Revealing the spectral/temporal evolution of Cyg X-1 under Suzaku & MAXI collaboration

S.Torii[1], K.Makishima[1], S.Yamada[1] and K.Nakazawa[1]

[1] The University of Tokyo
E-mail(TS): torii@juno.phys.s.u-tokyo.ac.jp

Abstract

Over the past 3 decades, the Low/Hard state of black hole binaries has remained rather poorly understood. This limitation is now being overcome by the wide-band capability of Suzaku. In fact, a Suzaku observation of Cyg X-1 in the Low/Hard state led to a view that an optically-thick disk partially intrudes into a hot corona, the disk is truncated at 10 gravitational radii, and the corona is highly inhomogeneous (Makishima+08). From 2005 to 2009, Cyg X-1 was observed 25 times with Suzaku. The source meanwhile stayed mostly in the Low/Hard state, but approached the Soft state on June 2009. We applied a unified spectral and timing analysis to all these data sets. The results suggest that, as the 2–10 keV luminosity increases, (1) the corona shrinks, (2) the inner radius of the optically-thick disk decreases, and (3) the disk intrudes deeper into the corona. These results will be much enhanced through a collaboration between MAXI and Suzaku. For example, we may select a transition phase from the Low/Hard state to the High/Soft state, and examine how the Comptonized hard continuum in the former state turns into the enigmatic steeper hard-tail emission which is seen in the latter state.