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OBSERVATIONS OF TWO HIPPARCOS ECLIPSING VARIABLES[†]

KURPIŃSKA-WINIARSKA, M.¹; OBLAK, E.²; WINIARSKI, M.¹; KUNDERA, T.¹

¹ Cracow Astronomical Observatory, Orla 171, 30-244 Krakow, Poland, e-mail: kurpin@oa.uj.edu.pl

² CNRS UPRESA 6091, Observatoire de Besançon, 41bis, avenue de l'Observatoire, 25010 Besançon, France, e-mail: oblak@obs-besancon.fr

New photometric and radial velocity observations of two HIPPARCOS variables, HP Dra = HIP 92835 and V2080 Cyg = HIP 95611 performed in 1998 and 1999, are presented. Both of these stars were selected for radial velocity observations as candidates for new, well detached, double-lined eclipsing binaries. A re-analysis of the satellite data suggested that the periods and the shape of the light curves could be different from that originally presented in the HIPPARCOS and TYCHO catalogues (ESA, 1997). Spectroscopic observations were carried out at the Haute Provence Observatory during three observing runs (years 1998 and 1999), with the CORAVEL and ELODIE spectrometers. Photoelectric observations were collected with the 50-cm telescope of the Cracow Observatory through the Johnson *B* and *V* filters. The corrections for differential extinction were applied using the mean seasonal extinction coefficients.

For both systems, the correct periods were determined. Figures 1 and 3 show the *V* light curves, Figures 2 and 4 present the observed and calculated radial velocity curves. Table 1 summarizes some characteristics of the systems.

HIP 92835 = HP Dra = HD 175900. Catalogued as a new HIPPARCOS EA type eclipsing binary with the period of 6.6930 days. The first spectroscopic observations, between June 2 to 8th, 1998, made with the CORAVEL spectrometer, showed that the period is longer than found originally from 94 points of TYCHO data. Subsequent runs at OHP (August 1998 and 1999) and photometric observations done at Cracow (June 1998 to November 1999) allowed us to find the correct period. HIP 93029 = HD 176341 and BD+52°2471 were used as comparison and check stars.

The new ephemeris is:

$$\text{Min. I} = \text{HJD } 2451041.4812 + 10^d 7615305 \times E. \\ \pm 0.0003 \quad \pm 0.0000023$$

The position of the secondary minimum at phase 0.518 and the shape of the velocity curves suggest a non-circular orbit solution. The TYCHO data reduced with the above ephemeris presents the same phase shift of the secondary minimum (adopted as the primary in the HIPPARCOS catalogue). The primary minimum is represented by only one point in the TYCHO data.

Some results from spectral and photometric observations are summarized in Table 1 and presented in Figures 1 and 2.

[†]Based in part on the observations made at Observatoire de Haute Provence (CNRS), France and on data from the Hipparcos astrometry satellite.

The preliminary analysis suggests that the system is composed of similar stars of about 1.1 solar mass. The simultaneous solution of the V , B light curves and velocity curves will be published elsewhere.

Table 1

HIP	GCVS-Name	ΔV mag.		Sp. type	K_1	K_2	γ	e
92835	HP Dra	0.30	0.26	G5	62.3	64.5	16.2	0.043
95611	V2080 Cyg	0.41?	0.38	F5	81.6	83.8	3.2	0.0

Remarks to Table 1:

1. The ΔV values correspond to the depth of minimum I and minimum II.
2. K_1 and K_2 are half the amplitudes of radial velocities expressed in km/sec for brighter and fainter components.
3. Columns γ and e give the systemic velocity in km/sec and a preliminary value of the eccentricity.

