15448 - Constraining the emergent EUV ionizing emission in the reawakening monster in Mrk 590

Cycle: 25, Proposal Category: GO/DD

(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) NGC-863	COS/FUV COS/NUV	1	22-Jan-2018 20:08:35.0	yes
02	(1) NGC-863	COS/FUV COS/NUV	1	22-Jan-2018 20:08:36.0	yes
S3	(1) NGC-863	COS/FUV COS/NUV	1	22-Jan-2018 20:08:37.0	yes

3 Total Orbits Used

ABSTRACT

After a 10-year hiatus, Mrk 590 is rekindling its nuclear activity! This offers a very rare opportunity to document the onset of AGN activity as it occurs that can lead to a better understanding of the long-standing issue of how AGNs are fuelled and how AGN work. We have monitored Mrk 590 ~bi-daily with Swift since late August 2017 in response to sudden and strong X-ray flares that continue. Early December we triggered our HST/COS ToO program of 2 single-orbit visits and additional ToO programs with VLT/Xshooter and Gemini that run for a month and spectroscopically cover from 3200A to 2.2micron. We now observe with Swift daily for at least another month. Our recent VLT/MUSE, X-shooter and HST/COS data show a strengthening of the UV-optical-IR broad lines. In particular, we see appearance of HeI IR lines that indicate a strengthening of the EUV continuum; the continuum is still low in the UV-optical and non-existing in the near-IR. We kindly ask for two additional single-orbit visits in order to follow the strengthening of the broad component of the UV Helium, Lyman-alpha and Carbon lines in order to better constrain the build-up of the ionizing EUV continuum source. The HST/COS data are pivotal, since we cannot obtain these constraints on the far-UV and EUV emission any other way.

An extensive and ancillary database is being acquired on Mrk 590 from radio through X-ray wavelengths - also during this current brief monitoring campaign. These new and existing HST/COS data will contribute with unique information to the legacy database on this intriguing object, Mrk 590, that will undoubtedly spawn new insight on AGN and their fuelling.

OBSERVING DESCRIPTION

This is an extension of proposal 15404. The source has already been successfully observed.
Same observing startegy applies.
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We propose to obtain COS low resolution FUV observations of the Seyfert 1 galaxy Mrk 590 to determine if the AGN thermal emission and broad emission lines have re-appeared in response to the significant increase in X-ray and far-UV emission as detected by Swift when this program is triggered. Using the G140L grating @1105 Ang we will be able to cover the Lya1215, NV1240, Si IV + O IV1400, C IV1549, HeII1640 and CIII]1909 broad emission lines in a single exposure. The grating resolution is adequate to resolve the typical AGN narrow emission components; the width of the [O III]5007 narrow line is FWHM~400 km s-1.

As explained in the Phase I, the target has been closely monitored with SWIFT, and in the past 80 days UVW2 fluxes (centroid wavelength 1928)

have varied from a minimum of ~2.2e-15 erg s-1 cm-2 Ang-1 to a max of ~4.0 erg s-1 cm-2 Ang-1.

Note: the target has already been successfully observed in the same configurations during faint state (PID 13518)

ACQUISITION: The target has precise 2MASS coordinates (ICRS reproduced with an error < 0.1"). We plan to use ACQ/IMG NUV MIRRORB and an exp time of 140s. For our ETC calculations we assume a flat continuum in fl normalized to half of the min observed UVW2 flux f_l ~1.1e-15 erg s-1 cm-2 Ang-1 @1928 Ang (http://etc.stsci.edu/etc/results/COS.ta.1030198/). This will ensure acquisition in case of "faint" state. The source will not pose a threat to the detector even if it ends up being 5 times more luminous than the max detected in the past 80 days (http://etc.stsci.edu/etc/results/COS.ta.1030199/).

SCIENCE: We use the G140L grating at 1105Ang with FP_POS=ALL. For ETC calculations we assume a flat continuum normalized to the mean observed UVW2 flux in the past 80 days (http://etc.stsci.edu/etc/results/COS.sp.1030204/). Buffer time is set to 2/3 of the ETC buffer time. The source will not pose a threat to the detector even if it ends up being 5 times more luminous than the past 80 days (http://etc.stsci.edu/etc/results/COS.sp.1030205/).

