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NO "CHROMOSPHERIC ACTIVITY" SEEN IN η And

The double-lined spectroscopic binary η And (HD 5516) is listed as star # 9 in the *Catalog of Chromospherically Active Binary Stars* (CABS; Strassmeier *et al.* 1988) as having weak Ca II H and K emission lines according to Wilson's intensity class 3 (Wilson 1976). Because of the overexposure of Wilson's plates in order to bring out even very weak emission and the fact that only one 10 Å/mm plate was used, his intensity class $I_K=3$ might be an upper limit for the K-line strength. As demonstrated in the CABS catalog, if one uses high-resolution spectra to detect H and K emission, the resulting intensity class is generally higher than that of Wilson by one subclass. In this paper we report a *nondetection* of H and K emission in η And from high-resolution Echelle-Reticon spectra. $H\alpha$ appears as a normal (double) absorption feature. We thus reject this star from the CABS catalog as being not chromospherically active.

The observations were obtained at the Leopold-Figl Observatorium für Astrophysik (FOA) of the University of Vienna with the 1.5m telescope in October 1990. The Echelle spectrograph (Weiss *et al.* 1981) was used in 57th order ($\lambda_c=3938$ Å) and in 34th order ($\lambda_c=6602$ Å) at dispersions of 0.08 Å/px and 0.15 Å/px, respectively. The observations utilized a 1872-pixel Reticon array (Weiss, Schalk, Ogris 1987) and had an effective wavelength resolution of 0.2 Å in the blue and 0.3 Å in the red region. The blue spectra have S/N ratios of around 30:1 and the red spectra approximately 100:1.

Fig. 1 shows parts of our spectra centered at, from top to bottom, Ca II H and K, $H\alpha$, and LiI $\lambda 6707$ Å. No obvious H and K emission is present and attempts to measure an absolute emission line flux by identifying the H_1 and K_1 points failed. The lower panel in Fig. 1 shows the 6700 Å region where the position of the Lithium blends is indicated. No obvious LiI absorption is present. The $H\alpha$ line in the second panel is a composite from both components but the narrower photospheric lines appear clearly doubled. From these we derive $v \sin i$ for both components of 5 ± 2 km s⁻¹. These values supersede the < 15 km s⁻¹ values of Herbig and Spalding (1955) which were derived from blue spectra ($\lambda_c \sim 4500$ Å) where blending is much more severe.

