Osservatorio Astronomico di Roma	valerio.delia@vistec.ac.th
Dr. Massimo Della Valle (CoI) (ESA Member)	INAF, Osservatorio Astronomico di Capodimonte	massimo.dellavalle@inaf.it
Prof. Dieter Hartmann (CoI)	Clemson University	hdieter@clemson.edu
Dr. Klaas Wiersema (CoI) (ESA Member)	The University of Warwick	k.wiersema@warwick.ac.uk
Dr. C. Kouveliotou (CoI)	George Washington University	ckouveliotou@gwu.edu
Dr. Steve Schulze (CoI)	Weizmann Institute of Science	steve.schulze@weizmann.ac.il
Dr. David Kann (CoI) (ESA Member)	Thüringer Landessternwarte Tautenburg (TLS)	kann@tls-tautenburg.de
Dr. Susanna Vergani (CoI) (ESA Member)	Observatoire de Paris - Section de Meudon	susanna.vergani@obspm.fr
Dr. Daniele Bjorn Malesani (CoI) (ESA Member)	University of Copenhagen, Niels Bohr Institute	malesani@dark-cosmology.dk

Proposal 15708 (STScI Edit Number: 0, Created: Wednesday, April 10, 2019 at 8:01:10 AM Eastern Standard Time) - Overview

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Dong Xu (CoI) (ESA Member)	University of Copenhagen, Niels Bohr Institute	dong@dark-cosmology.dk
Dr. Bo Milvang-Jensen (CoI) (ESA Member)	University of Copenhagen, Niels Bohr Institute	milvang@astro.ku.dk
Dr. Andrea Rossi (CoI) (ESA Member)	INAF, Osservatorio di Astrofisica e Scienza dello Spazio di B	andrea.rossi@inaf.it
Dr. Gianpiero Tagliaferri (CoI) (ESA Member)	INAF, Osservatorio Astronomico di Brera, Merate	gianpiero.tagliaferri@brera.inaf.it
Rhaana L.C. Starling (CoI) (ESA Member)	University of Leicester	rlcs1@le.ac.uk
Dr. Sergio Campana (CoI) (ESA Member)	INAF, Osservatorio Astronomico di Brera, Merate	sergio.campana@brera.inaf.it
Dr. Luca Izzo (CoI) (ESA Member)	Instituto de Astrofisica de Andalucia (IAA)	luca.izzo@gmail.com
Mr. Jan Bolmer (CoI) (ESA Member)	European Southern Observatory - Germany	jbolmer@eso.org
Dr. Andrew S. Fruchter (CoI) (AdminUSPI)	Space Telescope Science Institute	fruchter@stsci.edu
Dr. Giovanna Pugliese (CoI) (ESA Member)	Universiteit van Amsterdam	pugliese@astro.uva.nl
Prof. Jens Hjorth (CoI) (ESA Member)	University of Copenhagen, Niels Bohr Institute	jens@dark-cosmology.dk
Dr. Gavin Lamb (CoI) (ESA Member)	University of Leicester	gpl6@leicester.ac.uk
Dr. Tanmoy Laskar (CoI) (ESA Member)	University of Bath	t.lasker@bath.ac.uk
Dr. Daniel Perley (CoI) (ESA Member)	Liverpool John Moores University	d.a.perley@ljmu.ac.uk
Dr. Pall Jakobsson (CoI)	University of Iceland	pja@raunvis.hi.is
Dr. Boris Sbarufatti (CoI)	The Pennsylvania State University	bxs60@psu.edu
Dr. Patricia Schady (CoI) (ESA Member)	University of Bath	p.schady@bath.ac.uk
Dr. Paolo Goldoni (CoI) (ESA Member)	Commissariat a l'Energie Atomique (CEA)	paolo@discovery.saclay.cea.fr
Jure Japelj (CoI) (ESA Member)	Universiteit van Amsterdam	japelj.jure@gmail.com
Dr. Ruben Salvaterra (CoI) (ESA Member)	INAF, Istituto di Astrofisica Spaziale e Fisica, Milano	ruben@lambrate.inaf.it
Dr. Alexander Van der Horst (CoI)	George Washington University	ajvanderhorst@email.gwu.edu
Tuomas Kangas (CoI)	Space Telescope Science Institute	tkangas@stsci.edu
Prof. Paul Groot (CoI) (ESA Member)	Radboud Universiteit Nijmegen	pgroot@astro.kun.nl
Dr. Peter Gustaaf Jonker (CoI) (ESA Member)	Space Research Organization Netherlands	p.jonker@sron.nl

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	(3) GRB190114C	WFC3/IR	1	10-Apr-2019 09:01:08.0	yes
02	(3) GRB190114C	ACS/WFC	2	10-Apr-2019 09:01:09.0	yes

3 Total Orbits Used

ABSTRACT

Several thousand gamma-ray bursts (GRBs) have now been detected, lasting from a fraction of a second to several hours, and with spectral energies peaking in the hundreds of keV range. A handful of bursts have been detected at GeV energies, but very recently GRB 190114C became the first GRB to be identified in the TeV regime via the detection of a flash of Cherenkov light by the MAGIC telescope. This detection offers a new window on the GRB phenomena, probing the generation of these extreme photons, as well as a route to testing the scattering of such photons off the Extragalactic Background Light (EBL). The environment of the burst is also exceptional, being extremely dense and perhaps indicating a link between the very high energy emission and environment, as suggested by some models. Our proposed HST observations will track the late time behaviour of the counterpart, disentangle the supernova, afterglow and host emission and determine if the physics of this unique burst differs from that seen in other examples. The observations will also characterise the environment in emission, dissecting it at higher resolution than possible from the ground and tying the emission to absorption properties. Finally, the observations will measure the optical photon density close to the GRB itself (i.e. in the host), and hence the contribution of these photons to the scattering of very high energy light (i.e. the total of local to the burst + EBL). This in turn will enable the determination of the true energetics of the burst at TeV energies and test scattering models in the EBL, both key questions in high energy astrophysics and cosmology.

