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AW VIRGINIS: PHOTOELECTRIC TIMES OF MINIMUM AND IMPROVED PERIOD

The variable star AW Virginis (α=13^{h}25^m.0, δ=+03°10'.0; 1950.0) was discovered by Hoffmeister (1935). Jensch (1935) classified this star as a W UMa type system based on the first photographic light curve. He also obtained fourteen times of minimum light and derived the following ephemeris:

$$\text{Min I=J.D.hel.}\,2427871.495+0^d.353998\times E \qquad (1)$$

Whitney (1955) and Koch (1961) published photographic times of minimum light and the first author calculated an orbital period of P=0.3539968 days. More recently, Hoffmann (1983) determined two additional photoelectric times of minimum.

Figure 1 shows the BV light curves obtained in April 1988 at Las Campanas (Chile) with the 60 cm telescope of the David Dunlap Observatory and in March 1989 at the Complejo Astronomico El Leoncito –CASLEO– (San Juan, Argentina). An RCA 1P21 photomultiplier refrigerated by dry ice, and a photon-counting system were used in the first case and the Vatican Observatory photo-polarimeter VATPOL (Magalhães et al., 1984) with two dry-ice cooled RCA 31034 Ga-As photomultipliers were employed in the second.

The measurements were made differentially with respect to a comparison star. No variation in the light of this star was detected. All the observations were corrected for first and second order differential extinction. As the comparison is located very near to the variable the corrections were small. Absolute photometry of the comparison star allowed to determine a V_{max}=10.93 for the variable star.

A total of 608 observations in each BV passband were obtained. These observations well cover the orbital period and show minima of approximately the same depth of $\sim$ 0.7 mag (see Figure 1). From these measurements we determined 17 times of minimum light (9 times of primary minimum and 8 times of secondary minimum) using the bisection-of-chords method. A linear least squares fit to our photometric data yields an updated ephemeris:

$$\begin{aligned}\text{Min I=J.D.hel.}\,2447269.82175 &+ 0^d.35399736\times E \qquad (2)\\ \pm 0.00012 &\quad \pm 0.00000029\end{aligned}$$

We compiled all the previously determined times of minimum as well as those reported is this note. Using a linear least squares solution we derived an improved ephemeris:

$$\begin{aligned}\text{Min I=J.D.hel.}\,2447269.82135 &+ 0^d.353997025\times E \qquad (3)\\ \pm 0.00016 &\quad \pm 0.000000046\end{aligned}$$

