



13651 - Disentangling Signatures of Ultra-high-energy Cosmic Rays from a Unique Gamma-ray Blazar

Cycle: 22, Proposal Category: GO

(UV Initiative)

(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) QSO-B1215+303	COS/FUV	7	21-Jul-2014 21:01:44.0	yes

7 Total Orbits Used

ABSTRACT

Blazars have been postulated as possible progenitors of ultra-high-energy cosmic rays (UHECRs; $E > 1$ PeV) for decades. This is particularly compelling in the case of blazars observed as TeV gamma-ray sources, since acceleration of particles to extreme energies must take place there. Unfortunately, convincing evidence supporting this theory has yet to be collected, mainly due to lack of firm measurements of blazar distances. Leveraging a novel technique that we successfully used to robustly pin-down redshifts in four blazars via absorption spectroscopy, we propose HST/COS observations of B2 1215+30, a blazar with the unique potential to address the validity of blazars as acceleration sources of UHECRs.

These observations will provide firm limits on the distance to B2 1215+30, which will be used in conjunction with archival observations in the very high energy (VHE; $E > 100$ GeV) band to enable a detailed study of the interaction of UHECRs with the lower-energy extragalactic photon fields along the line of sight between B2 1215+30 and the Earth.

OBSERVING DESCRIPTION

The seven orbits granted will comprise of a single visit with initial target acquisition followed by three G130M target exposures (FP_POS positions 1, 2 and 3, respectively) and four G160M target exposures (FP_POS positions 1, 2, 3, 4, respectively). The target acquisition involves a 45 second PEAKXD exposure followed by a series of five 60 second PEAKD exposures with 0.9 arcsecond steps, each onto the G130M grating at 1291 angstroms. The first target exposure will immediately follow the target acquisition and cover the remainder of the first orbit (1940 in FP_POS 1). The fourth through ninth target exposures will use the remaining 6 orbits.

----- Additional Comments -----

This target is a variable target, found to vary by +/- an optical magnitude in the R-band (http://users.utu.fi/kani/1m/ON_325.html). In order to ensure that our measurement will be successful independent of state, we have calculated the proposed observing plan assuming the target is in the faintest state (FUV ~18.5 magnitude). With the safety of the instrument in mind, a check was made on the proposed target acquisition exposures on the chance that the target will be in the brightest state during observations (FUV~16.5). The exposures requested are found to produce no instrumental risk (see below for ETC run numbers). This visit sequence is requested independent of the source magnitude at time of observation.

Exposure Time Calculator run with FUV magnitude of 16.5:

Exposure 1 ETC Run #: 620592

Exposure 2 ETC Run #: 620593

Exposure 3 ETC Run #: 620594

Exposure 4 ETC Run #: 620595

Exposure 5 ETC Run #: 620595

Exposure 6 ETC Run #: 620596

Exposure 7 ETC Run #: 620596

Proposal 13651 (STScI Edit Number: 0, Created: Monday, July 21, 2014 8:01:46 PM EST) - Overview

