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# PHOTOMETRY AND A PRELIMINARY ANALYSIS OF THE BETA-LYRAE LIKE SYSTEM HD 173 198

As a part of an observational program on binary systems of Beta-Lyrae type HD 173 198 was observed photoelectrically with UBV filters during the 1976 southern winter at the Abrahao de Moraes Observatory in Valinhos (Sao Paulo state-Br.).

The first observations on this system were reported by Leewen (1975). From the epoch of the principal minimum observed by us and from that given by Leewen, we have improved the period of the system, which is now given as follows

$$P = 1^{d}.364076 \pm 0^{d}.000001.$$

The observations reported presently were carried out with the 61 cm telescope of the Sao Paulo University at Valinhos, using photon counting techniques and a data acquisition system operated by a Nova computer. The observations were reduced following the standard techniques and Figure 1 shows the light curve in the B color.

The main comparison star was HD 173 003 (B5) whose colors, obtained from absolute photometry in two nights, are

$V = 7^{m}.72 \pm 0^{m}.01$; $(B-V) = 0^{m}.43 \pm 0^{m}.01$; $(U-B) = -0^{m}.12 \pm 0^{m}.02$.

As a check star, was used HD 172 850 (B9, $8^{m}.2$).

The light curves in B and V colors were rectified by the Russel and Merril (1952) method and we have followed Kopal (1959), taking into account the shape of the minima in order to determine the function $\chi(x,k,\alpha_{o},n)$. We have considered an average value of $\chi$ for several points instead to take only one point in each eclipse.

The elements of the system obtained from this analysis,

Table 1

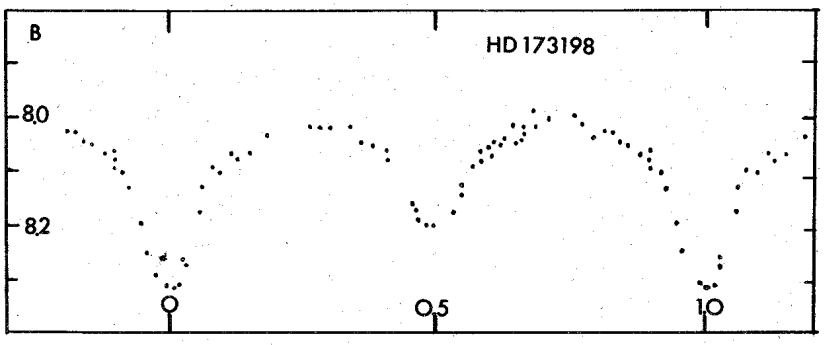
| Color | $L_1$ | $L_2$ | $r_1$ | $r_2$ | i |
|---|---|---|---|---|---|
| V | 0.679 | 0.321 | 0.432 | 0.326 | $81^{o}$ |
| B | 0.672 | 0.328 | 0.433 | 0.325 | $81^{o}$ |

Table 2

| Star | Color | $r_a$ | $r_b$ | $r_c$ | $T_e(K^{o})$ | L | $m_1/m_2$ |
|---|---|---|---|---|---|---|---|
| 1 | V | 0.516 | 0.450 | 0.411 | 22,000 | 0.658 | 1.25 |
| 2 | V | 0.344 | 0.331 | 0.321 | 20,210 | 0.341 | |
| 1 | B | 0.516 | 0.450 | 0.411 | 22,000 | 0.666 | 1.25 |
| 2 | B | 0.344 | 0.331 | 0.321 | 20,154 | 0.333 | |

Table 3

| Star | Type | $m/m_{\odot}$ | $R/R_{\odot}$ | $(B-V)_o$ |
|---|---|---|---|---|
| 1 | B1 | 14.1 | 6.9 | -0.23 |
| 2 | B2 | 11.2 | 5.0 | -0.21 |



namely, the normalized luminosity, relative radius and orbital inclination are given in Table 1.

We have also analysed the light curves through the Wood's model (1971 and modifications 1973-1976). The computations, following the numerical code developed by Wood, were started using as initial parameters those obtained previously through the Russel-Merril method.

The astrophysical parameters obtained directly from our computations are given in Table 2. Main sequence calibration allows us to estimate the individual masses and absolute dimensions, using Kepler's third law. These data are shown in Table 3.

The total visual extinction was estimated to be $A_V = 1^m.5$ and the distance is about 1.0 kpc.

A more detailed analysis of this system will be presented elsewhere.

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