

# LINE-PROFILE VARIABLE $\epsilon$ PER: SPECTROSCOPIC BINARY AND (?) MILD Be STAR

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$\epsilon$  Per (45 Per, HR 1220, HD 24760, ADS 2888A) is a star which was used for years as a spectrophotometric and MKK classification standard. Nowadays it is known as an archetype of early-type line-profile variables (LPV). The variations are so pronounced that they were misinterpreted for a composite spectrum (B0.5+A2) and the star was even reported to be a double-lined spectroscopic binary (Petrie 1958). Since 1983, the characteristics of line-profile variability in the spectrum of  $\epsilon$  Per have been intensively studied (Bolton 1983, Smith 1985, Gies & Kullavanijaya 1988). The recent investigations of RV variations of  $\epsilon$  Per led to the conclusion that  $\epsilon$  Per is a spectroscopic binary with a period of about 14.05 days and a rather eccentric orbit (Harmanec & Tarasov 1990). The issue of the binary nature (with a very eccentric orbit) is of utmost importance since it could be causally related to the extremely large observed line-profile variations (e.g., Polfliet & Smeyers 1990, Tassoul & Tassoul 1992).

To derive a reliable binary orbit of  $\epsilon$  Per, to investigate the characteristics of the rapid line-profile variability and to derive possible relationship between rapid line-profile changes and orbital motion we obtained several new series of spectroscopic observations of  $\epsilon$  Per at four observatories over a period of ten years. This study is devoted to a preliminary analysis.

## Principal results

The principal results of this study are:

a) Confirmation of the binary nature of  $\epsilon$  Per.

From the analysis of all high-dispersion data the following elements were

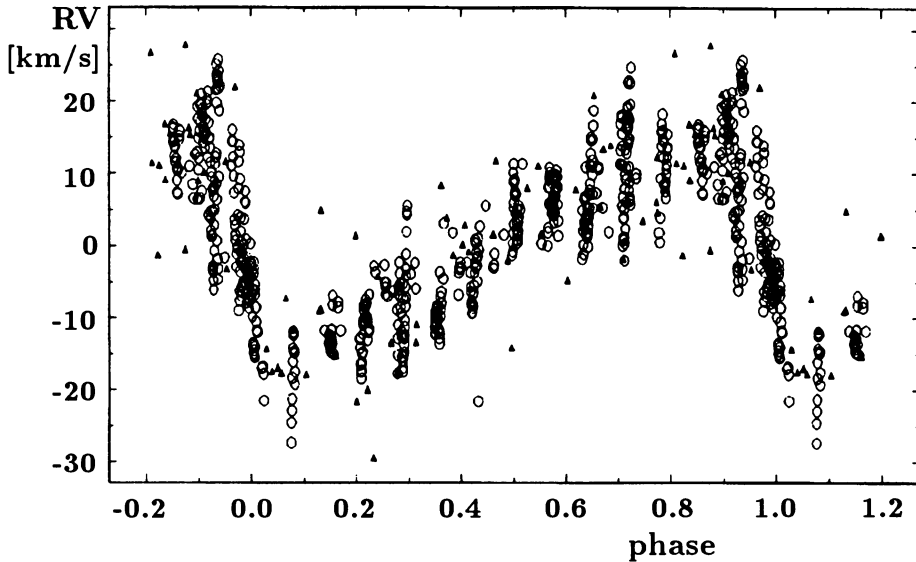


Fig. 1. The radial-velocity curve of the  $\epsilon$  Per primary (all data). Allegheny velocities of 1907–1912 are shown by triangles while all RVs obtained since 1983 are shown by open circles.

derived:

$P = 14.075978$  days,  $T_{\text{periastr.}} = 47767.49$ ,  $e = 0.503$ ,  $\omega = 109.7^\circ$ ,  
 $K = 16.8 \text{ km s}^{-1}$ ,  $\gamma = 5.85 \text{ km s}^{-1}$ .

Phase plot for all available RVs of  $\epsilon$  Per is shown in Fig. 1.

- b) Discovery that  $\epsilon$  Per may be a mild Be star.
- c) Further evidence that the line profile variations of the  $\epsilon$  Per primary may be controlled by only one physical period.
- d) There may be a 1:2 resonance between the synchronization in periastron and the rotational period of the primary.

In any case, the analyses of the (multi)periodicity of line-profile variations of  $\epsilon$  Per should be re-considered in the light of the fact that the RV of the whole profile varies with the binary orbital period for about  $30 \text{ km s}^{-1}$ .

## References

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