Exposure 8 ETC Run #: 620596

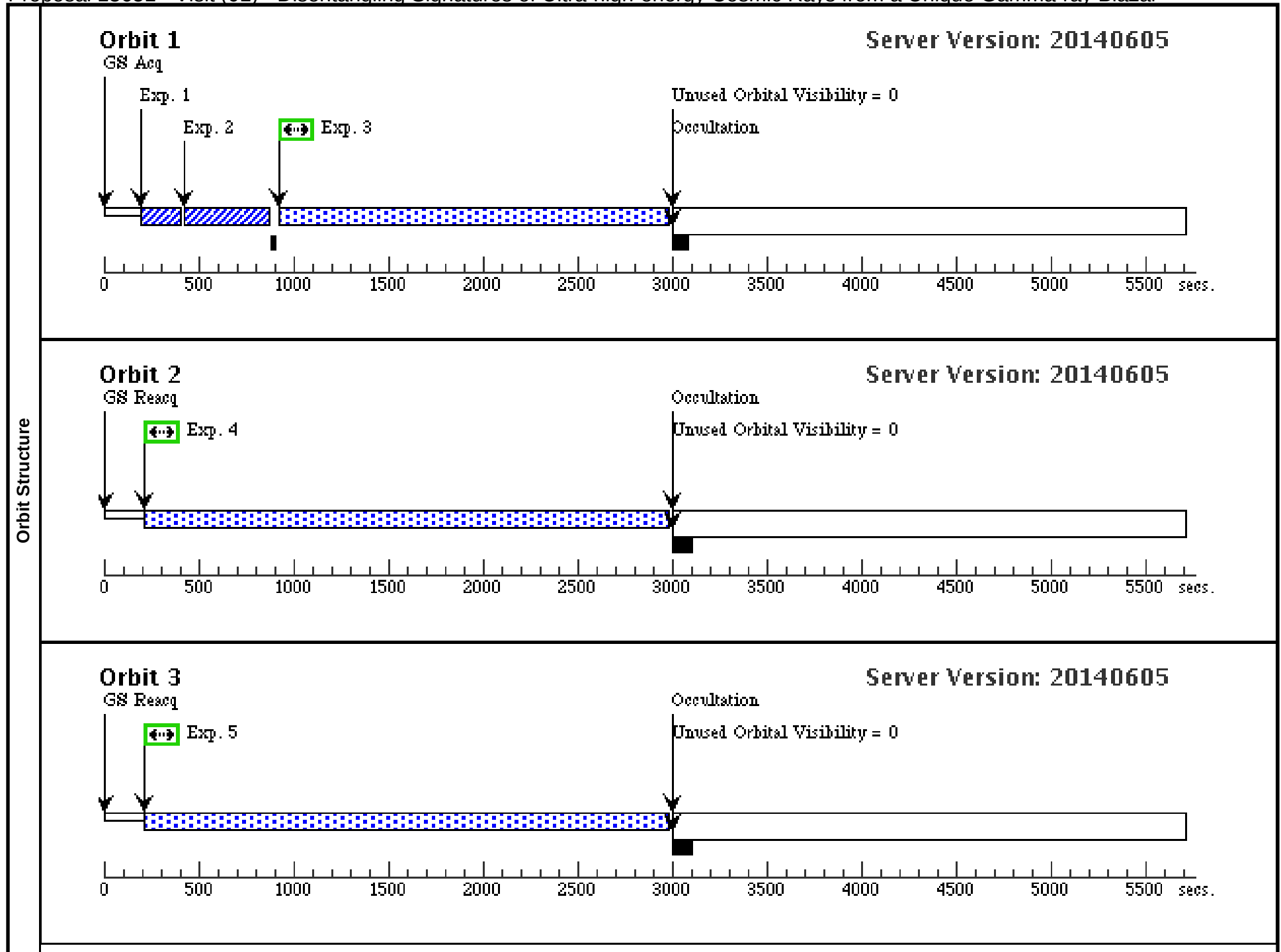
Exposure 9 ETC Run #:620596

Proposal 13651 - Visit (01) - Disentangling Signatures of Ultra-high-energy Cosmic Rays from a Unique Gamma-ray Blazar

Visit	Proposal 13651, Visit (01), implementation					Tue Jul 22 01:01:46 GMT 2014
	Diagnostic Status: Warning					
	Scientific Instruments: COS/FUV					
	Special Requirements: PCS MODE FINE; GYRO MODE 3GOBAD; SCHED 100%					
	Comments: This target is a variable target, found to vary by +/- an optical magnitude in the R-band (http://users.utu.fi/kani/1m/ON_325.html). In order to ensure that our measurement will be successful independent of state, we have alculated the proposed observing plan assuming the target is in the faintest state (FUV ~18.5 magnitude). With the safety of the instrument in mind, a check was made on the proposed target acquisition exposures on the chance that the target will be in the brightest state during observations (FUV~16.5). The exposures requested are found to produce no instrumental risk (see below for ETC run numbers). This visit sequence is requested independent of the source magnitude at time of observation. Exposure Time Calculator with FUV magnitude of 16.5: Exposure 1 ETC Run #: 622524 Exposure 2 ETC Run #: 622525					
Diagnostics	(Visit (01)) Warning (Form): For the best data quality, it is strongly recommended that all four FP-POS positions be used when observing at a given COS CENWAVE setting.					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	QSO-B1215+303	RA: 12 17 52.0820 (184.4670083d) Dec: +30 07 0.64 (30.11684d) Equinox: J2000		V=15.62+/-1.0	Reference Frame: ICRS
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.					

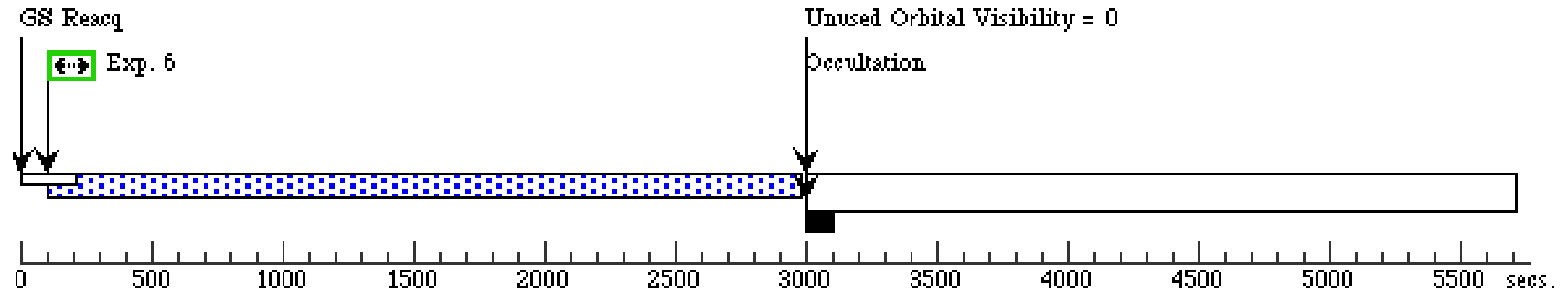
Proposal 13651 - Visit (01) - Disentangling Signatures of Ultra-high-energy Cosmic Rays from a Unique Gamma-ray Blazar