OBSERVING DESCRIPTION

We will obtain a series of observations of GRB 190114C in the F606W, F775W, F850LP, F110W and F160W filters. Each of these exposures will use a standard 3-point dither. We will place the WFC observations close to the edge of the chip using the CTE aperture in order to mitigate CTE effects, and will use the standard IR aperture for infrared observations.

The purpose of these observations is to measure the long term decay of the counterpart of GRB 190114C, in tandem with earlier observations.

Proposal 15708 - Visit 01 - Unpicking the exceptional properties of the first TeV emitting gamma-ray burst

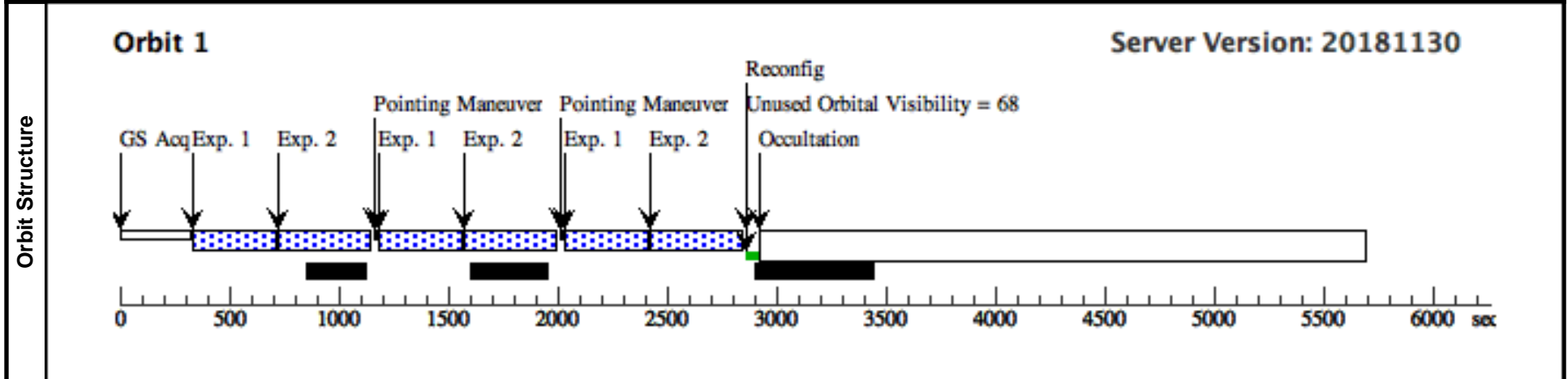
Wed Apr 10 13:01:10 GMT 2019

Visit	Proposal 15708, Visit 01 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: SCHED 100%; BETWEEN 15-AUG-2019:00:00:00 AND 30-SEP-2019:00:00:00		

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 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
	(3)	GRB190114C	RA: 03 38 1.1600 (54.5048333d) Dec: -26 56 46.90 (-26.94636d) Equinox: J2000		V=22+/-2	Reference Frame: ICRS
	<i>Comments:</i> Category=EXT-STAR Description=[GAMMA RAY BURSTER]					

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(3) GRB190114C	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=SPAR S50		Pattern 1, Exps 1-2 in Visit 01 (1)	352.935448 Secs (1058.806 Secs)	[1]
	2		(3) GRB190114C	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=9; SAMP-SEQ=SPAR S50		Pattern 1, Exps 1-2 in Visit 01 (1)	402.935899 Secs (1208.808 Secs)	[1]



Proposal 15708 - Visit 02 - Unpicking the exceptional properties of the first TeV emitting gamma-ray burst

Wed Apr 10 13:01:10 GMT 2019

Visit	Proposal 15708, Visit 02 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: SCHED 100%; GROUP 02.01 WITHIN 10D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(3)	Pattern Type=LINE Purpose=DITHER Number Of Points=3 Point Spacing=0.604 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1-3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	GRB190114C	RA: 03 38 1.1600 (54.5048333d) Dec: -26 56 46.90 (-26.94636d) Equinox: J2000		V=22+/-2	Reference Frame: ICRS				
	<i>Comments:</i> Category=EXT-STAR Description=[GAMMA RAY BURSTER]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(3) GRB190114C	ACS/WFC, ACCUM, WFC1-CTE	F606W				Pattern 3, Exps 1-3 in Visit 02 (3)	400 Secs (1386 Secs)	
									[==>493.0 Secs (Pattern 1)]	[1]
									[==>493.0 Secs (Pattern 2)]	[2]
									[==>(Pattern 3)]	[2]
	2	(3) GRB190114C	ACS/WFC, ACCUM, WFC1-CTE	F775W				Pattern 3, Exps 1-3 in Visit 02 (3)	337 Secs (1104 Secs)	
									[==>430.0 Secs (Pattern 1)]	[1]
								[==>(Pattern 2)]	[2]	
								[==>(Pattern 3)]	[2]	
3	(3) GRB190114C	ACS/WFC, ACCUM, WFC1-CTE	F850LP				Pattern 3, Exps 1-3 in Visit 02 (3)	337 Secs (1104 Secs)		
								[==>430.0 Secs (Pattern 1)]	[1]	
								[==>(Pattern 2)]	[2]	
								[==>(Pattern 3)]	[2]	