Visit

Proposal 15448, Visit 01, completed Tue Jan 23 01:08:38 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Fixed Targets

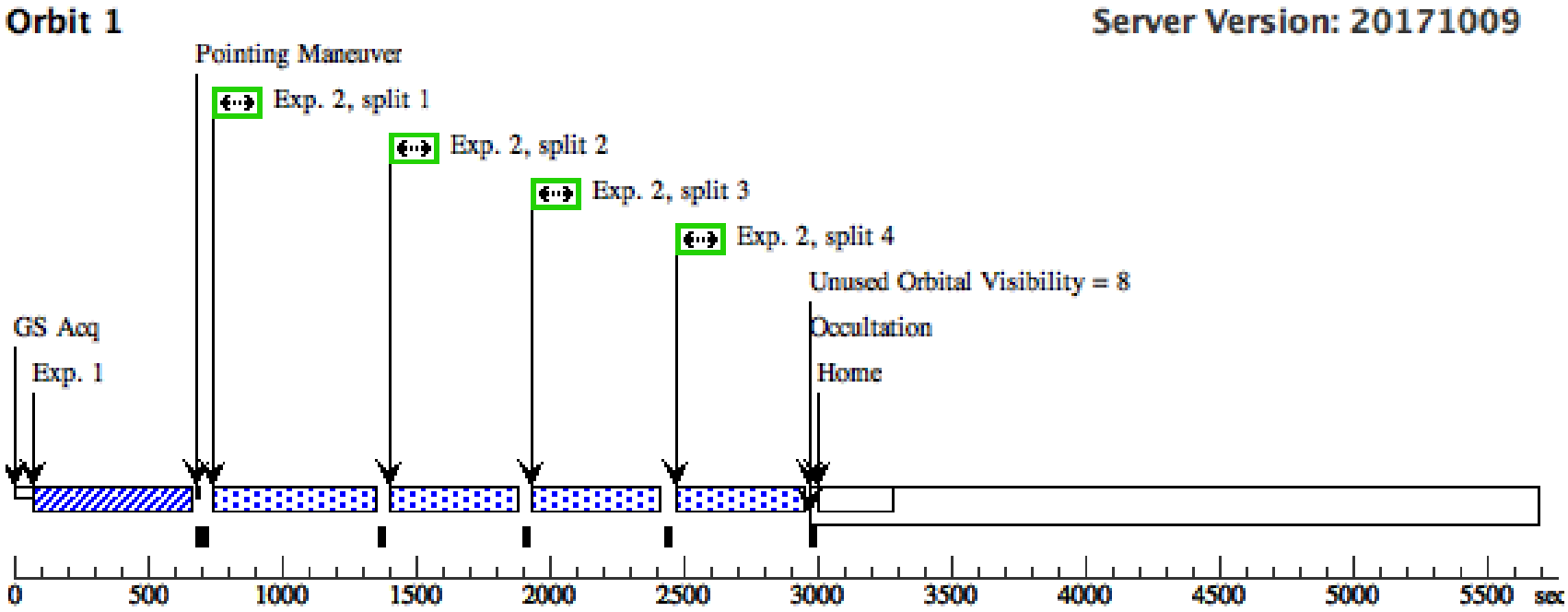
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-863	RA: 02 14 33.5790 (33.6399125d) Dec: -00 46 0.28 (-.76674d) Equinox: J2000		V=13.81	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[ACCRETION DISK, BLR, SEYFERT]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NUV MIRROR B ACQ (COS.ta.1030198)	(1) NGC-863	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				140 Secs (140 Secs) *[==>]*	*[1]*
2	FUV G140L /1105 Science (COS.sp.1030204)	(1) NGC-863	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=ALL; BUFFER-TIME=5000			474 Secs (1720 Secs) *[==>430.0 Secs (Split 1)]* *[==>430.0 Secs (Split 2)]* *[==>430.0 Secs (Split 3)]* *[==>430.0 Secs (Split 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15448, Visit 02, failed

Tue Jan 23 01:08:38 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Fixed Targets