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(620592)	(1) QSO-B1215+303	COS/FUV, ACQ/PEAKXD, PSA	G130M 1291 A	SEGMENT=BOTH		Sequence 1-3 Non-Int in Visit (01)	45 Secs (45 Secs) [==>]	[1]
	2	(620593)	(1) QSO-B1215+303	COS/FUV, ACQ/PEAKD, PSA	G130M 1291 A	CENTER=FLUX-W T-FLR; NUM-POS=5.0; SEGMENT=BOTH; STEP-SIZE=0.9		Sequence 1-3 Non-Int in Visit (01)	60 Secs (60 Secs) [==>]	[1]
	3	(620594)	(1) QSO-B1215+303	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=26 00; FLASH=YES; FP-POS=1; SEGMENT=BOTH		Sequence 1-3 Non-Int in Visit (01)	1940 Secs (1940 Secs) [==>]	[1]
	Comments: The ~15A gap from ~1280 to 1295 angstroms is acceptable. Three of the four FP-POS positions will be sufficient to account for detector imperfections.									
	4	(620595)	(1) QSO-B1215+303	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=30 00; FLASH=YES; FP-POS=2; SEGMENT=BOTH			2714 Secs (2714 Secs) [==>]	[2]
	Comments: The ~15A gap from ~1280 to 1295 angstroms is acceptable. Three of the four FP-POS positions will be sufficient to account for detector imperfections.									
	5	(620595)	(1) QSO-B1215+303	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=30 00; FP-POS=3; SEGMENT=BOTH			2714 Secs (2714 Secs) [==>]	[3]
	Comments: The ~15A gap from ~1280 to 1295 angstroms is acceptable. Three of the four FP-POS positions will be sufficient to account for detector imperfections.									
	6	(620596)	(1) QSO-B1215+303	COS/FUV, TIME-TAG, PSA	G160M 1611 A	BUFFER-TIME=30 00; FLASH=YES; FP-POS=1; SEGMENT=BOTH			2714 Secs (2712 Secs) [==>2712.0 Secs]	[4]
	7	(620596)	(1) QSO-B1215+303	COS/FUV, TIME-TAG, PSA	G160M 1611 A	BUFFER-TIME=30 00; FLASH=YES; FP-POS=2; SEGMENT=BOTH			2714 Secs (2714 Secs) [==>]	[5]
	8	(620596)	(1) QSO-B1215+303	COS/FUV, TIME-TAG, PSA	G160M 1611 A	BUFFER-TIME=30 00; FLASH=YES; FP-POS=3; SEGMENT=BOTH			2714 Secs (2714 Secs) [==>]	[6]
	9	(620596)	(1) QSO-B1215+303	COS/FUV, TIME-TAG, PSA	G160M 1611 A	BUFFER-TIME=30 00; FLASH=YES; FP-POS=4; SEGMENT=BOTH			2714 Secs (2714 Secs) [==>]	[7]



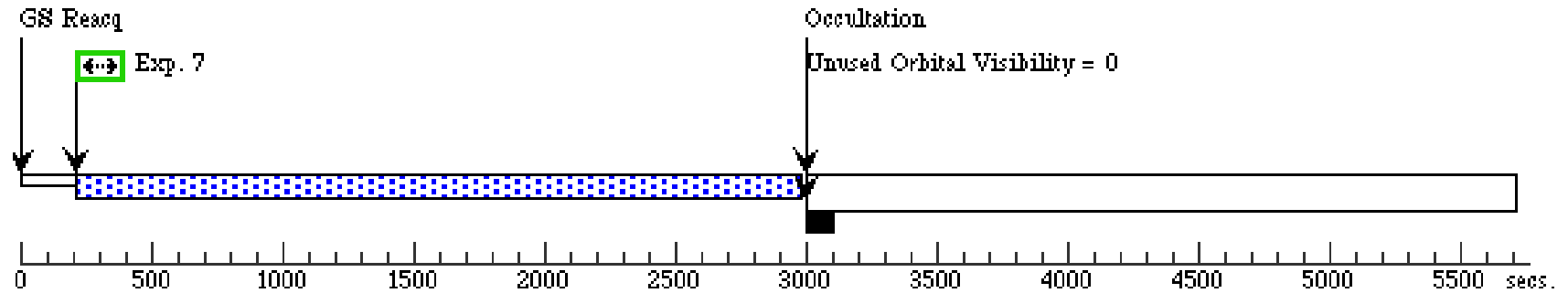
Orbit 4

Server Version: 20140605



Orbit 5

Server Version: 20140605



Orbit 6

Server Version: 20140605

