

COMMISSION 27 OF THE I. A. U.
 INFORMATION BULLETIN ON VARIABLE STARS

Number 2378

Konkoly Observatory
 Budapest
 4 August 1983
 HU ISSN 0374-0676

PRELIMINARY 1983 PHOTOMETRY OF HD 174429 (PZ Tel)

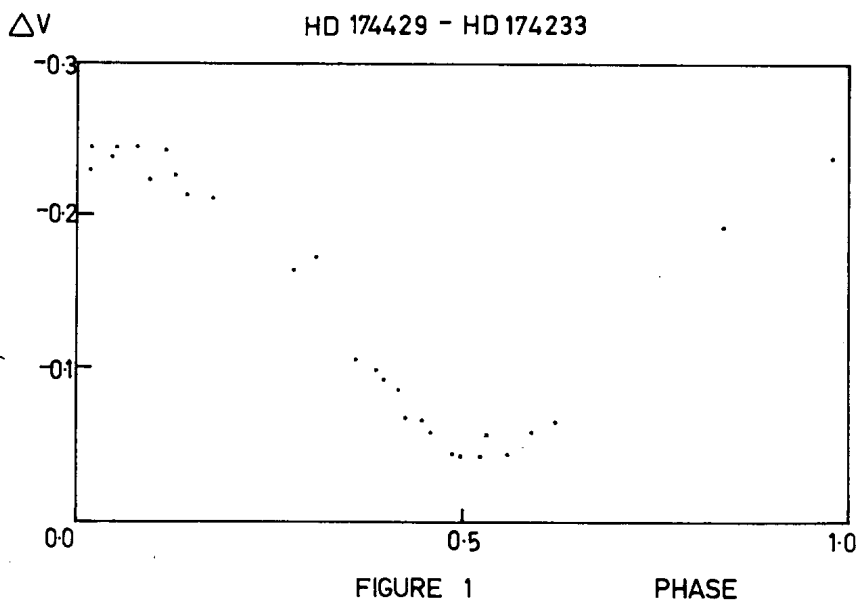
We present B and V photometry of the proposed RS CVn type star HD 174429, taken over seven nights in the interval 1983 early May to mid June.

HD 174429 (KO Vp, Houk, 1978) was included in a list of southern RS CVn candidate stars by Weiler and Stencel (1979) on the basis of strong Ca II H and K emission. Stencel (1980) suggested it was a member of the RS CVn class on the basis of radial velocity variations obtained by Stacy, Stencel and Weiler (1980). We have obtained photoelectric light curves of this system for 1980 and 1982 (Coates et al., 1980, Coates et al., 1982). On the basis of changes in its light curve from 1980 to 1982, and within the 1982 season itself, we also concluded it was a member of the RS CVn class. (Coates et al., 1982).

This year, we have obtained 28 V and 26 B measurements of HD 174429 on seven nights in May and June. All observations were taken with Monash University's 40cm telescope with an uncooled 1P21 photomultiplier tube. In addition to the comparison stars HD 176557 and HD 176664 used in previous seasons at Monash, we have also included HD 174233 (which is much nearer the programme star in brightness than the other two comparison stars) following communication with Dr. T. Lloyd Evans at SAAO. The magnitude differences between these stars obtained this year are shown in Table I, with the 1980 and 1982 differences included [in brackets] for comparison. We conclude that within observational scatter there has been no change in either the B or V magnitudes of these comparison stars.

Table I

	ΔV	ΔB
HD 176664 - HD 174233	-2.689 \pm 0.004	-1.846 \pm 0.003
HD 174233 - HD 176557	1.421 \pm 0.005	0.337 \pm 0.006
HD 176557 - HD 176664	1.268 \pm 0.006 [1.260 \pm 0.005]	1.509 \pm 0.006 [1.500 \pm 0.004]

