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AN IMPROVED PERIOD FOR DU LEONIS

The 9th-magnitude eclipsing variable DU Leonis (BD +26°1996, HD 84207, SAO 80992) was discovered by Kaiser (1990). The system has a G0 spectrum and two nearly equal minima 0.7 magnitude deep. An approximate period of 1.3742 days was found by Williams et al. (1990). The official designation DU Leonis was assigned in the 71st Name List (Kazarovets et al., 1993). Popper (1993) reported preliminary results from radial velocity measures in a program to determine accurate masses for G-K main sequence stars.

I have examined DU Leo on almost 700 Harvard patrol plates from the intervals 1899-1953 and 1968-1989. Table I lists 40 times when DU Leo was estimated to be at or very near minimum light. Due to long exposure times and accidental errors of estimation, the uncertainty in the photographic minima is about 0.03 day. I have also obtained additional R-band photoelectric observations, using the same equipment described previously (Williams et al., 1990). From this data, one new time of minimum is included in the Table. The photoelectric observations were affected by low signal to noise ratio, and the estimated uncertainty of the minimum is ± 0.002 day.

Table I

HJD	Min.	O-C	HJD	Min.	O-C	HJD	Min.	O-C
2414973.835	pg I	-0.003	22042.603	pg I	-0.041	28919.778	pg II	+0.028
15169.618	" II	-0.042	22382.729	" II	-0.025	29988.880	" II	+0.014
15711.801	" I	+0.025	22422.627	" II	+0.021	31146.630	" I	+0.014
16519.785	" I	-0.011	22729.745	" I	+0.009	44376.596	" II	+0.018
16939.626	" II	+0.017	22782.650	" II	+0.008	45812.574	" II	-0.027
16961.587	" II	-0.009	24905.783	" II	+0.026	45823.586	" II	-0.008
17171.852	" II	+0.005	25603.863	" II	+0.020	46139.663	" II	+0.006
17321.659	" II	+0.026	25954.905	" I	-0.042	46519.592	" I	-0.027
20111.936	" I	+0.022	26016.775	" I	-0.010	46846.676	" I	+0.001
20131.853	" II	+0.013	26069.674	" II	-0.017	47208.782	" II	+0.010
20246.595	" I	+0.011	26447.563	" II	-0.029	47511.799	" I	+0.019
20575.715	" II	+0.013	28139.918	" I	+0.018	47537.884	" I	-0.005
21010.609	" I	-0.022	28221.661	" II	-0.003	48348.658	pe I	0.000
21251.783	" II	-0.017	28550.773	" I	-0.009			

I have also used a photoelectric timing of minimum published by Diethelm (1991), HJD 2448362.401 ± 0.003 , in the calculation of improved light elements.

Entering all 42 times into a least squares solution with weight 1 for photographic data and 10 for photoelectric, the following improved light elements were derived:

$$\text{Min I} = \text{HJD } 2448348.658 \pm 0.002 + 1^d 37418454 \times E \pm 6 \quad (1)$$

The O-C residuals in Table I were calculated from this ephemeris. The period has been constant.

Scatter in the photoelectric data (Figure 1) prevents a precise determination of the small difference in depth between the two minima. But in the R-band the primary minimum appears to be no more than 0.03 magnitude deeper than the secondary minimum; the estimated amplitudes are 0.73 and 0.70 magnitude, respectively.

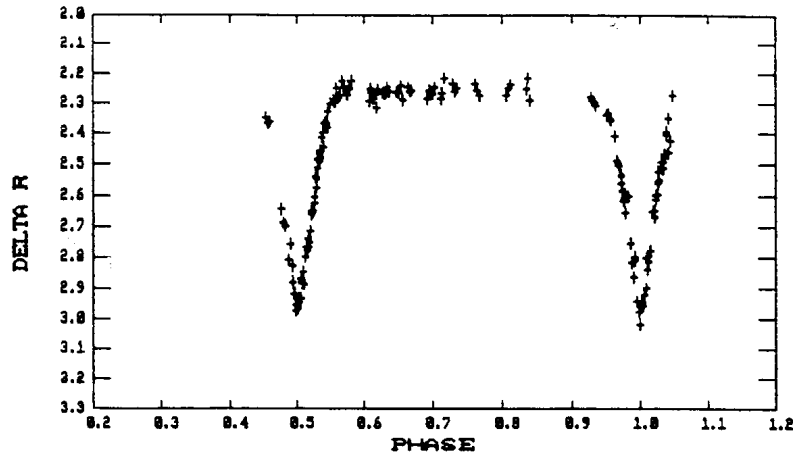


Figure 1. R-band photoelectric light curve of DU Leo.

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References:

- Kaiser, D. H.: 1990, *Inform. Bull. Var. Stars*, No. 3480
 Kazarovets, E. V., Samus, N. N., and Goranskij, V. P.: 1993, *Inform. Bull. Var. Stars*, No. 3840
 Diethelm, R.: 1991, in *BBSAG Bull.*, No. 97
 Popper, D. M.: 1993, *Astrophys. J.*, **404**, L67
 Williams, D. B., Baldwin, M. E., and Kaiser, D. H.: 1990, *Inform. Bull. Var. Stars*, No. 3514