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VARIABILITY OF LR Hya = HD 91816 NOT CONFIRMED

Bopp *et al.* (1984) found this star to be a new BY Draconis variable with a photometric period of 3.1448 days and an amplitude of 0.02 mag in *V*. The star is a double-lined spectroscopic binary with two nearly identical K0 dwarfs and an orbital period of 6.866 days (Fekel *et al.* 1988). CaII 3950 Å region spectra show composite H and K emission features at a surface-flux level of several $10^6 erg\ cm^{-2} s^{-1}$. The photometric variability is thought to be caused by the presence of starspots rotating in and out of view. As a result of this, Kholopov *et al.* (1987) assigned the new variable star designation LR Hya.

Follow-up photometry has been obtained with the Fairborn APT (Automatic Photoelectric Telescope) in 1984-85 (Strassmeier *et al.* 1989). Their photometry revealed three different possible periodicities of 2.57, 3.57, and 4.86 days. The largest of these, at 4.86 days, results in the greatest reduction of the sum of the squares of the residuals. The formal value of the full amplitude from a sine-curve fit was $\sim$0.04$\pm$0.02 mag in *V*, thus, not really significant.

New photometry was obtained during the observing seasons 1986-87 and 1987-88 with the 0.25 m Fairborn APT and the 0.4 m Vanderbilt APT. All observations used HD 91566 = SAO 137648 as the comparison star. A listing of the individual data transformed to the *UBV* system can be requested from the author.

The data were examined for periodicity using a period-finding program that uses least-squares to fit sine curves to the data. No single significant period for any of the data sets showed up. This is demonstrated in the periodograms in Figure 1, where the three panels are for the 1986-87 and 1987-88 observing season, and for the combined data set from 1984 through 1988. The arrows indicate the orbital period and half of the orbital period.

The light curves are plotted with the orbital period of 6.866 days in Figure 2, where zero phase is taken arbitrarily as JD 2,446,800. A Fourier analysis, allowing only for $cos\Theta$ and $cos2\Theta$ terms and using the orbital period resulted in the (formal) amplitudes listed in Table 1. This table also lists the seasonal mean differential brightnesses, their standard deviations, i.e. its "width" or "variability" around that value in Figure 2 and, in the last column, the average deviations or mean absolute deviations of the seasonal mean brightness (all values in magnitudes). From this, the photometric variability seen by

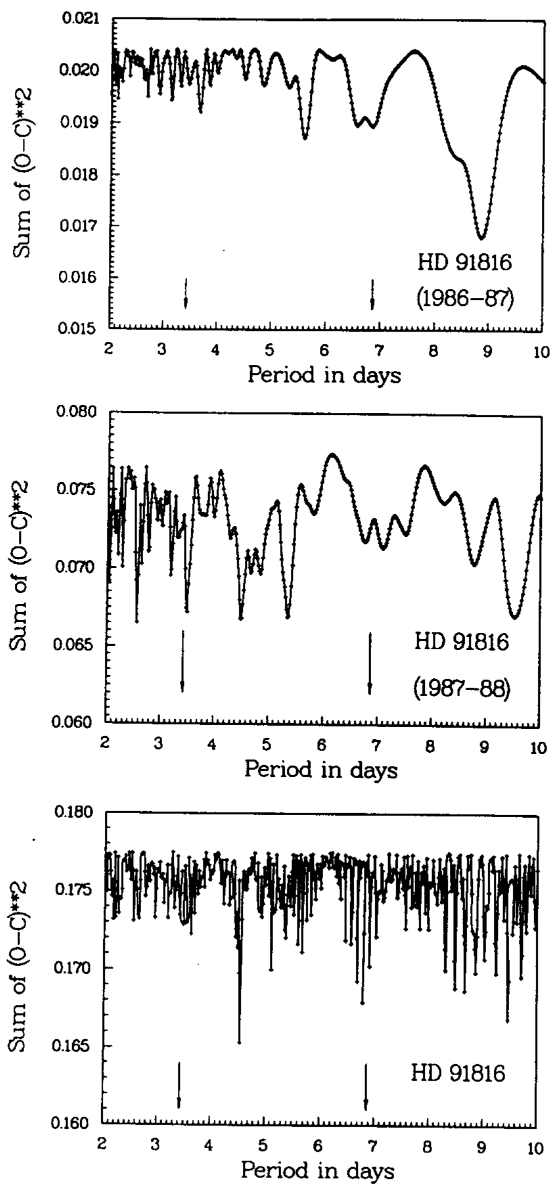

Fig. 1 Periodograms for the observing seasons 1986-87 and 1987-88 (top and middle panel), and the combined data set of Table 1 from 1984 through 1988 (lower panel). The arrows indicate the orbital period and half of the orbital period. No firm conclusion can be made about a photometric period.

