
Effects of clumpy stellar wind in the microquasar Cyg X-1

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Abstract

Due to its brightness and persistent emission, Cygnus X-1 is the ideal source to understand the emission mechanisms in different X-ray states and, because it repeatedly crosses the jet line, state transitions. It has been the target of multiple large observing campaigns, ranging from almost 16 years of mostly bi-weekly monitoring with RXTE to a coordinated campaign with XMM, NuSTAR, INTEGRAL and a variety of radio telescopes over more than a full binary orbit (> 5.6 days; 700 ks XMM time) recently.

Analysis of Cyg X-1 observations and thus our understanding of it in itself and as showpiece for accretion and ejections processes in microquasars is, however, hampered by the very nature of the system: Cyg X-1 accretes from the focusses wind of an O-type companion. Winds of such stars are structured ("clumpy") resulting in variable absorption on timescales ranging from seconds to kiloseconds. The overall absorption additionally strongly depends on the orbital phase of the system and thus our line of sight towards the black hole.

I will discuss why the proper treatment of the variable absorption is crucial to disentangle the emission components and how we can use what we may, on first sight, consider a nuisance to accretion and ejection studies, to learn more about the structure of stellar winds and thus large-scale accretion structure in high mass X-ray binaries including possible effects of jet interaction with clumpy winds.

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