RECENT OBSERVATIONAL EVIDENCE ON W URSAE MAJORIS STARS

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During the four last years (1978-1981), some close binaries of W Ursae Majoris type have been observed from the National Observatory of Athens.

In all cases a two-beam, multi-mode, nebular-stellar photometer has been used, attached to the 48-inch Cassegrain reflector at the Kryonerion Station.

The observed systems are: 44i Boo, VW Cep, AB And, BV Dra, BW Dra, U Peg, V508 Oph. Especially VW Cep and 44i Boo, are very interesting objects; in addition to the light curves that have already been published (Rovithis and Rovithis-Livaniou, 1980-1981), other observations were obtained during the last year and are now at computational stage. The observations of these two systems will be continued during the next years.

In figures 1-4, the light curves of 44i Boo in U,B,V,R, are represented (observations of 1978).

From them, it is obvious that the two minima are of unequal depth and Max I (the one following primary minimum) is higher than Max II. Moreover, in the B, V and R light curves of figures 3 and 4 there is a very good fit between the observations on 5/6 of April and 3/4 of May. In the U curve of figure 3, there is not much dispersion in the ascending branch towards Max II while it is large in the one descending towards the primary minimum. In the other curves of figures 3 and 4, the dispersion is quite large between phases 0.570 and 1.0.

Figure 5 represents the B and V light curves of VW Cep (observations of 1979).

In all light curves of VW Cep we have obtained until now, the two minima are of unequal depth. This was the case in Kwee's (1966) observations, but was not so in 1969 when Scarfe and Brimacombe (1971)

Z. Kopal and J. Rahe (eds.), Binary and Multiple Stars as Tracers of Stellar Evolution, 337–342.

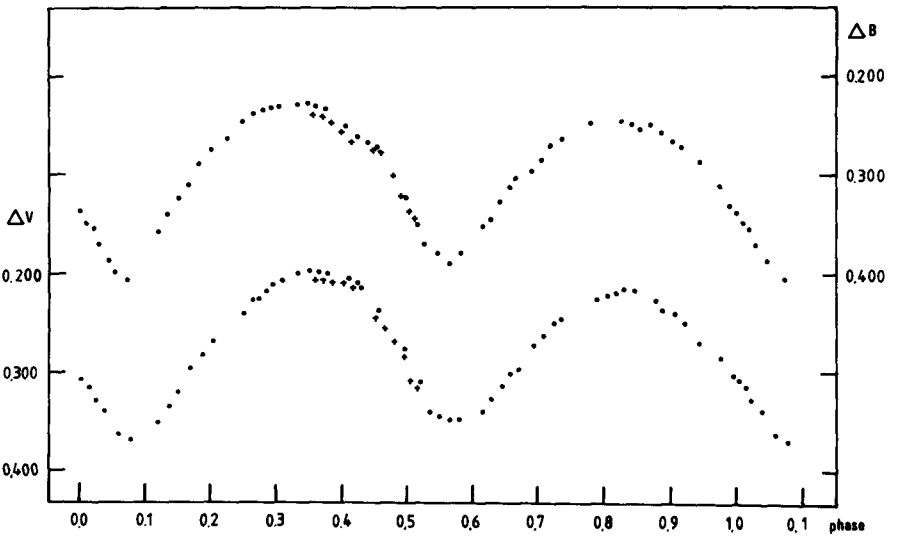

Fig. 1. B and V light curves of 44i Boo on 15/4/1978. The phases have been computed using Kukarkin's et al. ephemeris formula.