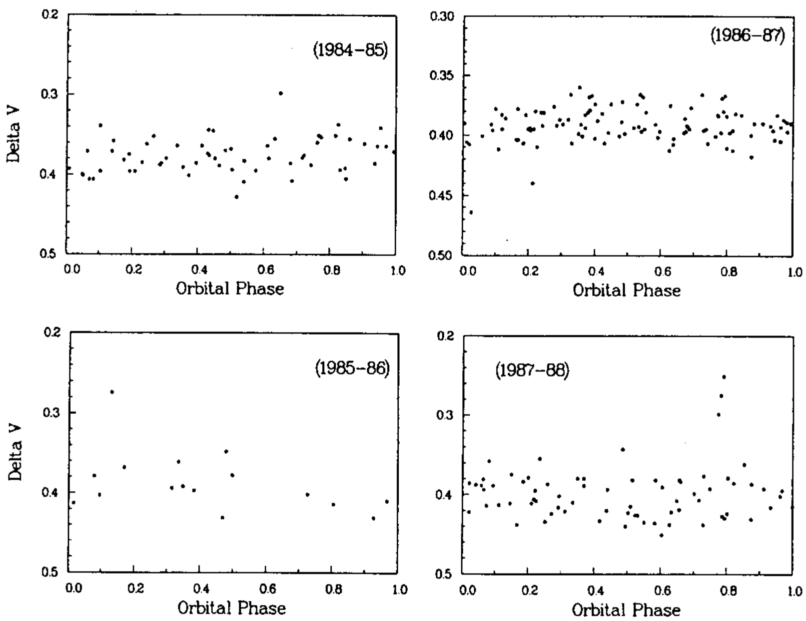

Fig. 2 Differential V light curves for the observing seasons 1984-85 (upper panel) through 1987-88 (lower panel). The data are phased together with the orbital period and an arbitrarily chosen epoch.

TABLE 1

PARAMETERS FROM LEAST-SQUARES FITS

Observing season	JD 2440000+	Data points	Full amplitude	Mean brightness	Standard deviation	Average deviation
1984-85	6045 6197	62	0.011±0.008	0.377	0.020	0.017
1985-86	6417 6555	16	0.071±0.027	0.395	0.024	0.019
1986-87	6806 6943	109	0.011±0.004	0.391	0.012	0.010
1987-88	7141 7318	73	0.026±0.012	0.403	0.023	0.020

Bopp *et al.* (1984) from 1982 through 1984 cannot be confirmed for the follow-up seasons 1984 through 1988. It is, however, interesting to note that the seasonal mean differential brightness is slowly decreasing, from 0.377 mag in 1984-85 to 0.403 mag in 1987-88. This might be an indication that there is a long-term starspot activity. *If* the data contain low-amplitude rotational modulation it is certainly smaller than our standard deviation of around 0.02 mag in *V*.

High precision, milli-mag photometry is needed to answer whether LR Hya is a micro variable or not.

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References

Bopp, B. W., Hall, D. S., Africano, J. L., Goodrich, B. D., Henry, G. W., and Barksdale, W. S. 1984, *Inf. Bull. Var. Stars*, No. 2604.

Fekel, F. C., Gillies, K., Africano, J., and Quigley, R. 1988, *A. J.*, **96**, 1426.

Kholopov, P. N., Samus, N. N., Kazarovets, E. V., and Kireeva, N. N. 1987, *Inf. Bull. Var. Stars*, No. 3058.

Strassmeier, K. G., Hall, D. S., Boyd, L. J., and Genet, R. M. 1989, *Ap. J. Suppl.*, **69**, 000 (January).