η And = HD 5516

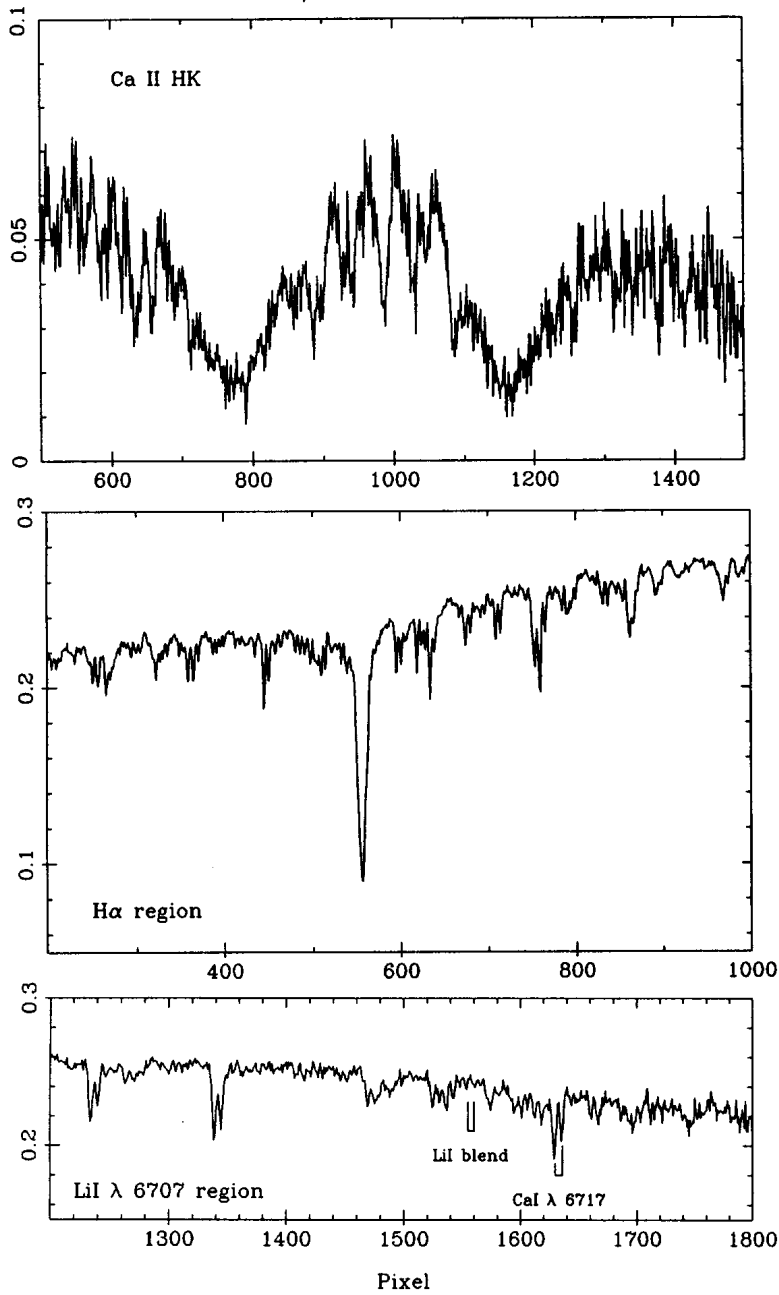


Figure 1

Gordon (1946) found the component with the larger radial-velocity amplitude being also the fainter but assigned identical spectral classifications (G8 III-IV). Petrie (1950) measured a brightness difference between the two components of 0.29 ± 0.02 mag from 6 FeI and TiII lines at around 4500 \AA . From our red-wavelength spectrum centered at 6600 \AA we find a mean ratio of the line strengths of 0.78 ± 0.08 from eight FeI and CaI lines corresponding to a magnitude difference of 0.27 ± 0.08 mag in the same sense than found by Petrie. With equal brightness differences in the red and in the blue, the brighter component must be of (approximately) equal spectral type but slightly larger, and thus slightly more massive which is in agreement with the observed mass ratio of 1.11. If we assume synchronous rotation (i.e., $P_{rot} = P_{orb}$), our $v \sin i$ measures translate into minimum radii of $11 \pm 5 R_{\odot}$. Thus, the giant classification seems to be appropriate for both components.

Two ultra-violet spectra are available in the IUE archive. SWP26529 was underexposed and shows mostly noise. CIV was not detected to an upper limit of about $5 \times 10^{-13} \text{ ergs.cm}^2.\text{s}^{-1}$ (J. Eaton, private communication). LWP4671 shows double, but otherwise normal, Mg II h and k lines (Fig. 2).

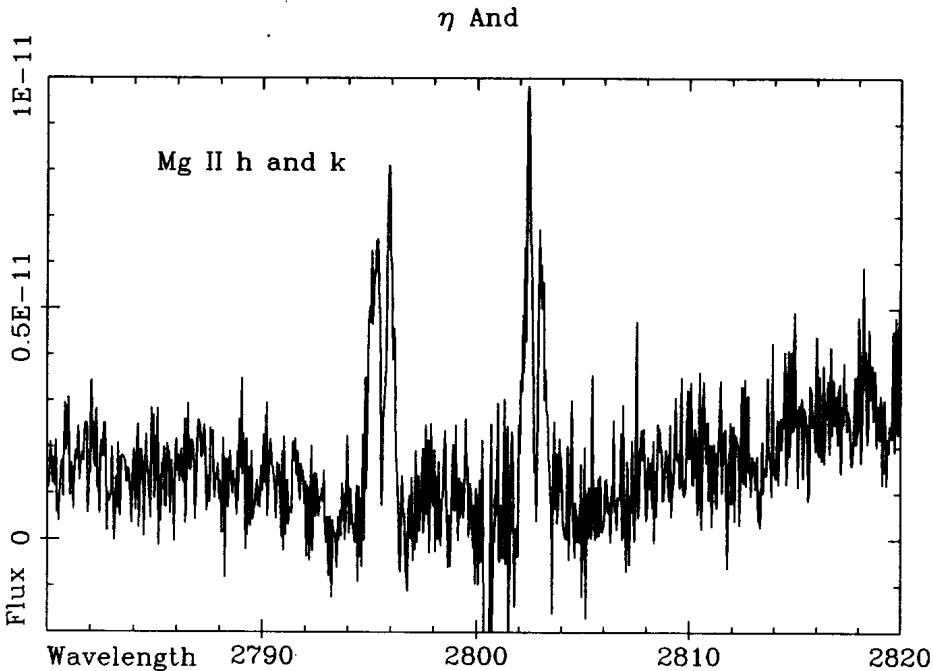


Figure 2

With an orbital period of 115 days, $e \approx 0$ (Batten, Fletcher, MacCarthy 1989) and assumed synchronism, η And would be already an unlikely case of an active binary system of the long-period RS CVn class. Another long-period system (4 UMi, $P_{orb}=605$ days) originally listed in the CABS catalog as having weak ($I_K=3$) H and K emission, was recently found to be chromospherically inactive (Strassmeier *et al.* 1990). There are two more systems in the catalog which need high-resolution Ca II H and K observations to verify (or contradict) Wilson's eye-based estimates: ν^2 Sgr and τ Sgr.

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