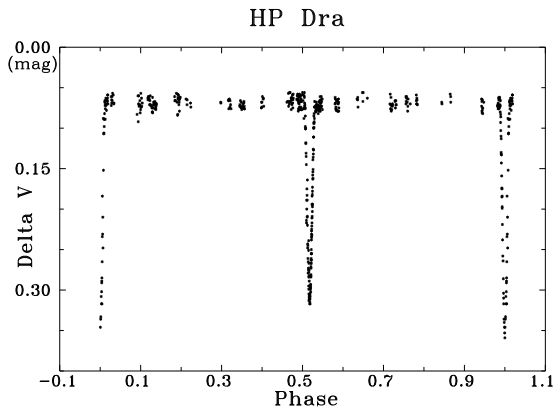
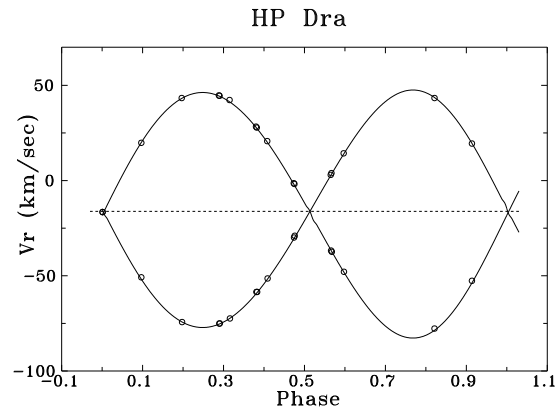
Figure 1. Light curve in V filter

Figure 2. Radial velocity curve

HIP 95611 = V2080 Cyg = HD 183361. Star listed in the HIPPARCOS catalogue as EA variable with the period 2.46680 days. As in the case of HP Dra, it was obvious from the CORAVEL observations in June 1998 that the period should be corrected as follows:

$$\text{Min. I} = \text{HJD } 2451053.705 + 4^{\text{d}}93355 \times E \\ \pm 0.001 \pm 0.00002$$

HD 183340 and HIP 95504 = HD 183123 were used as comparison and check stars. The moment of the primary minimum was adopted on the basis of radial velocity data and shows that the HIPPARCOS Min. I is in reality the secondary one. Unfortunately, there are as yet no data fully covering the primary minimum, which should be slightly deeper than the secondary one (Table 1).

The light and velocity curves presented in Figures 1, 2 and 3, 4 are plotted with a phase scale calculated from the ephemerides given above. The vertical scale of the light curves gives the difference between variable and comparison stars and is expressed in V magnitudes.

A tentative solution has been fitted for both systems, using the Wilson–Devinney programme (Wilson, 1993). The computed radial velocities are shown in Figures 2 and 4 as solid lines.

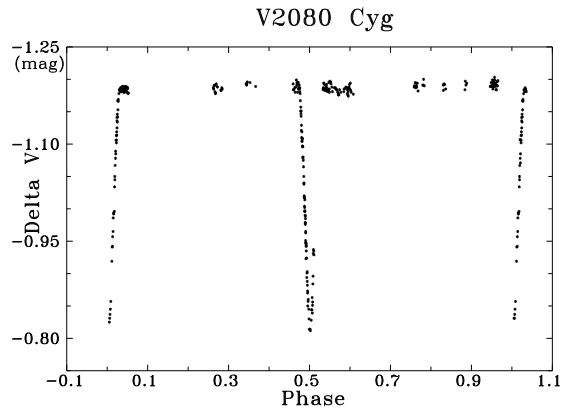


Figure 3. Light curve in V filter

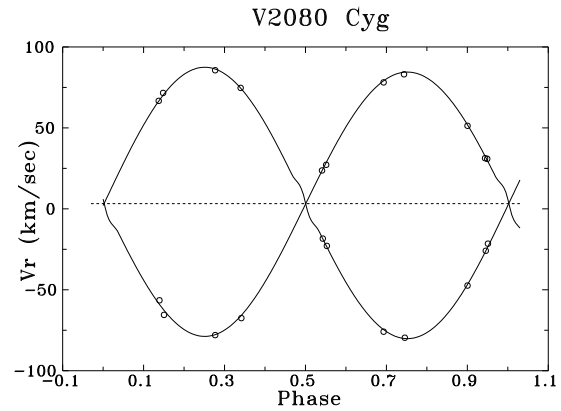


Figure 4. Radial velocity curve

Both stars, HP Dra and V2080 Cyg are good candidates for precise determination of physical properties of the system.

References:

- ESA, 1997, The Hipparcos and Tycho Catalogues, ESA SP-1200
- Wilson, R.E., 1993, Documentation of Eclipsing Binary Computer Model