

THE Be STAR ϕ PERSEI

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ABSTRACT

He II (λ 4686) emission has been detected in the spectrum of the binary Be star ϕ Persei. The He II emission has velocity variations which are 180° out of phase with the velocity variations of the primary. The primary velocity curve is determined from the broad He I and H lines, and the Fe II emission lines. The amplitude of the primary velocity curve (K_1) is 16 ± 2 km s $^{-1}$. The amplitude of the He II velocity curve is 121 ± 9 km s $^{-1}$.

If one assumes that the He II emission arises from the secondary, minimum masses for the primary and secondary are $29 \pm 14 M_\odot$ and $3.8 \pm 1.7 M_\odot$, respectively. We suggest that the secondary is a hot compact star, either the remaining helium core of a once more massive star, or a neutron star. The primary is too cool, B1 IIIe, to have any appreciable He II emission.

DISCUSSION FOLLOWING POECKERT

Guinan: Have you found any evidence of short term or long term variations in the H emission line strengths for ϕ Persei?

Shore: There is another possibility for forming He II 4686 emission in close binaries besides the ones you've listed--collision of stellar winds. The region between the components is heated in a lens-shaped region to temperatures which are deduced from thermalizing the shock $T > 10^6$ K and He II emission could occur from recombination. The problem, of course, is that you find, as you've pointed out, a double peak and for this system the only way of doing this is with self absorption which should be unlikely--this lozenge is thin. It would be interesting though to look at other systems for He II λ 4686.