13516 - The Variable Absorption and Disrupting X-ray Jet of the Broad Absorption Line Radio-Loud Quasar PG 1004+130

Cycle: 21, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) PG1004+130	COS/NUV	1	30-Sep-2013 21:52:59.0	yes

1 Total Orbits Used

ABSTRACT

We propose non-simultaneous joint Chandra (60 ks), XMM-Newton (60 ks), and HST (1 orbit) observations of the remarkable BAL RLQ PG 1004+130. These, in conjunction with our previous X-ray/UV coverage, will yield (1) one of the most comprehensive X-ray spectral monitoring campaigns of a variable BAL quasar undertaken, probing multi-year and multi-month timescales to constrain the nature of the X-ray absorber; (2) the highest S/N X-ray spectra of a BAL RLQ currently available, enabling modeling of X-ray absorption and the underlying continuum; and (3) the deepest X-ray imaging yet obtained of a disrupting jet in a hybrid morphology radio source, allowing tests for jet flux variability and characterization of the morphologies and spectra of the jet and diffuse emission.

We prefer that the Chandra and XMM-Newton observations take place 1-9 months apart, with the HST observation also within this window.

OBSERVING DESCRIPTION

We request one HST orbit to obtain a COS/NUV spectrum investigating established C IV Broad Absorption Line (BAL) variability in PG 1004+130 (at redshift 0.24) across rest-frame decades.

The science requirements are resolution matching the most recent 2003 STIS observation and continuum signal-to-noise of about 20-30 near the C IV region. These are provided by COS with the G230L grating (central wavelength of 2950 A), which has resolution of R ~ 2500 and still provides excellent throughput (the estimated S/N from the ETC comfortably meets our requirements at 1950 A in ~ 25-30 minutes). Importantly, the G230L grating spans the entire C IV emission line and BAL absorption region on the A stripe, whereas the stripes on the higher-resolution G185M grating are too narrow to accomplish this in a single exposure; our science goals require only moderate resolution, so this highly inefficient alternative is ruled out.
The target is the brightest source within the field and is much fainter than the bright objects limits (<0.1 count/s for the brightest pixel). Use of the standard TIME-TAG mode will permit exclusion of any poor quality data and give improved background removal.

We prefer that the Chandra and XMM-Newton observations take place 1-9 months apart, with the HST observation also within this window.

ADDITIONAL COMMENTS

PI W.N. Brandt has little experience with HST operational details, so please check this Phase II submission carefully.

As explained in the attached Chandra proposal, we basically want good spectral coverage of the C IV line region. The C IV line has a rest wavelength of 1549 A, which here corresponds to an observed wavelength of 1921 A (the redshift of PG 1004+130 is 0.24).

Visit

Proposal 13516, Visit 01

Tue Oct 01 01:53:08 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	PG1004+130	RA: 10 07 26.0997 (151.8587488d) Dec: +12 48 56.21 (12.81561d) Equinox: J2000	Redshift: 0.24	V=15.68	Reference Frame: ICRS

Comments: Coordinates for PG 1004+130 are available from Andrei et al. 2009A&A...505..385A

RA 2000 = 10 07 26.0997
DEC 2000 = 12 48 56.210
RA Error = 0.152 arcsec
DEC Error = 0.0968 arcsec

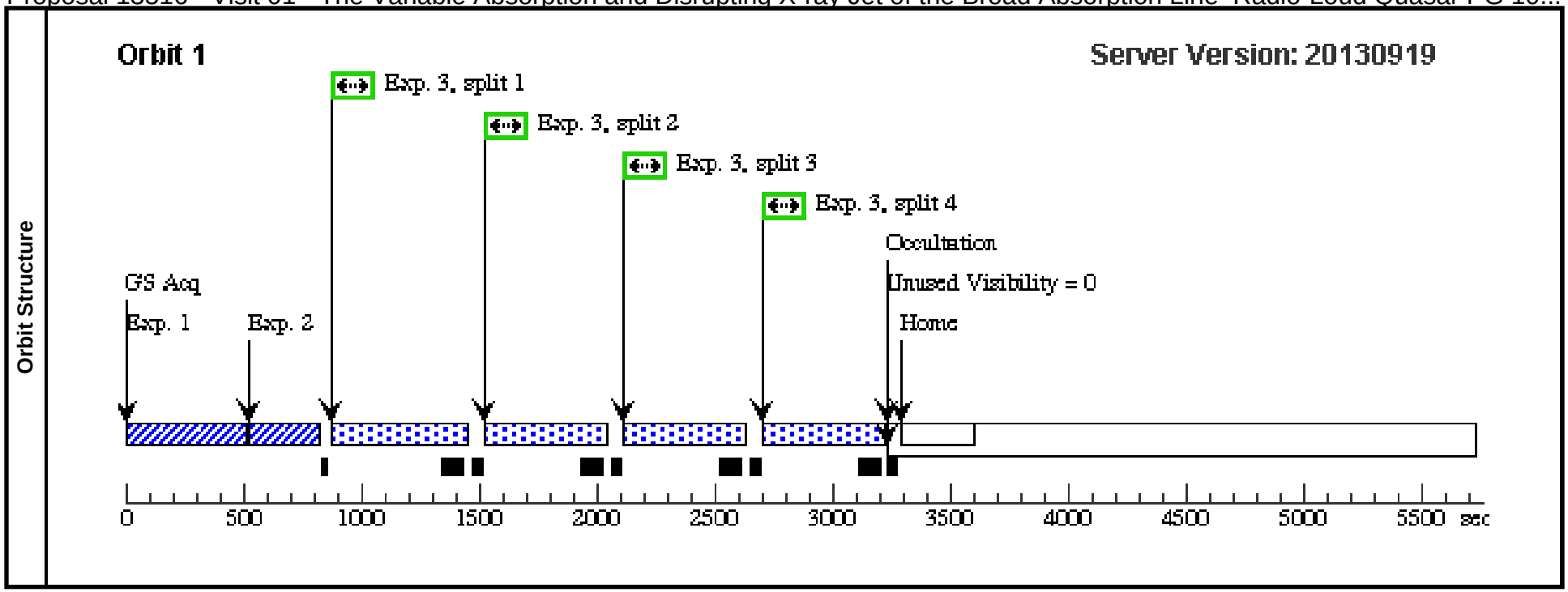
This is an optical representation of the IRCS.

The redshift of PG 1004+130 is 0.24.

We have set the flux for PG 1004+130 based upon the recent Swift UVOT UVW2 measurements. This is perhaps somewhat conservative given the range of historical UV flux.

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	PG 1004+130 acquisition (534216)	(1) PG1004+130	COS/NUV, ACQ/PEAKXD, PSA	G230L 2950 A				100 Secs (100 Secs) *[==>]*	*[1]*
2	PG 1004+130 acquisition (534216)	(1) PG1004+130	COS/NUV, ACQ/PEAKD, PSA	G230L 2950 A	STEP-SIZE=1.0; NUM-POS=5; CENTER=FLUX-WT-FLR			30 Secs (30 Secs) *[==>]*	*[1]*
3	PG1004+130 spectroscopy of C IV region (534212)	(1) PG1004+130	COS/NUV, TIME-TAG, PSA	G230L 2950 A	BUFFER-TIME=402; FP-POS=ALL			502 Secs (2008 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	*[1]*


Orbit Structure
Orbit 1
Server Version: 20130919
Exp. 3, split 1
Exp. 3, split 2
Exp. 3, split 3
Exp. 3, split 4
Occultation
Unused Visibility = 0
GS Acq
Exp. 1
Exp. 2
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec