13185 - Mrk590: A Disappearing AGN?

Cycle: 20, 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) NGC863	COS/FUV COS/NUV	1	10-Apr-2013 21:02:02.0	yes

1 Total Orbits Used

ABSTRACT

Recent optical spectroscopy reveals that the active nucleus of the Seyfert 1 galaxy Mrk590 (NGC863) has gone into an extremely faint state. The broad emission lines characteristic of Type 1 AGNs and the AGN thermal continuum are no longer visible in optical spectra, and even the narrow emission lines appear to have faded by about a factor of two since our previous observations about a decade ago. AGN continua generally peak in the UV, so we propose to obtain a single HST COS UV spectrum to better determine how much the source has faded. Because of the lack of stellar flux in the UV, we will also be better able to determine whether or not there is any residual broad-line flux. Also, the fact that the AGN is in such a faint state will allow us to determine whether or not the normally strong UV emission lines have narrow-line components. We are requesting Director's

Discretionary Time for this observation because in previous similar cases, the nucleus has become active again. There is simply no guarantee that Mrk590 will be in such a low-luminosity state when Cycle 21 begins.

OBSERVING DESCRIPTION

We propose to obtain COS low resolution FUV observations of the Seyfert 1 galaxy Mrk590 (1) to determine if the AGN thermal emission and broad emission lines have indeed vanished as expected from recent optical spectra and (2) to attempt to detect the elusive narrow components of strong UV emission lines such as Ly-alpha lambda1216 and CIV lambda1549. From our optical spectroscopic observations, we have estimated a lower limit for the AGN thermal continuum emission at the optical rest-frame wavelength lambda = 5100 Ang after the subtraction of the starlight contamination through the spectral extraction window: F-CONT(5100) ~ 5 10-16 erg s-1 cm-2 Ang-1. Since the AGN emission is evolving with time and our most recent spectroscopic observations are in the optical (where the starlight contamination is significant), we have large uncertainties on the target UV flux.

ACQUISITION: The target has precise 2MASS coordinates (ICRS reproduced with an error < 0.1"). To overcome the uncertainties on the expected UV fluxes we have run simulations through COS ETC with different flux normalizations and various continuum models. The most reliable and efficient acquisition method has turned out to be the ACQ/IMAGE. With 320 sec exposure time, MIRRORB, and PSA aperture we will reach the recommended S/N of 40 even if the continuum contribution is half of the expected value. At the same time, with the chosen configuration, we will not risk saturation even if the continuum is 5 times brighter than expected.

OBSERVATIONS: Using the G140L grating 1105Ang we will cover the Ly-alpha, NV, Si IV+O IV, C IV, and CIII] broad emission lines in one exposure. The grating resolution (R ~ 1500-4000) is adequate to resolve the typical AGN narrow emission components (the width of the [O III] lambda5007 narrow line is FWHM ~ 400 km s-1). For the ETC simulations, we have considered a flat continuum normalized at the measured F-CONT(5100). We have deliberately made an extremely conservative estimate for the AGN UV continuum flux. Assuming E(B-V) = 0.0366 mag (with RV = 3.1), average values for background and airglow, and a total exposure time of ~2000 s, we expect to detect the continuum with an average S/N >~ 3 per resolution element. To correct for the COS grid wires we request observations at FP-POS=3 and 4 (any other fixed-pattern noise is irrelevant at our expected S/N). The individual exposure times have been adjusted not to exceed the visibility period. The spectra will be recorded in TIME-TAG mode with concurrent wavelength calibration (TAGFLASH).

Visit

Proposal 13185, Mrk590 (01), implementation Thu Apr 11 01:02:09 GMT 2013

Diagnostic Status: Warning

Scientific Instruments: COS/NUV, COS/FUV

Special Requirements: (none)

Diagnostics

(Mrk590 (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)	NGC863	RA: 02 14 33.5790 (33.6399125d)	Redshift: 0.026385	V=13.5	Reference Frame: ICRS
	Alt Name1: MRK590	Dec: -00 46 0.28 (-.76674d)		F(5100)=2.9 E-15,	
		Equinox: J2000		F-CONT(5100)=5 E-16	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. The V-Magnitude might not be representative since the AGN emission has faded. The F(5100) is the optical observed flux and includes host galaxy contribution. F-CONT(5100) is the AGN estimated continuum flux after subtraction of the starlight contamination.

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	mrk590_ACQ (COS.ta.497832)	(1) NGC863	COS/NUV, ACQ/IMAGE, PSA	MIRRORB		GS ACQ SCENARIO BASE1B3		320 Secs *[==>]*	 ***[1]***
2	mrk590_SPEC_FP3 (COS.sp.498283)	(1) NGC863	COS/FUV, TIME-TAG, PSA	G140L 1105 A	SEGMENT=A; BUFFER-TIME=779; EXTENDED=YES; FP-POS=3; FLASH=YES			889 Secs *[==>]*	 ***[1]***
3	mrk590_SPEC_FP4 (COS.sp.498283)	(1) NGC863	COS/FUV, TIME-TAG, PSA	G140L 1105 A	SEGMENT=A; BUFFER-TIME=779; EXTENDED=YES; FP-POS=4; FLASH=YES			890 Secs *[==>]*	 ***[1]***

Orbit Structure