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ON THE PERIOD OF HD 200925

Bedolla and Pena (1979) presented photoelectric observations of HD 200925 in V filter and estimated the period of its variability to be $0.^d.238$ with an amplitude of $0.^m.35$. Later in 1979 this star was observed spectroscopically by Imbert (1980). The radial velocity measures yielded a period of pulsation of $0.^d.26765 \pm 0.00005$ with an indication of a second pulsation mode superposed on the principal mode. Imbert also excluded the possibility that the star HD 200925 might be an eclipsing variable. The star was observed by us photoelectrically in the year 1979 in UBV filters and the period was determined to be:

$$0.^d.267396 \pm 0.000003, \text{ (Gupta and Padalia, 1980)}$$

The light curves obtained by us were analysed further and the physical parameters were determined. The nature of its variability was found to resemble that of a dwarf cepheid (Padalia and Gupta, 1982).

While our observations were still in progress, Dupuy (1981) reexamined the photoelectric V observations of Bedolla and Pena and determined its period to be $0.^d.2675$. He, however, noticed that on (26-27 September, 1978) one night's observations of Bedolla and Pena, the star appeared systematically brighter by about $0.^m.08$.

In order to investigate the multiperiodicity in the light variation of this star as reported by Imbert (1980) and to improve its period, the star was observed further by us on 10 nights from September 1980 to October 1981. The instrumental system and the comparison star are the same as mentioned in

our previous papers. The data were reduced to the standard system.

We tried to draw a comprehensive light curve for our observations of 1980 and 1981. In this, a period of $0^d.267394$ as determined earlier (Padalia and Gupta, 1982) and epoch JD Hel 2443776.835 (which appears as the time of the first maximum in the light curves obtained by Bedolla and Pena) were taken. It was noticed that all the maxima observed during 1980 and 1981 are shifted by about 0.5, in phase. This shift may be attributed either to a wrong choice of epoch (i.e. the time of first maximum) or to a sudden change in the period of this star. From an examination of the light curves, the former reason appeared to be more plausible. Therefore, taking the new epoch of maximum to be 2443776.715 (which is the time of first minimum as reported by Bedolla and Pena), an improved period of $0^d.267299 \pm .000001$ by least squares method was determined. With this new epoch of maximum and improved period, all the observations taken by various authors till 1981 can be explained fully in the sense of drawing a comprehensive light curve. UBV light curves for our observations taken during the years 1980 and 1981 are shown in Figure 1.

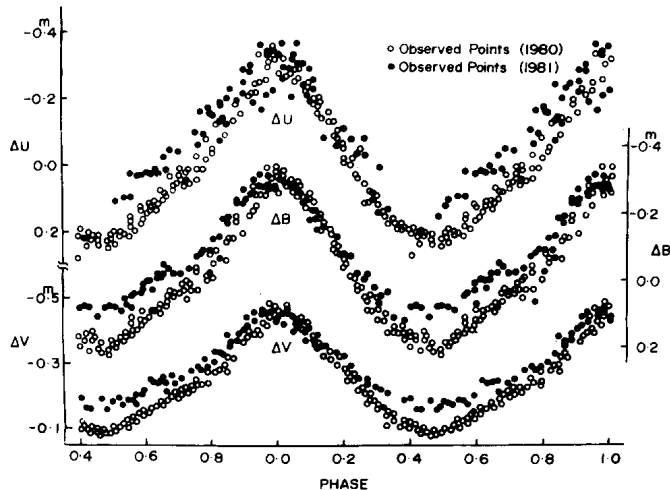


Figure 1: U, B, V light curves of HD 200925

Since the new epoch of maximum (JD Hel 2443776.715) considered by us actually appeared as minimum in the light curve given by Bedolla and Pena, it was felt necessary to remove this confusion through correspondence with them. They confirmed that all the minima that appeared in the individual light curves of their paper are actually maxima and vice-versa.

Dupuy (1981) pointed out that the V observations reported by Bedolla and Pena on the night of September 26-27 were systematically brighter by about $0^m.08$. However our UBV observations of 1981 show that the star is brighter at the times of minima and gradually the light curves merge into the maxima of the light curves of 1980 as shown in Figure 1. A change of $0^m.11$ and $0^m.08$ has been noticed in the B and V filters at the time of minimum, respectively. However due to lack of observations at the time of minimum in U filter, increase in brightness in U could not be estimated.