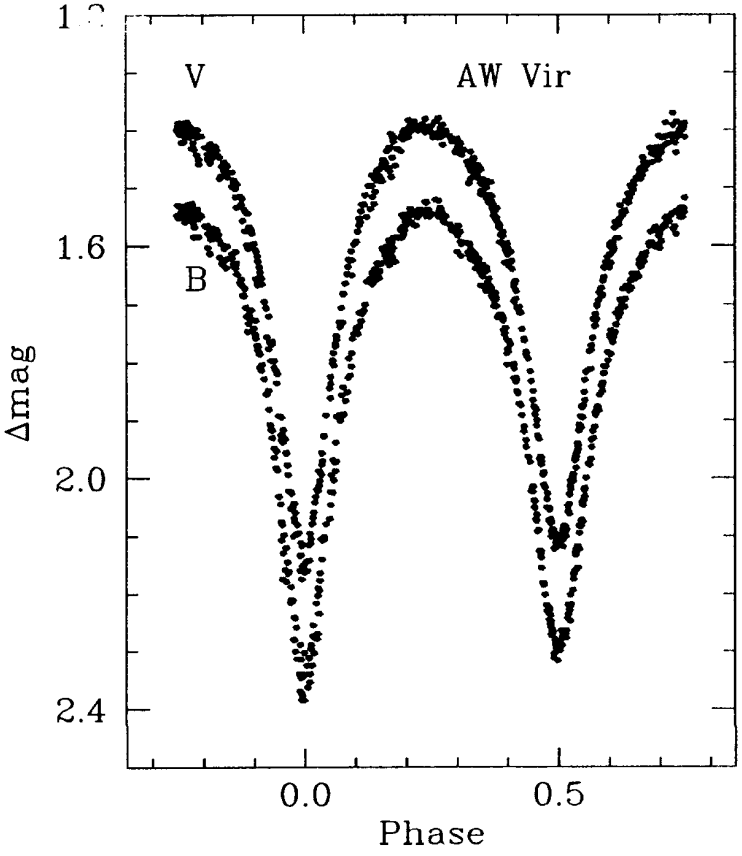

Figure 1

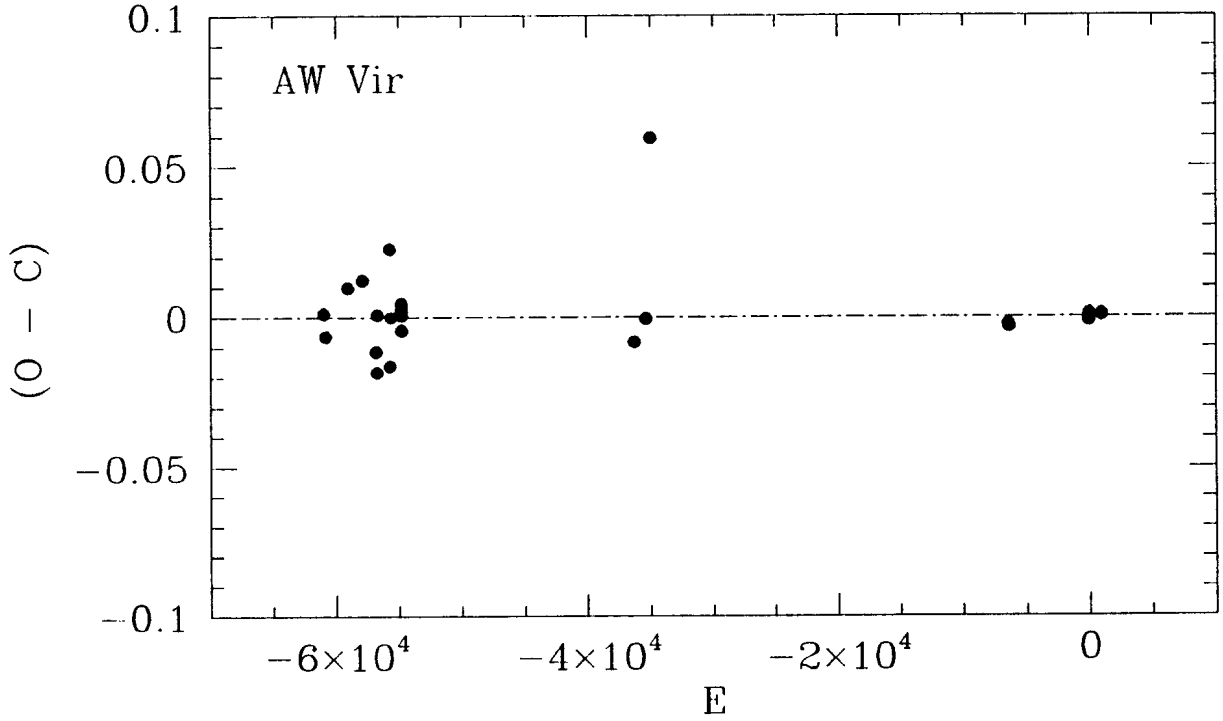

Figure 2

Table 1. Photoelectric times of minimum light of AW Virginis

Min.	JDhel. 2400000.+	E	$(O-C)_{(3)}$	$(O-C)_{(2)}$	reference
II	25680.429	−60987.5	0.001		(1)
I	25735.468	−60832.0	−0.006		(1)
II	26363.652	−59057.5	0.010		(1)
II	26771.459	−57905.5	0.012		(1)
II	27155.522	−56820.5	−0.011		(1)
I	27180.472	−56750.0	−0.018		(1)
I	27191.465	−56719.0	0.001		(1)
I	27539.466	−55736.0	0.023		(1)
II	27543.498	−55724.5	−0.016		(1)
I	27573.427	−55640.0	0.000		(1)
I	27866.541	−54812.0	0.005		(1)
I	27871.493	−54798.0	0.001		(1)
I	27873.619	−54792.0	0.003		(1)
I	27874.674	−54789.0	−0.004		(1)
I	34425.385	−36284.0	−0.008		(2)
I	34750.716	−35365.0	−0.001		(2)
I	34886.711	−34981.0	0.060		(3)
II	45002.645	−6404.5	−0.002		(4)
I	45022.645	−6348.0	−0.003		(4)
I	47257.7843	−34.0	−0.0011	−0.0016	(5)
I	47257.7855	−34.0	0.0001	−0.0003	(5)
II	47259.7330	−28.5	0.0006	0.0001	(5)
II	47259.7331	−28.5	0.0007	0.0003	(5)
II	47259.7332	−28.5	0.0008	0.0004	(5)
I	47268.7593	−3.0	−0.0000	−0.0004	(5)
I	47268.7597	−3.0	0.0004	−0.0000	(5)
II	47269.6447	−0.5	0.0004	−0.0000	(5)
II	47269.6451	−0.5	0.0008	0.0003	(5)
I	47269.8224	0.0	0.0011	0.0006	(5)
I	47269.8224	0.0	0.0011	0.0006	(5)
II	47270.7068	2.5	0.0005	0.0001	(5)
II	47270.7070	2.5	0.0007	0.0003	(5)
II	47270.7064	2.5	0.0001	−0.0003	(5)
I	47615.6770	977.0	0.0006	−0.0002	(5)
I	47615.6773	977.0	0.0009	0.0001	(5)
I	47615.6772	977.0	0.0008	0.0000	(5)

Note: (1) Jensch (1935); (2) Whitney (1955); (3) Koch (1961); (4) Hoffmann; (5) this note.

Table 1 lists all the times of minimum light used to derive equation (3). The columns give: the Julian date corresponding to each minimum, the epoch number, and the (O−C) residuals calculated from equation (3). For the new times of minimum light we included the residuals derived from equation (2). Figure 2 shows the (O−C) vs E diagram corresponding to equation (3). The residuals are, in general, randomly distributed and except for one minimum (Koch, 1961) the amplitude of the dispersion is of ∼0.002 days. According to the precision of the ephemerides the orbital period of the system seems to have remained practically constant over the last ∼50 years. However, additional times of minimum distributed on a longer time base are needed to confirm this preliminary result.

E. LAPASSET and
M. GÓMEZ
Observatorio Astronómico
Universidad Nacional de Córdoba
Laprida 854, 5000 Córdoba
Argentina

References:

Hoffmann, M., 1983, *Inf. Bull. Var. Stars*, No. 2344
Hoffmeister, C., 1935, *Astronomische Nachrichten*, **255**, 401
Jensch, A., 1935, *Astronomische Nachrichten*, **256**, 279
Koch, R. H., 1961, *AJ*, **66**, 35
Magalhães, A. M., Benedetti E., and Roland, E. H., 1984, *PASP*, **96**, 383
Whitney, B. S., 1955, *AJ*, **60**, 453