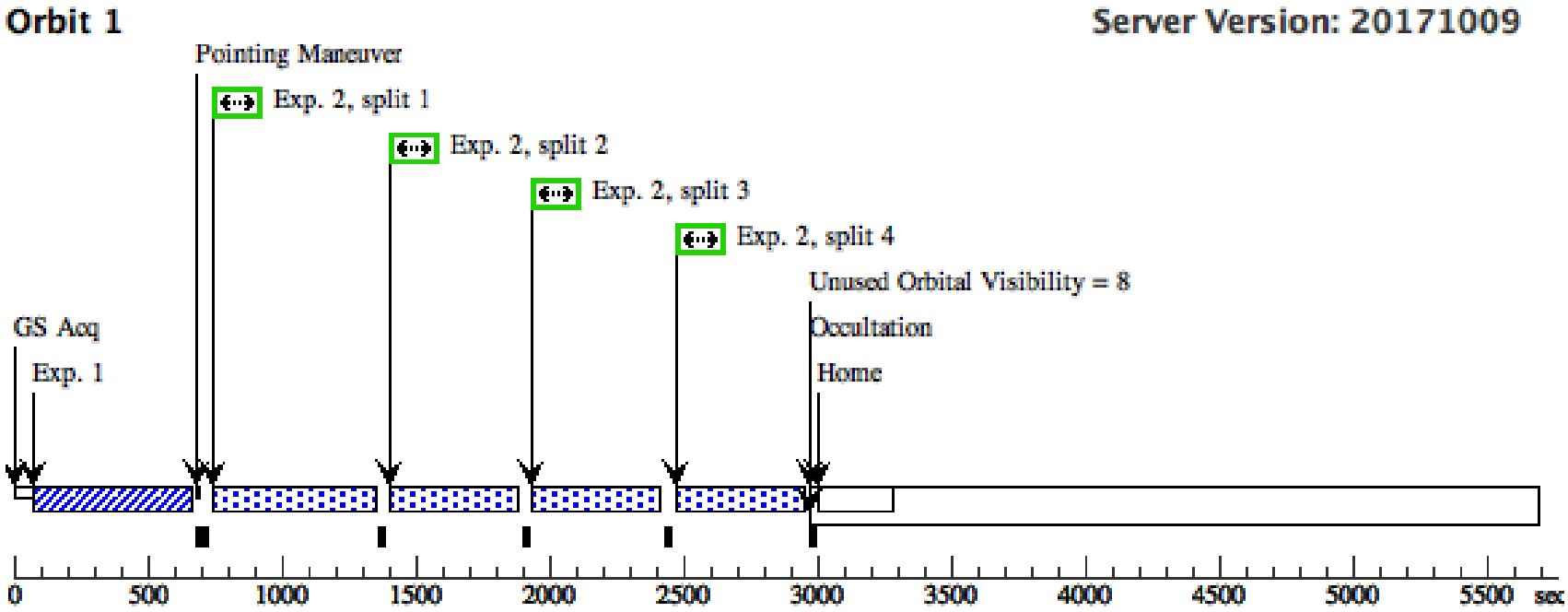
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-863	RA: 02 14 33.5790 (33.6399125d) Dec: -00 46 0.28 (-.76674d) Equinox: J2000		V=13.81	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[ACCRETION DISK, BLR, SEYFERT]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NUV MIRROR B ACQ (COS.ta.1030198)	(1) NGC-863	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				140 Secs (140 Secs) *[==>]*	*[1]*
2	FUV G140L /1105 Science (COS.sp.1030204)	(1) NGC-863	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=ALL; BUFFER-TIME=5000			474 Secs (1720 Secs) *[==>430.0 Secs (Split 1)]* *[==>430.0 Secs (Split 2)]* *[==>430.0 Secs (Split 3)]* *[==>430.0 Secs (Split 4)]*	*[1]*

Orbit Structure



Visit

Proposal 15448, SafingAutoRepeat (S3) Tue Jan 23 01:08:38 GMT 2018

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-863	RA: 02 14 33.5790 (33.6399125d) Dec: -00 46 0.28 (-.76674d) Equinox: J2000		V=13.81	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[ACCRETION DISK, BLR, SEYFERT]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NUV MIRROR B ACQ (COS.ta.1030198)	(1) NGC-863	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				140 Secs (140 Secs) *[==>]*	*[1]*
2	FUV G140L /1105 Science (COS.sp.1030204)	(1) NGC-863	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=ALL; BUFFER-TIME=5000			474 Secs (1720 Secs) *[==>430.0 Secs (Split 1)]* *[==>430.0 Secs (Split 2)]* *[==>430.0 Secs (Split 3)]* *[==>430.0 Secs (Split 4)]*	*[1]*

Orbit Structure