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HD 181219 : A SUSPECTED ECLIPSING BINARY

HD 181219 is a star with a K0 spectral type and a V = 7.86 magnitude, both taken from the Henry Draper Catalogue. It was serving as the comparison star during photometry of HD 181943 in an investigation by Hooten and Hall (1989) using the Vanderbilt 16-inch automatic telescope. HD 181943 had appeared earlier on a list of 40 suspected variables (Fekel and Hall 1985), where we see it has a G8 IV spectral type and a V = 9.3 magnitude. Hooten and Hall noticed, from several discordant differential magnitudes, that the comparison star was occasionally faint by about 0.1 magnitude.

HD 181219 itself was observed differentially with respect to the check star HR 7379 (A1 V, V = $6^{m}.70$) from JD 2,447,277.93 to JD 2,447,434.62 and 70 differential magnitudes in V and B were obtained. These observations have been corrected for differential atmospheric extinction and transformed to the UBV system. Three times of diminished brightness (at Julian dates of 2,447,287.91, 2,447,316.83, and 2,447,424.63) were suspected of being in either primary or secondary eclipse. Initially we considered them belonging to the same (primary) eclipse. Different periods were used to compute phases beginning with periods around 29 days, the time elapsed between the first two minima in the data. Periods in this vicinity failed to bring all three points together in phase. Then, considering the data contained points from both the primary and the secondary eclipse, periods around twice the suspected 29-day value were explored.

A light curve for HD 181219 with the most likely period, P = $55^{d}.1$, is shown in Figure 1. This representation permits eclipses no longer in duration than about 3.0 days for one eclipse and 3.5 days for the other eclipse. When computing phases, the deepest point, $\Delta V = 1^{m}.18$ at JD 2,447,287.91, was used for the preliminary initial epoch. It is evident from the light curve that this cannot be the exact midpoint. A better approximation would be about a half day earlier. Thus the best available estimate for the current ephemeris of this newly discovered eclipsing binary would be

$$JD(hel.) = 2,447,287.4 + 55^{d}.1\ n\ . \qquad (1)$$

Relative to this ephemeris the other eclipse occurs at about phase 0.52. Thus there must be a slight eccentricity in the orbit.

A photometry project with a more continuous series of observations allowing for a period around 55 days will be needed to confirm the correctness of our ephemeris and define the shape of the light curve. Because our photometry is so scant, we cannot rule out the possibility that the eclipses are deeper than $0^{m}.13$ nor that the eclipses are complete.

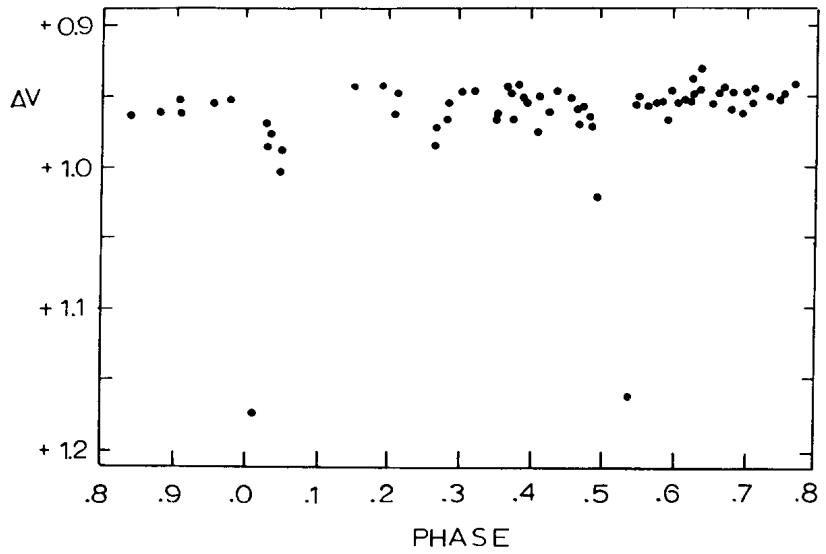

Figure 1. Light curve of HD 181219. The vertical axis is differential magnitude with respect to HR 7379. The horizontal axis is phase computed with the ephemeris in equation (1). We are not sure which eclipse is primary and which is secondary.

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