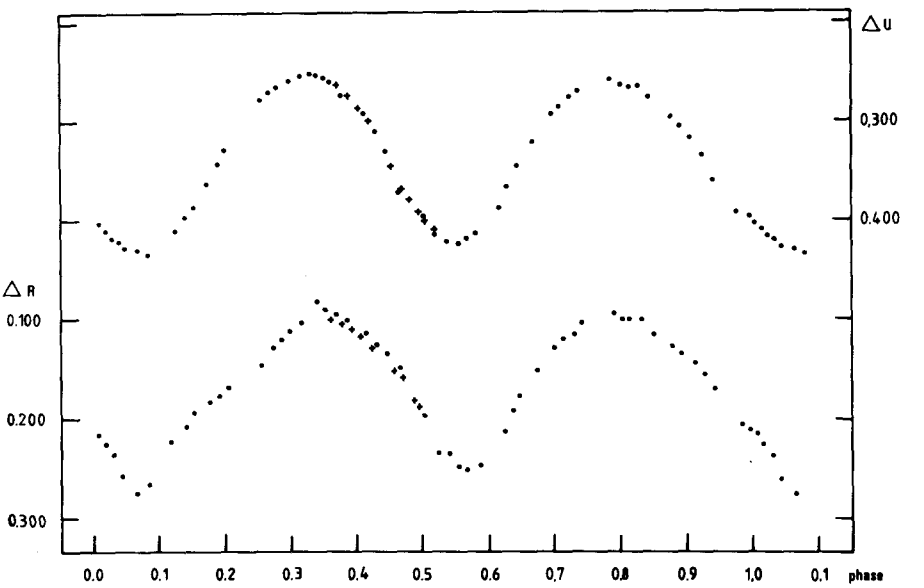

Fig. 2. U and R light curves of 44i Boo on 15/4/1978.

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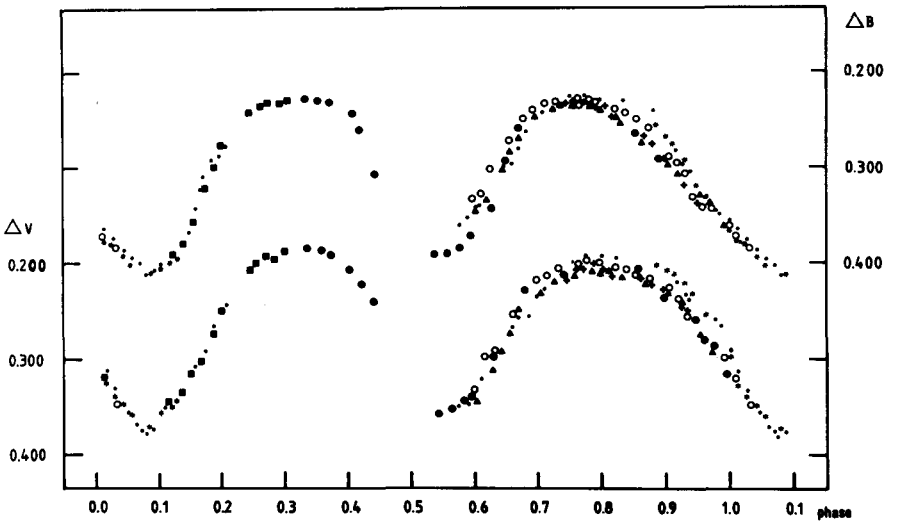

Fig. 3. B and V light curves of 44i Boo. The individual measurements were obtained on 1978 April 5 (⊖), 11 (○), 12 (▲), 16 (•), 17 (✱), and 1978 May 3 (■), 4 (+).

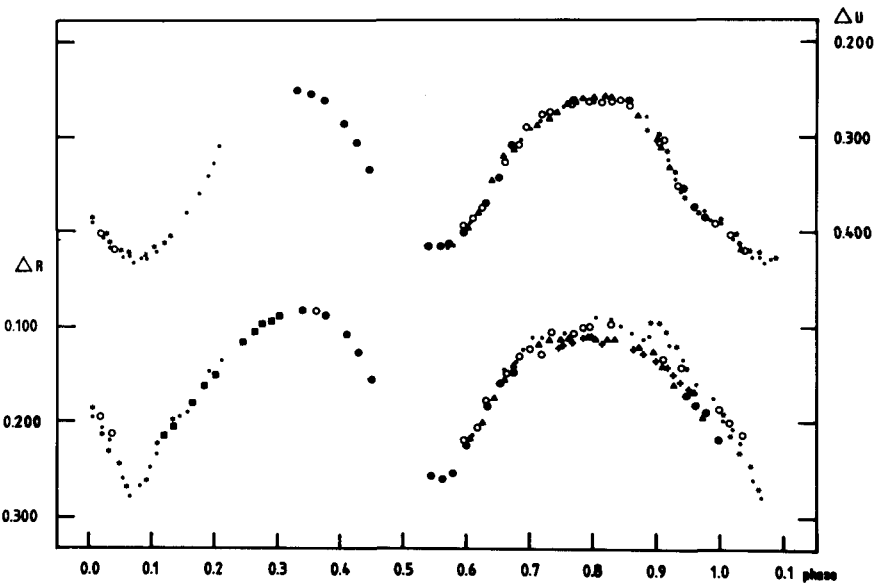

Fig. 4. U and R light curves of 44i Boo.

