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A LIGHT CURVE FOR HD 46282 = V683 MON

Originally intended as a comparison star for the Be star HD 46380, HD 46282 was discovered to be unusable for that purpose due to its own variability. This author has found the system to be an eclipsing binary of Algol type with partial eclipses. Rufener & Bartholdi (1982) noted two V magnitudes differing by 0.40 which suggested variability. HD 46282 was assigned the designation V683 Mon in the 69th Name-list of Variable Stars (Kholopov et al., 1989), evidently on the strength of a statement by Halbedel (1986) in a paper on HD 46380. Previously published spectral types all appear to derive from the HD catalog type of B9. No emission has ever been reported for HD 46282.

Photometry for HD 46282 was gathered in diverse photometric systems and with different instruments. BV differential photometry was obtained primarily with the Corralitos Observatory 0.6-m. telescope and single channel photon-counting photometer (utilizing an EMI 9924A tube) and also with the #2 0.9-m. telescope of the Kitt Peak Observatory and its automated filter photometer and 1P21 phototube. This same Kitt Peak telescope also contributed Stromgren uvby photometry during one particular eclipse which was then transformed to BV colors. Also, eleven coude spectra centered on H α were obtained with the Kitt Peak coude feed telescope and RCA2 CCD camera. This system has a resolution of 0.89 Å per two pixel line width.

Insofar as photometry was concerned, only a single comparison star was utilized: HD 46283 (V = 7.27; B-V = +0.25). Although this is not generally recommended behavior, the constancy of the HD 46282 system outside of eclipse would seem to indicate that HD 46283 is legitimately non-variable. As an indication of the accuracy of the photometry, the standard errors for comparison stars in V and B-V for other variables taken during the same nights have been found to hover around 0.015 magnitudes as a general rule. In total, 306 observations on 112 nights were obtained for HD 46282 over JD range 2446025 - 7593. The results of the photometry appear in Figure 1. HD 46282 is seen to be an Algol-type eclipsing variable with unequal minima. The preliminary ephemeris for primary minimum is as follows:

$$\text{Prim. Min.} = \text{JD } 2446755.9500 + 3.39274 * E$$

The range of primary eclipse is 0.43 V magnitudes and that of secondary eclipse, 0.33, implying a slightly later spectral type or lesser luminosity for the secondary star. The orbit would seem to be circular since there is no displacement of secondary minimum in phase. No marked asymmetries appear in either secondary or primary eclipse profiles, and the star appears to remain at constant magnitude when not in eclipse. No color changes of any significance appear to take place during either eclipse. Outside of eclipse the mean values for V and B-V appear to be 8.211 and +0.006 respectively.

Spectroscopically, HD 46282 is seen to be a double-lined spectroscopic binary in the region of H α . Figure 2 shows a representative spectrum at non-eclipse, clearly indicating the stronger primary's contribution to H α disturbed by a weaker secondary line. No certain features other than H α are visible. There seems no a priori reason to object to the HD assigned spectral type of B9. The eleven spectra obtained reveal the expected displacements of the two lines during the orbital period. Figure 3 gives a somewhat unconventional representation of the radial velocity variation of the star. The ordinate ("Difference") displays the difference in arbitrary units measured between the centers of the primary and secondary line profiles on the

