Accretion Disk Corona Sources

Project Goal:

In X-ray binaries, the X-rays reprocessed by accretion disks to the optical, UV, and X-ray bands are among the best means of probing accretion disk structure and the environment around compact objects. Low-mass XRBs are ideal for studying X-ray emission from accretion disks, because their geometry and radiation environments are well understood. The central continuum dominates the energetics of the disk atmosphere and corona. X-ray spectra provide valuable clues about disk structure, as well as a window into the physics of the photoionized gas and its phase transitions. The disk plasma at 10^6 – 10^7 K cools through the atomic line emission that can be detected with the high resolution spectrometers on board Chandra and XMM-Newton.

There are approximately eight ADC sources in the Chandra archive with verified X-ray line emission from their HETG spectra. Examples of analyzed spectra include 4U 1822-37 (40ksec; Cottam et al. 2001), EXO 0748-676 (116ksec; Jimenez-Garate et al. 2003), Her X-1 (245ksec; Jimenez-Garate et al. 2005, Ji et al. 2009), and Cir X-1 (142ksec; Schulz et al. 2002, 2008). We want to systematically understand those ADCs through in-depth studies of line diagnostics, and related physical modelling.

Main References:

1. Ji et al. ApJ, 2009
2. Ji et al. ApJ, 2011

Potentail Targets:

EXO 0748-676
2S 0921-630

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