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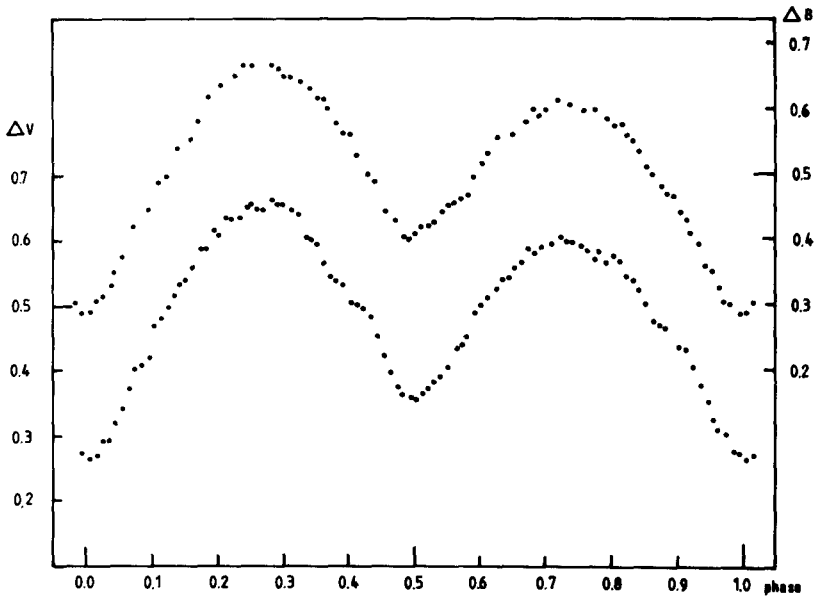

Fig. 5. B and V light curves of VW Cep during 1979, relative to HD 192889. (Normal points; unpublished light curves).

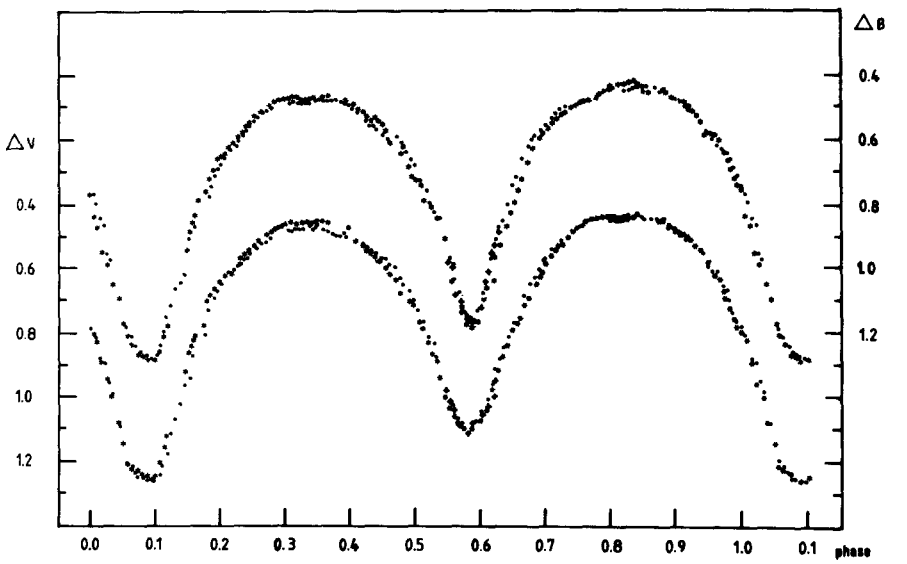

Fig. 6. B and V light curves of AB And relative to HD 219372, obtained on 1979 Sept. 19/20 (•), 20/21 (✱), 21/22 (+). The phases have been computed using Kukarkin's et al. formula.

