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MINIMUM TIMES FOR SEVERAL SOUTHERN EARLY-TYPE ECLIPSING BINARIES[+])

During two observing periods with the 50 cm ESO telescope at La Silla in February/March and May 1992, several early-type eclipsing binaries were measured in the UBV system. Here the minimum times - and, in some cases, new ephemeris - are reported for FZ CMa, QZ Car, V606 Cen and MY Ser.

FZ CMa (HD 52942, B2.5 IV-Vn): for this variable, a light time effect due to a third body was reported by Moffat et al. (1983). The secondary minimum time measured by us is JDhel. $2448688.6343 \pm 0.0004^{d}$. The depths of this minimum were 0.39^{m}, 0.37^{m} and 0.36^{m} in U,B and V, respectively. From the light curve published by Moffat et al. (1983) a secondary minimum depth of about 0.36^{m} is apparent (in Strömgren v colour); this may indicate that the minima have meanwhile deepened. Such change can be due to a change of the orbital inclination, as has been demonstrated in the case of the eclipsing triple system IU Aur by Mayer and Drechsel (1987). Time-dependent variations of the orbital inclination and corresponding changes of the depth of eclipse minima are to be expected in a three-body system, where the orbital planes of the eclipsing binary and that of the third body orbiting around the mass center of the triple system are non-coplanar.

QZ Car (HD 93206, O9 III): a spectroscopic and photometric multiple system. The eclipse minimum for this star was not completely covered, however from the measured parts of the light curve, a minimum time can be estimated. The ephemeris of this star was given by Morrison and Conti (1980) as

[+]) Based on observations collected at the European Southern Observatory, La Silla, Chile

$$\text{Pri.Min.} = \text{JDhel.}\ 2443192.4 \underset{\pm 2}{} + 5.9981^{d}.E \underset{\pm 9}{} .$$

Using an additional minimum given by Walker and Marino (1972), we obtained the improved ephemeris

$$\text{Pri.Min.} = \text{JDhel.}\ 2448687.16 \underset{\pm 2}{} + 5.99857^{d}.E \underset{\pm 10}{} .$$

The period is very close to six days, which means, that in subsequent years, the minima are observable from limited geographic longitudes only:

1993: Australia
1994: New Zealand
1997, 1998: South America
2001: South Africa

The comparison and check stars were HD 93131, 93695 and 92740, which match the colours of QZ Car well, and no variability was found. The V light curve resulting from a preliminary reduction of our data is plotted in Fig. 1. Both maxima seem to be of different height. When the light curve is compared with the one

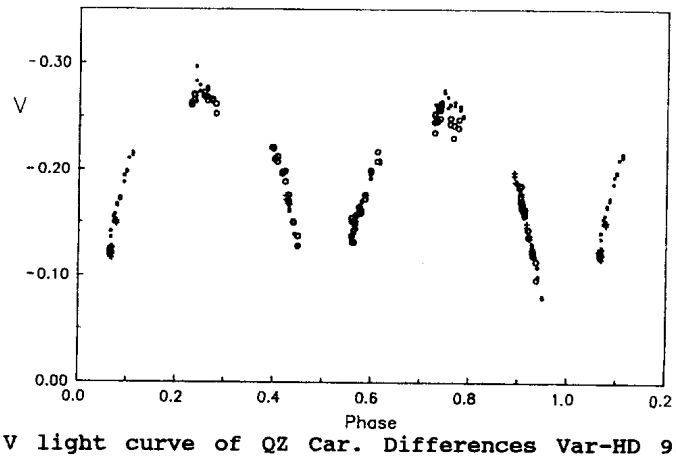

Fig. 1. V light curve of QZ Car. Differences Var-HD 93131 are plotted. Points - data from JD 2448682 to 2448687, open circles - data from JD 2448688 to 2448692, crosses - data from JD 2448749 to 2448753.

of Walker and Marino, the amplitude appears to be smaller than given in the GCVS: the depths of the primary and secondary minima can be estimated to be 0.25^m and 0.20^m, respectively.

V606 Cen (HD 115937, B1-2 Ib-II): the spectral type as given in the GCVS is, however, doubtful due to the short period, which probably excludes a supergiant nature of the star. The only data published so far for this variable is an ephemeris given by Hertzsprung (1950):

$$\text{Pri.Min.} = \text{JDhel. } 2427952.354 + 1.495093^d \cdot E \ .$$

We observed three secondary minima:

JDhel	Error	O - C
2448684.8118	$\pm.0004^d$	$+.0002^d$
687.8020	$\pm.0003$	$+.0002$
690.7916	$\pm.0002$	$-.0004$

The resulting new ephemeris is

$$\text{Pri.Min.} = \text{JDhel. } 2448687.8018 \pm 2 + 1.4950931^d \pm 2 \cdot E \ .$$

The O - C values in the preceding table were calculated using our new ephemeris. The comparison star was HD 116003, check HD 115223. The depths of the secondary minimum are: U: 0.85, B: 0.80, V: 0.80. Due to the particularly difficult period of the star, we were unable to observe the light curve around the primary minimum.

MY Ser (HD 167971, sp. type O8 Ib(f)p according to Walborn, 1972): spectroscopic and photometric evidence exists that this is a multiple system. Lorenz et al. (1991) gave the ephemeris

$$\text{Pri.Min.} = \text{JDhel. } 2446232.612 + 3.32160^d \cdot E$$

(unfortunately there was an error in JD in the above cited paper). Now a new primary minimum was observed at JDhel. $2448753.7130 \pm 0.0010^d$. The comparison and check stars were HD 168112 and BD $-12^\circ 4282$, respectively. Again, some asymmetry in the shape of the minimum is apparent, hence the real error of the

minimum time might be somewhat larger than the formal one. The new ephemeris

$$\text{Pri.Min.} = \text{JDhel.}\ 2446232.6125 \underset{\pm 10}{} + 3.321609^{d}.E \underset{\pm 2}{}$$

has been calculated using times of primary minima only.

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