

W33a Inhibition of Accretion by the Stellar Wind in Misaligned Be/X-ray Binaries

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Be/X-ray binaries constitute a prominent subclass within the category of high-mass X-ray binaries, characterized by their transient nature. These binaries intermittently manifest X-ray activity of $L_X \gtrsim 10^{36} \text{ erg s}^{-1}$; the rest of the time, they remain quiescent, with X-ray luminosities typically below $10^{34} \text{ erg s}^{-1}$. The consensus in the scientific community is that a Be/X-ray binary enters a quiescent state when accretion onto the neutron star is impeded by its rapidly rotating magnetosphere. Empirical support for this centrifugal inhibition of accretion, often referred to as the propeller mechanism, is evident in the observational data from 4U 0115+634, featuring a neutron star with a comparatively brief spin period. However, the applicability of this mechanism in other Be/X-ray binaries, particularly those housing slowly rotating neutron stars, remains uncertain.

This presentation aims to investigate an alternative hypothesis, positing that accretion inhibition arises from the wind emanating from the Be star. Our examination focuses on the impact of the stellar wind on the accretion dynamics in misaligned Be/X-ray binaries. Employing analytical models for both the wind and accretion disk, we initially assess the wind ram pressure against the gas/ram pressures of the accretion flow. This analysis yields a criterion for the substantial suppression of accretion by the stellar wind. Subsequently, we apply this criterion to all 13 Be/X-ray binaries, where pertinent information such as spectral type, orbital parameters, spin period, and surface magnetic field is known/well-constrained. Our findings indicate the presence of systems in which X-ray quiescence is likely attributed to accretion inhibition by the stellar wind.