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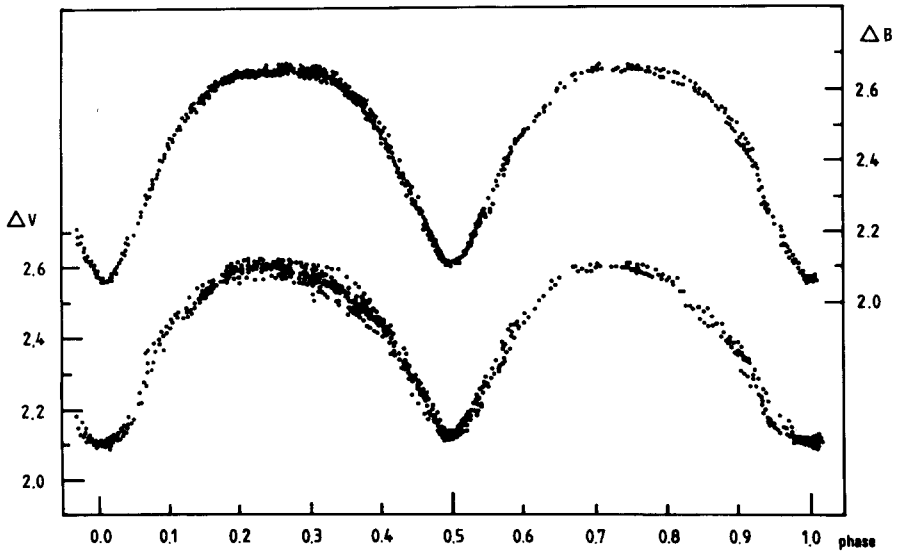

Fig. 7. B and V light curves of BV Dra obtained in 1980, relative to SAO 166029 (DM +62°1390). The phases have been computed using the formula Min I (hel.) = 2443244.1904 + $0^{d}.35006732$ E (in press).

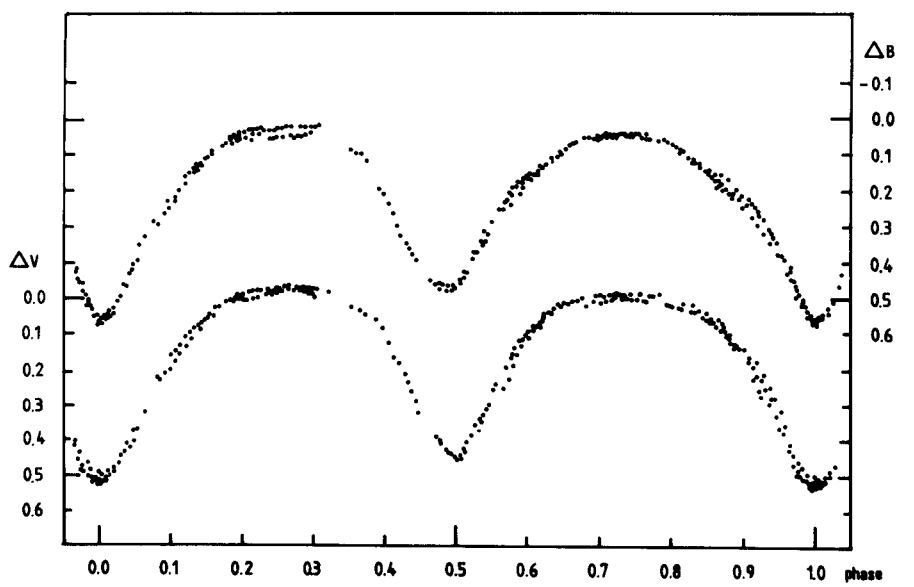

Fig. 8. B and V light curves of U Peg, obtained in 1980. (Unpublished light curves).

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reported that the two minima were of nearly equal depth. It is also obvious from figure 5, that the maximum following the secondary minimum is fainter than that following the primary one. Moreover, there are two "shoulders" visible in almost all four light curves, appearing more or less clearly in either the B or the V band; the first appears at phases around 0.4, and the second at phases around 0.9 (the last one being more obvious).

Figure 6 represents the light curves of AB And (observations of 1979). As it is shown, the secondary is only $0^{m}.115$ brighter in B and $0^{m}.16$ in V than the primary. There is also a very small difference between Max I and Max II, the later being the brighter. Finally, the variation of the color index $\Delta(B-V)$ will be around zero, since the magnitude differences Δm in both B and V vary by almost the same amount.

In figure 7 the B and V light curves of BV Dra are shown. In both curves the two maxima are of the same heighth. Moreover, the depth of the minima is almost the same. We have a large number of observational points and the dispersion is very small in the B curve. Unfortunately, this is not the case in the V curve in which the dispersion is quite large.

Figure 8 represents the B and V light curves of U Peg. Both minima are relatively deep and Maximum I is brighter than Max II (more clear in B curve).

Finally, photoelectric observations of BW Dra have been completed and they are now at computational stage, while for V508 Oph there are some observations taken during June and July of this year and we hope to have them completed either this October, or sometime next Spring.

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