

COS-GTO: X-Ray Binaries

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Scientific Category: HOT STARS

Scientific Keywords: X-RAY BINARIES, BLACK HOLES, ACCRETION DISKS

Abstract

This is a program to obtain UV spectra of soft X-ray transients (SXTs) in their quiescent states. The target, A0620-00, is an interacting binary system with a K7V donor star and a 9.7 M_{solar} black hole accretor. Our observations will use the COS G140L and STIS G230L modes to obtain low spectral resolution ($R = 1000$ -2000), broadband (1230-3200 Å) spectra of A0620-00. We will also obtain contemporaneous optical spectra of the system, which varies on time scales of days. The data will be used to establish the broadband SED of the system and to measure emission line strengths and widths in the UV. The dereddened SED will be modeled to determine the structure and temperature of the accretion disk. The FUV region of the spectrum, which has not been observed before, will be a key parameter in constraining the temperature and inner truncation radius of the disk, which is believed to transition to an advection-dominated accretion flow (ADAF) at large distances from the black hole in quiescent SXTs. The UV line spectrum, and in particular the NV 1240 and CIV 1550 transitions, will show whether C depletions, which have been seen in the NIR spectrum of the donor star, are present in the accretion disk and whether enhanced N abundances are also seen, indicative of CNO processing of material during the evolutionary history of the binary. Comparison of emission line velocities between the optical HI emission and the ionized UV metal transitions will also be used to constrain the relative extents of the photoionized disk chromosphere and the bulk of the disk in quiescent black hole binaries.

Investigators:

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Number of investigators: 2

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Target Summary:

Target	RA	Dec	Magnitude
A0620-00	06 22 44.4000	-00 20 45.00	V = 18.2 +/- 0.2, F(1500) = 9.2E-18, F(2500)=1.3E-17
XTE-J1118-480	11 18 10.9000	+48 02 13.00	V = 12.8 +/- 0.2, F(1500)=1.50E-17
NOVA-MUSCAE	11 26 26.6000	-68 40 32.30	V = 13.6 +/- 0.2, F(1500)=9.60E-18, F(2500)=1.30E-17

Observing Summary:

Target	Config Mode and Spectral Elements	Flags	Orbits
A0620-00	COS/FUV Spectroscopic G140L		3
A0620-00	COS/FUV Spectroscopic G140L		3
A0620-00	STIS/NUV-MAMA Spectroscopic G230L (2376)		5
XTE-J1118-480	COS/FUV Spectroscopic G140L		5
NOVA-MUSCAE	COS/FUV Spectroscopic G140L		5
NOVA-MUSCAE	STIS/NUV-MAMA Spectroscopic G230L (2376)		5

Total prime orbits: 26

This is a COS GTO project, no scientific justification is needed.