A hump appears in the ascending branch in the individual light curves, which is usually found in cepheid variables. The hump is more prominent in the U filter than in the B and V filters. Three typical individual light curves with humps in the U filter (one from each year of our observations) are shown in Figure 2a, b, c.

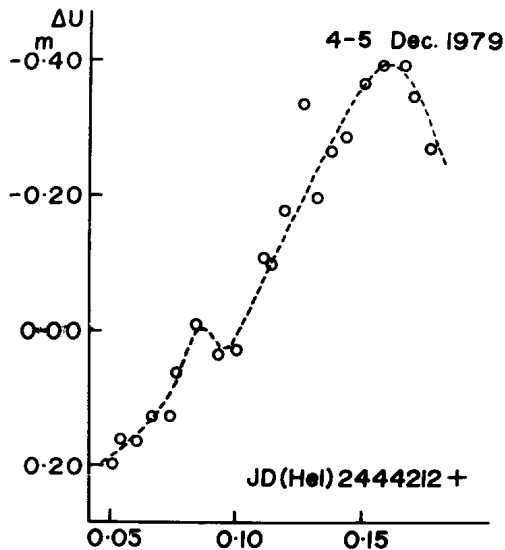


Figure 2a

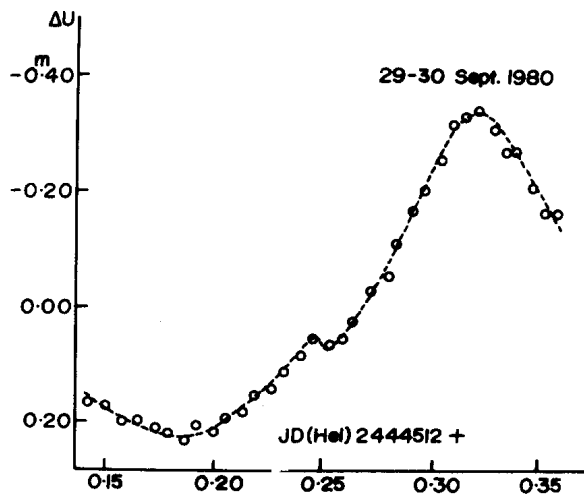


Figure 2b

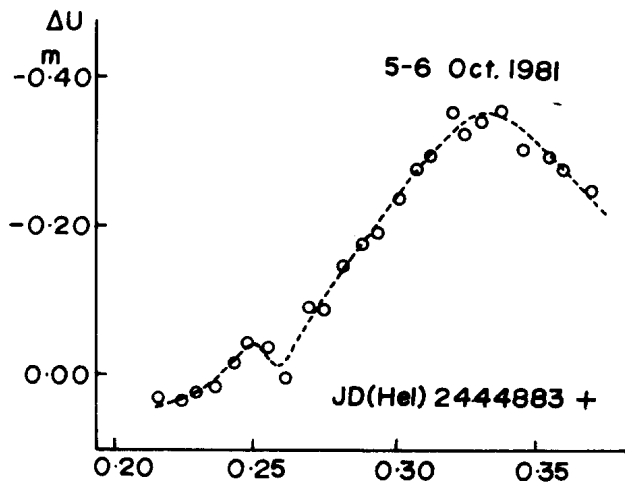


Figure 2c

Figure 2: Individual light curves of HD 200925 in U filter, showing humps.

We conclude that the period of $0.^d.267299$ has remained constant since 1978. The discrepancy in its period which existed so far appeared mainly because the times of its first maximum and minimum were not clear. From the shapes of the existing light curves, possibility of its having RRc nature can not be excluded. Spectroscopic observations are needed to confirm whether the star is a dwarf cepheid or RRc type variable. Further UBV observations for this star are in progress to see whether the brightness change at the time of its minimum has any periodicity.

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S.K. GUPTA AND T.D. PADALIA

Uttar Pradesh State Observatory, Manora Peak,
Nainital - 263129
India

References:

- Bedolla, S.F.G. and Pena, J.H., 1979, I.B.V.S. No. 1615
Dupuy, D.L., 1981, Publ. Astron. Soc. Pacific, 93, 126
Gupta, S.K. and Padalia, T.D., 1980, I.B.V.S. NO. 1870
Imbert, M., 1980, Astron. Astrophys. 86, 259
Padalia, T.D. and Gupta, S.K., 1982, Astrophys. Space Sci. 81,251