# STAGNATION-POINT FLOW IN COLLIDING-WIND BINARY SYSTEMS

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The low X-ray temperatures and luminosities of colliding wind binaries compared to theoretical expectations has been a long standing problem. As a potential solution to this problem we present quantitative calculations of the radiation hydrodynamics in colliding wind binary systems, accounting for the effect of two radiation fields on the dynamics of both winds, using a formulation similar to that of Castor *et al.* (1975, *ApJ* 195, 157). A more detailed description of this work can be found in Stevens & Pollock (1994, *MNRAS* in press). Consider only the WR wind being driven under the influence of the WR and O-star radiation fields and motion only on the line-of-centers. Near the WR-star, its own radiation field dominates, and the mass-loss rate will be largely unaffected by the presence of the companion. However, moving towards the O-star, the O-star radiation field becomes a significant fraction of the total flux. As the O-star radiation field is opposed to the WR radiation field the radiative line-force will be diminished and the wind acceleration diminished. This will lead to the WR star wind colliding with the O-star wind at a lower velocity than would be expected from single star models. This mechanism will only be at work in close binary systems. In wide binaries both winds will be at terminal velocity before the other radiation field makes a difference. Results for a sample calculation are shown in Fig 1, using parameters for V444 Cyg from Schmutz *et al.* (1989, *A&A* 210, 236). In the absence of any deceleration effects the WR wind velocity at the shock would be $\sim$ 1300 km s$^{-1}$, corresponding to $kT \sim 2$ keV. The reduction in the WR star velocity at the shock interface caused by the O-star radiation field is predicted to be $\sim \times 2$ leading to $kT_x \sim 0.5$ keV, in line with X-ray observations.

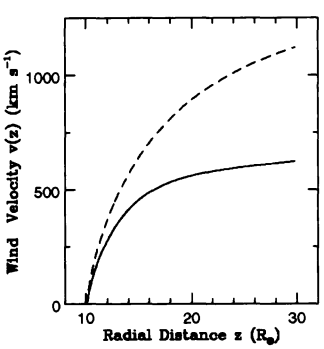


Fig. 1. Radiation hydrodynamics in a CWB, with parameters for appropriate for the WR+O-star system V444 Cyg. The wind velocity law ignoring the dynamical influence of the O-star radiation field is shown (dashed-line), and when it is included (full-line)



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