

# The Curious Case of the Alpha Persei Corona: a Dwarf in Supergiant's Clothing?

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## ABSTRACT

Alpha Persei (HD 20902: F5 Iab) is a luminous, nonvariable supergiant located just to the blue of the Cepheid instability strip. It is one of the brightest coronal X-ray sources in the young open cluster bearing its name, yet warm supergiants as a class generally avoid conspicuous high-energy activity. The Cosmic Origins Spectrograph on *Hubble Space Telescope*, recently has uncovered additional oddities. The far-ultraviolet spectrum of  $\alpha$  Per (1290–1430 Å) is dominated by photospheric continuum emission, with numerous superposed absorption features, mainly stellar, but the normal proxies of coronal activity, such as the Si IV 1400 Å doublet ( $T \sim 6 \times 10^4$  K), are very weak, as is the chromospheric C II 1335 Å multiplet ( $T \sim 3 \times 10^4$  K) and O I 1305 Å triplet. On the one hand, a reanalysis of the historical *ROSAT* pointing on  $\alpha$  Per finds that the coronal source is offset from the stellar position by about  $8''$ , at a moderate level of significance. On the other hand, the Si IV features of  $\alpha$  Per not only are narrower than those of later, G-type supergiants of similar  $L_X/L_{\text{bol}}$ , but also are fainter (in  $L_{\text{Si IV}}/L_{\text{bol}}$  by two orders of magnitude. The X-ray and Si IV discrepancies raise the possibility that the coronal source is unrelated to the supergiant, perhaps an accidental cluster member — likely a late G dwarf based on the  $L_X$  — lost in the glare of the bright star. If so, the coronal sources of similar  $L_X$  associated with a few of the classical Cepheids, and luminous nonvariables like Canopus ( $\alpha$  Carinae; HD 45348: F0 Ib), might have a similar origin in unrecognized main sequence companions.

*Subject headings:* Ultraviolet: stars — stars: individual (HD 20902, HD 45348) — stars: coroneae

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