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HD 22403 : A NEW VARIABLE WITH Ca II H AND K EMISSION

HD 22403 (BD + 25<sup>o</sup>580) is a single-lined spectroscopic binary with strong Ca II H and K emission. The orbital period is  $\sim 1.93$  days and the spectral type of the visible component is close to G2V (Carquillat et al., 1979). This object was included in a photometric programme on late type emission binaries to search for the type of photometric variability exhibited by most of the binaries with G-K spectra with Ca II H and K emission.

Observations of HD 22 403 were made with the 34-cm Cassegrain reflector of the Kavalur Observatory on 18 nights through standard B and V filters during the period from 1980 November to 1981 February. All the measurements were made with respect to the comparison star HD 22 269 (BD + 27<sup>o</sup>529). As a check on the constancy of the comparison, HD 22 145 (BD + 26<sup>o</sup>572) was also observed on all the nights of variable star observation. The mean differential magnitude and colour of the comparison with respect to the check star (in the sense HD 22 145 - HD 22 269) obtained by us are  $\Delta V = 1.010 \pm 0.003$  and  $\Delta(B-V) = -0.801 \pm 0.002$ .

The photometric data collected by us showed a scatter of  $\sim 0.10$  mag both in V and B indicating that HD 22 404 is definitely a variable. The Julian days of the observations were converted into orbital phases using the following ephemeris:

$$J.D. 244 1926.590 + 1.9299395 E,$$

where the initial epoch corresponds to the time of the periastron passage and the period is the spectroscopic orbital period (Carquillat et al., 1979). The differential magnitude and colour (in the sense HD 22 403 - HD 22 269) are plotted against the orbital phases thus computed in Figure 1. Each point is an average of 3-4 independent observations. The probable errors of the differential magnitude and colour are 0.012 and 0.010, respectively. Even though the observations are spread over about 47 orbital periods, the data obtained define a coherent light curve with little scatter. This implies that the photometric period is either equal or very close to that of the binary orbital period. As seen in Figure 1 the light curve is very asymmetric and the total

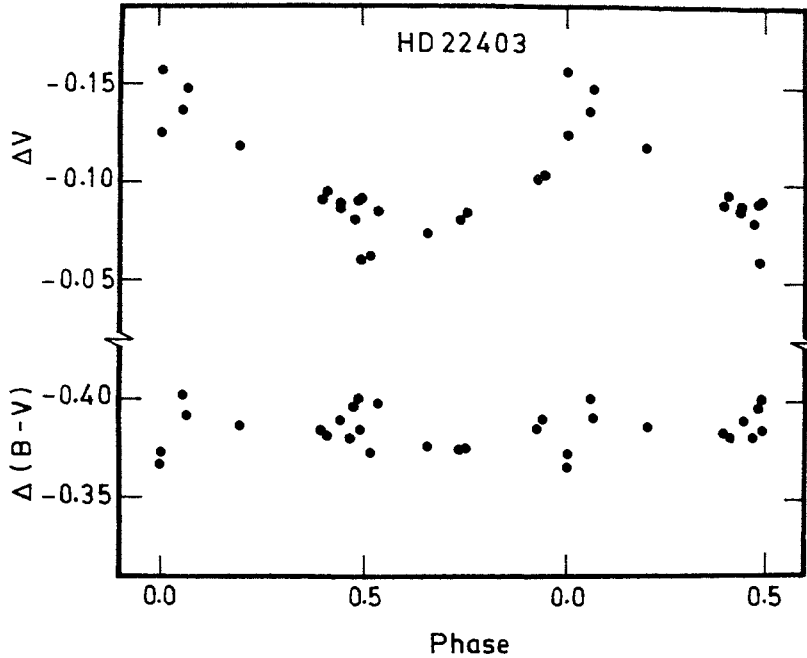


Figure 1

amplitude in V is  $\sim 0.09$  mag. The  $\Delta(B-V)$  values do not show any significant correlation with the light variation but appear scattered about the mean  $\Delta(B-V) = -0.384 \pm 0.002$ . From our photometric data we derived a mean  $(B-V) = 0.70 \pm 0.01$  for HD 22 403, consistent with the spectral type G2V assigned to it by Carquillat et al. (1979).

The nature of the light curve rules out geometrical eclipses as the cause of the observed light variation. Probably, in HD 22 403 we are seeing the type of 'activity' exhibited by the well known RS Canum Venaticorum and BY Draconis variables, where the photometric variation is attributed to the presence of 'starspots' which rotationally modulate the observed flux.

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