16433 - Has the UV broad line region around the black hole in Mrk 279 been disrupted?

Cycle: 27, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Edward M. Cackett (PI) (Contact)	**Wayne State University**	**ecackett@wayne.edu**
Dr. Jon Matthew Miller (CoI)	University of Michigan	jonmm@umich.edu
Dr. Gerard A. Kriss (CoI)	Space Telescope Science Institute	gak@stsci.edu
Dr. Elisa Costantini (CoI) (ESA Member)	Space Research Organization Netherlands	e.costantini@sron.nl
Dr. Elias Kammoun (CoI)	University of Michigan	ekammoun@umich.edu
Dr. Abderahmen Zoghbi (CoI)	University of Michigan	abzoghbi@umich.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) MRK-279	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	24-Sep-2020 10:00:21.0	yes

1 Total Orbits Used

ABSTRACT

A recent X-ray spectrum of the Seyfert 1.5 Mrk 279 shows a remarkable, unprecedented change - a previously strong narrow Fe K line has disappeared. The X-ray continuum spectrum is otherwise normal in brightness and shape. If the narrow line is formed at distances of ~1 pc, around the obscuring torus, it is difficult for the flux to disappear from such an extended structure, either via obscuration or photoionization changes. This

suggests that the line may be formed in the broad line region. However, recent ground-based optical spectra show that the broad Balmer lines have normal widths and intensity. The accretion flow must have changed dramatically at smaller radii, potentially signaling a torn or disrupted disk. Clues to such a disruption could be apparent in the shape of the UV/optical continuum or the structure of the inner parts of the BLR. To test this possibility, we propose to obtain a UV through optical spectrum to examine the continuum shape and to probe the high-ionization UV broad lines (Ly alpha, NV, C IV, He II) which are formed 2-10 times closer to the central engine than the Balmer lines.

OBSERVING DESCRIPTION

The narrow Fe K emission line in the Seyfert galaxy Mrk 279 has recently disappeared in X-ray spectra obtained with NuSTAR. We will obtain spectra with a S/N of ~15 covering the wavelength range from the far-UV to the optical, encompassing the major broad lines visible in a typical AGN spectrum: Ly alpha, N V 1240, Si IV 1400, C IV 1550, He II 1640, C III] 1909, Mg II 2798, H beta, and [O III] 4959,5007. We will acquire the target using an imaging target acq with the STIS CCD in the long-pass filter. Using the gratings G430L (with the CCD), G140L (FUV MAMA) and G230L (NUV MAMA), we will cover the full wavelength range. Current ground-based observations show a continuum flux level near H beta at 4900 A of 1e-15 erg/cm2/s/A. Our calculations using the STIS ETC use the SDSS-based QSO spectrum as a model, z=0.03045, and E(B-V)=0.014. All observations fit in a single orbit. Bright object checking shows a violation with GSC2, but this is due to the host galaxy, which is extended and has an integrated brightness of V=10.4. GALEX shows that the nucleus and surrounding field are safe for STIS.

Visit

Proposal 16433, Visit 01, implementation Thu Sep 24 14:00:22 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/NUV-MAMA, STIS/CCD, STIS/FUV-MAMA

Special Requirements: SCHED 100%

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=STIS-ALONG-SLIT	Coordinate Frame=POS-TARG		(2)
	Purpose=DITHER	Pattern Orientation=90.0		
	Number Of Points=3	Angle Between Sides=		
	Point Spacing=0.2	Center Pattern=false		
	Line Spacing=			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	MRK-279	RA: 13 53 3.4351 (208.2643129d) Dec: +69 18 29.41 (69.30817d) Equinox: J2000	Proper Motion RA: -3.735763090644583E-5 sec of time/yr Proper Motion Dec: -8.600004548497964E-5 arcsec/yr Epoch of Position: 2015.5	V=14.46 5.5E-15 erg/cm^2/s/A at 2246A from recent Swift/UVM2 observations	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[ACCRETION DISK, BLR, NLR, NUCLEUS, SEYFERT]

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(STIS.ta.1464627)	(1) MRK-279	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=POINT			5 Secs (5 Secs)	
								[==>]	***[1]***
Comments: In case the target is fainter than expected, we use a 5 s exposure instead of the 1 s exposure from the ETC calculation at the current brightnesss level of 1e-15 at 4900 A.									
2	(STIS.sp.1464626)	(1) MRK-279	STIS/CCD, ACCUM, 52X0.2E1	G430L 4300 A	CR-SPLIT=NO		Pattern 1, Exps 2-2 in Visit 01 (1)	50 Secs (150 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
3	(STIS.sp.1464632)	(1) MRK-279	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A				732 Secs (732 Secs)	
								[==>]	***[1]***
4	(STIS.sp.1464632)	(1) MRK-279	STIS/NUV-MAMA, ACCUM, 52X0.2	G230L 2376 A				400 Secs (400 Secs)	
								[==>]	***[1]***

Orbit Structure