## Joint X-ray observations of Cygnus X-1 at orbital phase zero

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## Abstract

We present first results of simultaneous observations of the high mass X-ray binary Cygnus X-1 for 50 ks with XMM-Newton, Chandra-HETGS, RXTE, Suzaku, INTEGRAL, and Swift in 2008 April. The observations are performed close to phase 0 of the 5.6 d orbit when pronounced dips in the X-ray emission from the black hole are known to occur. The dips are due to highly variable absorption in the focused wind from the O-star companion to the black hole. Compared to previous high resolution spectroscopy studies of the dip and non-dip emission with Chandra<sup>a</sup>, the addition of XMM EPIC-pn and Suzaku-XIS data allows for a better determination of the continuum through the broad iron line region, while RXTE and INTEGRAL constrain the >10keV continuum.

<sup>a</sup> Hanke, Wilms, Nowak, Pottschmidt, Schulz, & Lee (2008), ApJ [submitted]; Hanke, Wilms, Nowak, Pottschmidt, Schulz, & Lee [in preparation]



Several absorption dips with complex substructure severely reduce the count rate in the soft X-ray band (*Suzaku*-XIS, *Chandra*-HETGS, *XMM*-EPIC-pn). Some of the dips are also apparent above 4 keV (*RXTE*-PCA), and few appear even in the 20–40 keV band (*INTEGRAL*-IBIS). In order to guide the eye when comparing the different instruments, selected dip-structures are shown in color. Hard X-rays above 12 keV (*INTEGRAL*-IBIS, *Suzaku*-PIN) are influenced by scattering in the wind around orbital phase 0.