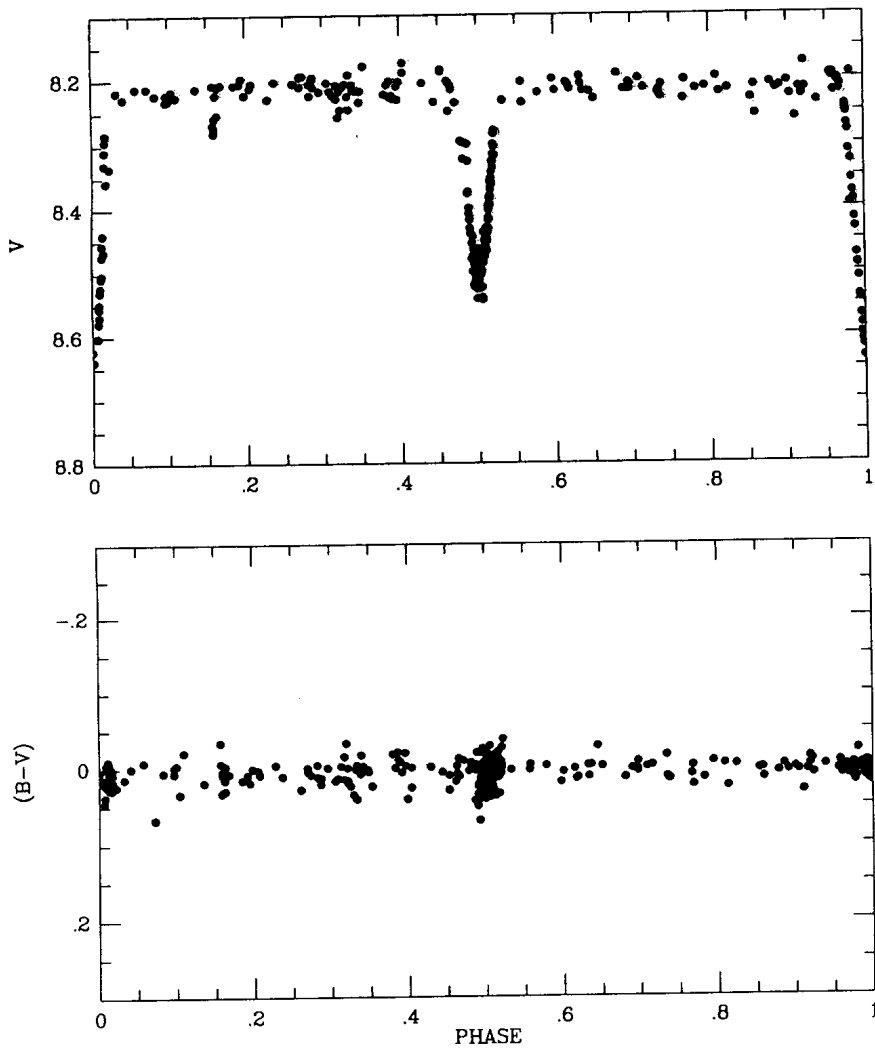


FIGURE 1: V and B-V Light Curves for HD 46282 - V683 Mon.

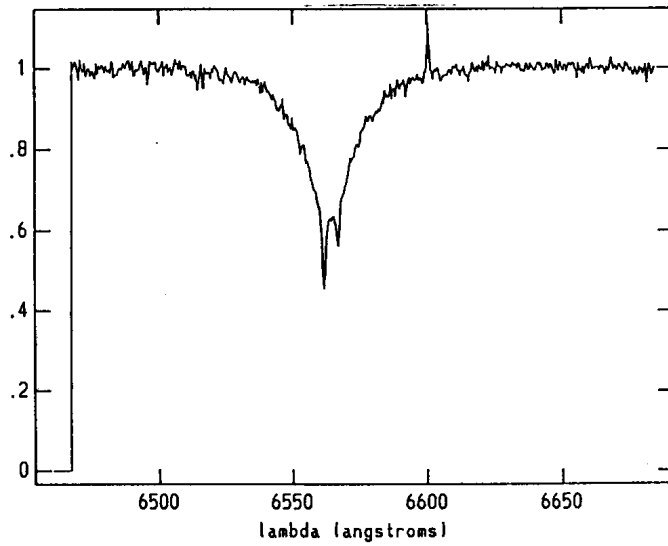


FIGURE 2: Non-eclipse spectrum of HD 46282 centered on H α . The peak at approximately 6600 Å is a noise spike.

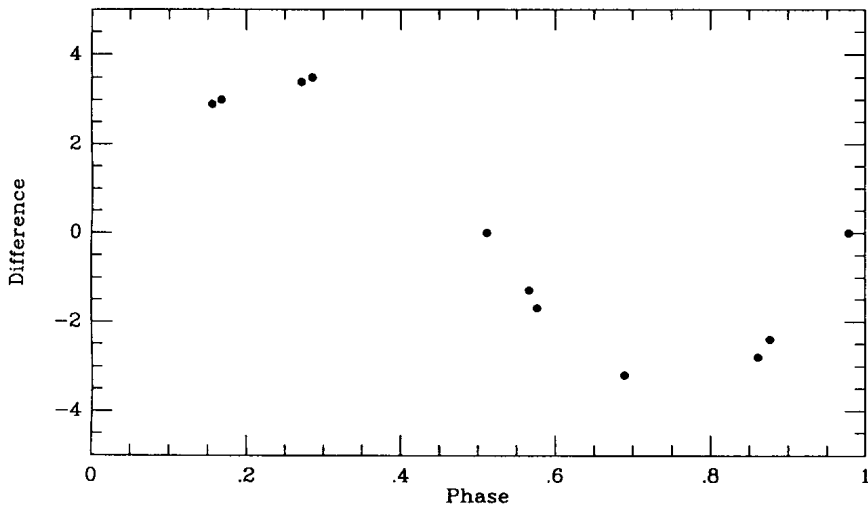


FIGURE 3: Graphic representation of the velocity variation of HD 46282. Explanation of the ordinate is in the text.

reduced spectra with the primary to shortward counting as positive. This serves to show that the displacements fit the period obtained from the light curve rather well.

Insofar as the secondary star contributes an H α line profile only slightly less intense than the primary and photometrically is marginally less luminous, it would seem likely that it is an early main-sequence A-type star.

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