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HR 7674: A LOW-AMPLITUDE CEPHEID?

HD 190422 = HR 7674 ($\alpha_{2000} = 20^{\rm h}07^{\rm m}35^{\rm s}$, $\delta_{2000} = -55°01'.0$,V = 6.25) was chosen as a comparison star for a study of photometric variations of some Ap stars, the results of which will be published elsewhere. The observations have been made at La Silla (ESO) during a three-week run in August 1996 with the 70 cm Swiss telescope equipped with the seven-colour double-beam Geneva photometer. Since HD 190422 was a comparison star for our initial programme, we could not use differential measurements. We had to rely on absolute data. Fortunately, these are of high quality in the Geneva system at La Silla.

This bright star is neither in the GCVS nor in the NSVSC. It is a standard of the Geneva system and does not appear in Rufener & Bartholdi's (1982) list of suspected variables. Neither is it suspected in variability in the Hipparcos Input Catalogue (Turon et al., 1992). Hence we were somewhat surprised to find HR 7674 to be slightly variable.

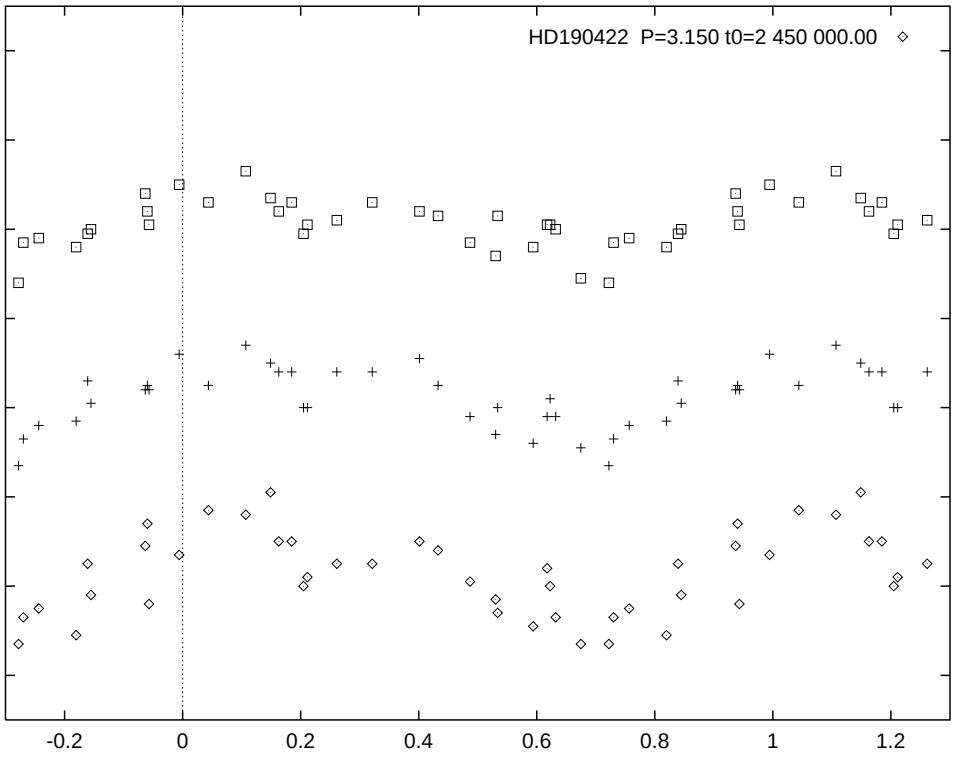

Figure 1. Lightcurves of HD 190422 in Geneva's UBV (bottom to top). The phase on the horizontal axis is computed with the origin JD=2 450 000. Tick marks on the vertical axis are separated by $0^{\rm m}.002$

Renson's (1978, 1980) period-searching algorithm has been applied to the 29 measurements obtained for this star. The resulting period is P = $3^{\rm d}.15 \pm 0^{\rm d}.03$. Figure 1 shows the measured Geneva V, B and U magnitudes plotted vs phases calculated with this value of P and the time origin 2 450 000.0. The total amplitude has been estimated by fitting a smooth analytical curve through the observations. It is about $0^{\rm m}.014$, $0^{\rm m}.016$ and $0^{\rm m}.023$ in V, B and U, respectively. All colours vary in phase with a rapid brightening followed by a slower fading. The maximum brightness is reached around phase 0.05 and the minimum at 0.70.

The HD spectral type of the star is F8, which is in perfect agreement with Johnson's colour index $B-V = 0.53$. An MK type F8V has also been published (Buscombe, 1977).

The asymmetric shape of the variation, the colour dependence of the amplitude and the synchronism of the light curves in all colours point toward HR 7674 being a low-amplitude cepheid. On the other hand, the luminosity class V disagrees with a cepheid nature of the star.

A confirmation of the origin of the variations would be obtained by a radial-velocity analysis. Because of the small amplitude, a high accuracy is needed. This is probably difficult to achieve because of the large value of $v \sin i$ (200 km/s).

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