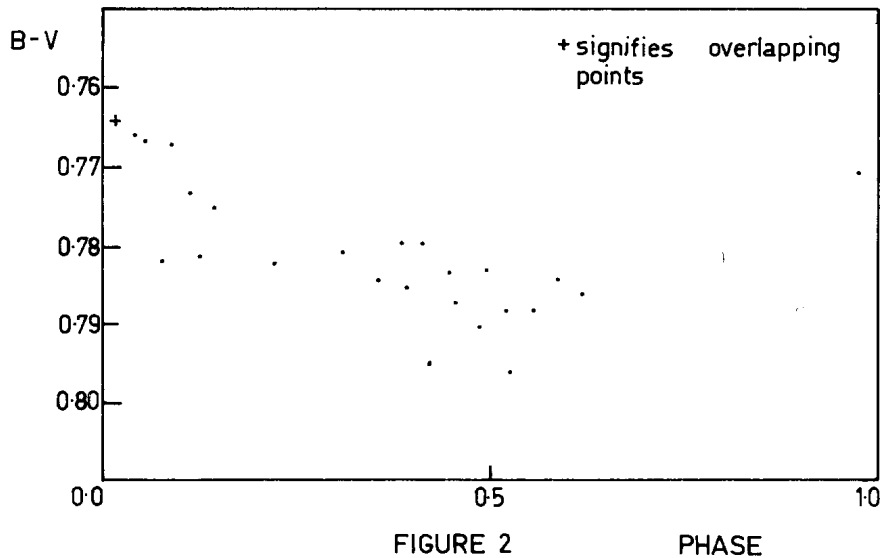


The V data obtained on HD 174429 this year are plotted in Figure 1, with the epoch of HJD 2444443.000 and $P = 0.943$ days, as in Coates et al., (1982). The data are plotted relative to HD 174233 in the sense variable minus comparison, not relative to HD 176557 as given previously. However the present data can be compared directly with the earlier light curves using the data in Table I.

The range in V of about 0.21 magnitudes is similar to the maximum range measured in 1982 (and thus twice the range of the 1980 data), but the maximum brightness is now some 0.05 magnitudes brighter than the maximum of the 1982 curve. As there has clearly been no shift of this size between the comparison stars from 1982 to 1983, we conclude that this must be a real brightening of the star.

Further evidence for a change in the properties of this star can be found by noting that while in 1982 the colour index B-V was found to be constant within the precision of our data at 0.77 ± 0.01 , the B-V data obtained this year (Figure 2), although scattered, appear to show a dependency on phase, the star being redder when fainter.

The photometric behaviour of this system is similar to that of many related objects (eg: II Peg, as in Vogt (1981), V711 Tau, as in Dorren et al. (1981)



in terms of the changes in the shape of the light curve and brightness levels from season to season. It is expected that localized active regions similar in size and temperature to those found for these related systems will also satisfactorily explain the behaviour of this star.

However, before detailed modelling of such regions can be commenced, further information about this system (such as its binarity) must be obtained. Towards this end, we have obtained high dispersion echelle spectrograms of this object with the 1.88 m telescope at Mt. Stromlo observatory on three nights in May and June.

Reduction of these data is proceeding, and further observations, both photometric and spectroscopic, are planned.

We thank Dr. T. Lloyd Evans for sending his observations on HD 174429 to us prior to publication. JLI and TTM are supported by Commonwealth Post-graduate Research Awards.

References:

- Coates, D.W., Halprin, L., Sartori, P. and Thompson, K.: 1980 Inform. Bull. Var. Stars, No. 1849
- Coates, D.W., Innis, J.L., Moon, T.T. and Thompson, K.: 1982 Inform. Bull. Var. Stars, No. 2248
- Dorren J.D., Siah, M.J., Guinan, E.F. and McCook, G.P.: 1981, Astron. J., 86, 572
- Houk, N.: 1978, Michigan Catalogue of Two Dimensional Spectral Types for the HD Stars (University of Michigan Astronomy Department, Ann Arbor), Vol.2
- Stacy, J.G., Stencel, R.E. and Weiler, E.J.: 1980, Astron.J., 85, 858
- Stencel, R.E.: 1980, reported in IAU Symposium No. 88 "Close Binary Systems: Observations and Interpretation", p. 386, Plavec, M.J., Popper, D.M. and Ulrich, R.K. (eds) D. Reidel, Dordecht, Holland
- Vogt, S.S.: 1981, Astrophys. J. 247, 975
- Weiler, E.J. and Stencel, R.E.: 1979, Astron. J., 84, 1372