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RECENT PHOTOMETRY OF THE HELIUM-WEAK STAR V396 PERSEI

V396 Persei = HR 1063 is important as the only helium-weak star known to be photometrically variable. We began photometry at the request of Shore (1983), whose spectrophotometry in the far ultraviolet with I.U.E. showed peculiar CIV line profiles varying in phase with the 2.5-day photometric (= rotational) period (Shore and Brown 1984). Although the period has been redetermined as $2^{d}.4928$ by Mallama and Molnar (1974), the precision of that value still was not sufficient to compute reliable phases at the epoch of the I.U.E. spectrophotometry a decade later. Therefore we redetermined the light curve during the winter of 1983-1984, to provide a recent, more nearly concurrent time of maximum light.

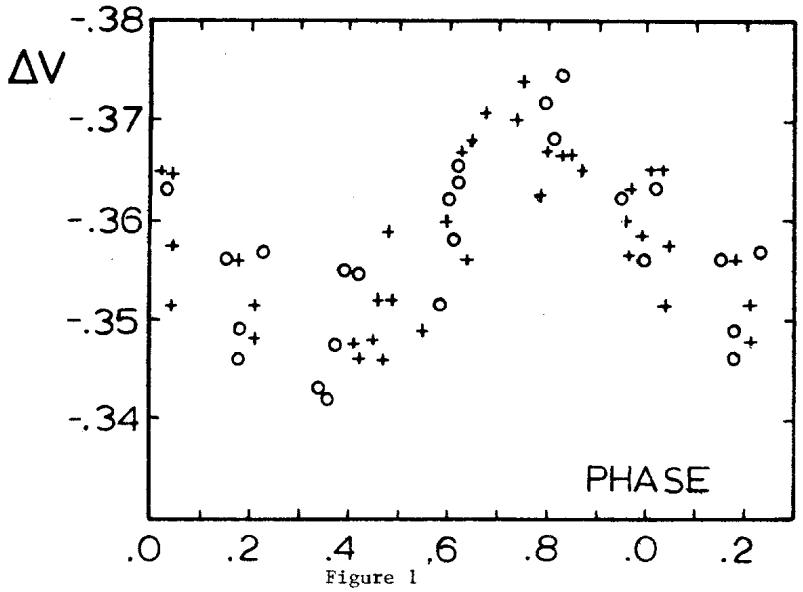

Figure 1

Our 1983-1984 light curve of the helium-weak star HR 1063. ΔV is differential magnitude in the sense variable minus HR 1051 and phase is computed with the ephemeris in equation (1). Each symbol is a mean of 3 or 4 individual differential measures, where o is Landis and + is Louth. The total amplitude is only 0.02 magnitude and maximum brightness occurs around phase 0.75.

Differential photometry was obtained at two observatories in the V bandpass using HR 1051 as the comparison star. Landis observed with his 8-inch telescope on 18 nights between JD 2445675.5 and 2445739.5. Louth observed with his 11-inch telescope on 22 nights between JD 2445667.6 and 2445747.6. The individual differential magnitudes, corrected for differential atmospheric extinction and transformed differentially to V of the UBV system, have been deposited in the I.A.U. Commission 27 Archive for Unpublished Observations of Variable Stars (Breger 1982), where they are available as File No. 139. Means of 3 or 4 individual ΔV values are plotted in Figure 1 versus phase computed with the ephemeris

$$JD(hel.) = 2441245.962 + 2^{d}.4928\ n \qquad (1)$$

taken from Mallama and Molnar (1974), where the initial epoch corresponds to a time of maximum light.

In Figure 1 we see the total amplitude is approximately $\Delta V = 0^{m}.02$, the same seen in the top part of figure 1 of Winzer (1974). The phase of maximum light is approximately $0^{P}.75$, the displacement from $0^{P}.00$ not surprising because of the uncertainty in phase accumulated over the last decade. We have not analyzed our light curve in more detail because there has been some question about the exact value of the photometric period, as was discussed by Mallama and Molnar (1974). Our photometry in Archive File No. 139 is, however, available for reanalysis if that proves necessary.

The rms deviation of the points in Figure 1 from a best fit of the light curve is around $\pm\ 0^{m}.003$, and any systematic difference between Landis and Louth is not more than about $\pm\ 0^{m}.001$. Differential photometry of this accuracy was possible because every pertinent factor was nearly ideal. The variable and the comparison star are comfortably bright ($V = 5^{m}.5$ and $V = 5^{m}.8$, respectively), similar in brightness ($\Delta V = -0^{m}.36$), very close together in the sky ($\rho < 0^{\circ}.3$), and very similar in color ($\Delta(B-V) < 0^{m}.1$). Moreover, the differential airmass was always extremely small ($\Delta X < 0.01$) and the transformation coefficients for the two observers were very small ($\varepsilon = -0.01$ for both Landis and Louth) and reliably determined.

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References:

Breger, M. 1982, I.B.V.S. No. 2246.

Mallama, A. D. and Molnar, M. R. 1974, B.A.A.S. 6, 307.

Shore, S. N. 1983, private communication.

Shore, S. N. and Brown, D. N. 1984, B.A.A.S. 16, 974.

Winzer, J. E. 1974, A.J. 79, 45.