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LIGHT ELEMENTS OF AG PHOENICIS

The variability of AG Phe=BV 1488=SAO 215098=HD 2320 (A3) was discovered by Strohmeier (I.B.V.S. No. 610, 1972) on sky patrol plates. He describes the star as an EB-type variable showing an amplitude of $0^m.5$ and a deep secondary minimum. From 14 times of minimum light he obtained a period of $1^d.510653$.

The variable (BV 1488) was listed as AG Phe by Kukarkin et al. (GCVS, 2nd Suppl., 1974).

Eggen (A.J. 83, 288, 1978) obtained u,v,b,y,β observations of the system, showing constant light of $V_E=8^m.9$ at maximum, in disagreement with EB characteristics. Also, he found a midsecondary minimum of $V_E= 9^m.4$ suggesting a shift from phase 0.5, or a slightly incorrect period.

In this note I present 7 photoelectric times of minimum light covering 524 cycles derived from about 1000 UBV observations made between September 1978 and August 1979. Of these observations 200 were made with the 154 and 76 cm reflecting telescopes of Bosque Alegre and El Leoncito, respectively in Argentina; and the rest with a 40 cm telescope of Cerro Tololo Observatory in Chile*.

The present photoelectric observations show the existence of a shallow secondary minimum, instead of a deep one, and that therefore the period is half of the value previously derived by Strohmeier.

Individual minima are listed in Table I. The standard errors given in parentheses were determined from the light curves on each pass-band. A least squares linear ephemeris using the mean values of the minima in the UBV bands, gives

$$\text{Min I} = \text{JDHel } 2444170.79481 + 0^d.75533809 \cdot E \qquad (1)$$
$$\pm.00018 \quad \pm.00000059$$

Table I .Individual times of Minima

JDHel 2440000+		
V	B	U
3778.7749(04)	3778.7745(03)	3778.7756(03)
3781.7957(03)	3781.7954(04)	3781.7956(09)
3902.6494(03)	3902.6487(03)	3902.6483(10)
4170.7951(08)	4170.7949(04)	4170.7948(03)
4171.5509(03)	4171.5507(07)	4171.5501(03)
4173.8161(04)	4173.8157(04)	4173.8144(09)
4174.5715(04)	4174.5717(03)	4174.5721(08)

Table II .Photographic and Photoelectric times of Minima

JDHel 2400000+	w	cycles	(O-C)	(O-C)'
38309.365	0.5	-7760.0	0.030	
38315.369	0.5	-7752.0	-0.008	
38318.369	0.5	-7748.0	-0.030	
38340.292	0.5	-7719.0	-0.012	
38614.528	0.5	-7356.0	0.035	
38642.446	0.5	-7319.0	0.005	
38670.374	0.5	-7282.0	-0.015	
38695.340	0.5	-7249.0	0.025	
39053.350	0.5	-6775.0	0.003	
39361.490	0.5	-6367.0	-0.073	
39383.418	0.5	-6338.0	-0.014	
40415.233	0.5	-4972.0	0.002	
40526.302	0.5	-4825.0	0.036	
40823.093	0.5	-4432.0	-0.023	
43778.77502(49)	1.5	- 519.0	0.0024	0.0007
43781.79559(14)	1.8	- 515.0	0.0015	-0.0001
43902.64902(37)	1.6	- 355.0	0.0001	-0.0008
44170.79486(09)	1.9	0.0	-0.0008	0.0000
44171.55052(39)	1.6	1.0	-0.0005	0.0004
44173.81577(47)	1.5	4.0	-0.0012	-0.0004
44174.57167(16)	1.7	5.0	-0.0007	0.0002

The photographic minima given by Strohmeier and the present observations lead to the following ephemeris:

$$\text{Min I} = \text{JDHel } 2444170^{d}.7956 + 0^{d}.7553429 \cdot E \qquad (2)$$
$$\pm .0045 \quad \pm .0000011$$

The data for both ephemeris are listed in Table II; weights $w=0.5$ are given to photographic minima, while $w=0.1\ \ln(1/\sigma)$ to the colour-averaged photoelectric values; (O-C) and (O-C)' are the residuals from (1) and (2), respectively. It is seen that the errors of the photoelectric elements are smaller than the photographic ones. The period including all observations over 16 years is slightly larger than the present value determined from photoelectric data alone. This would indicate that the period

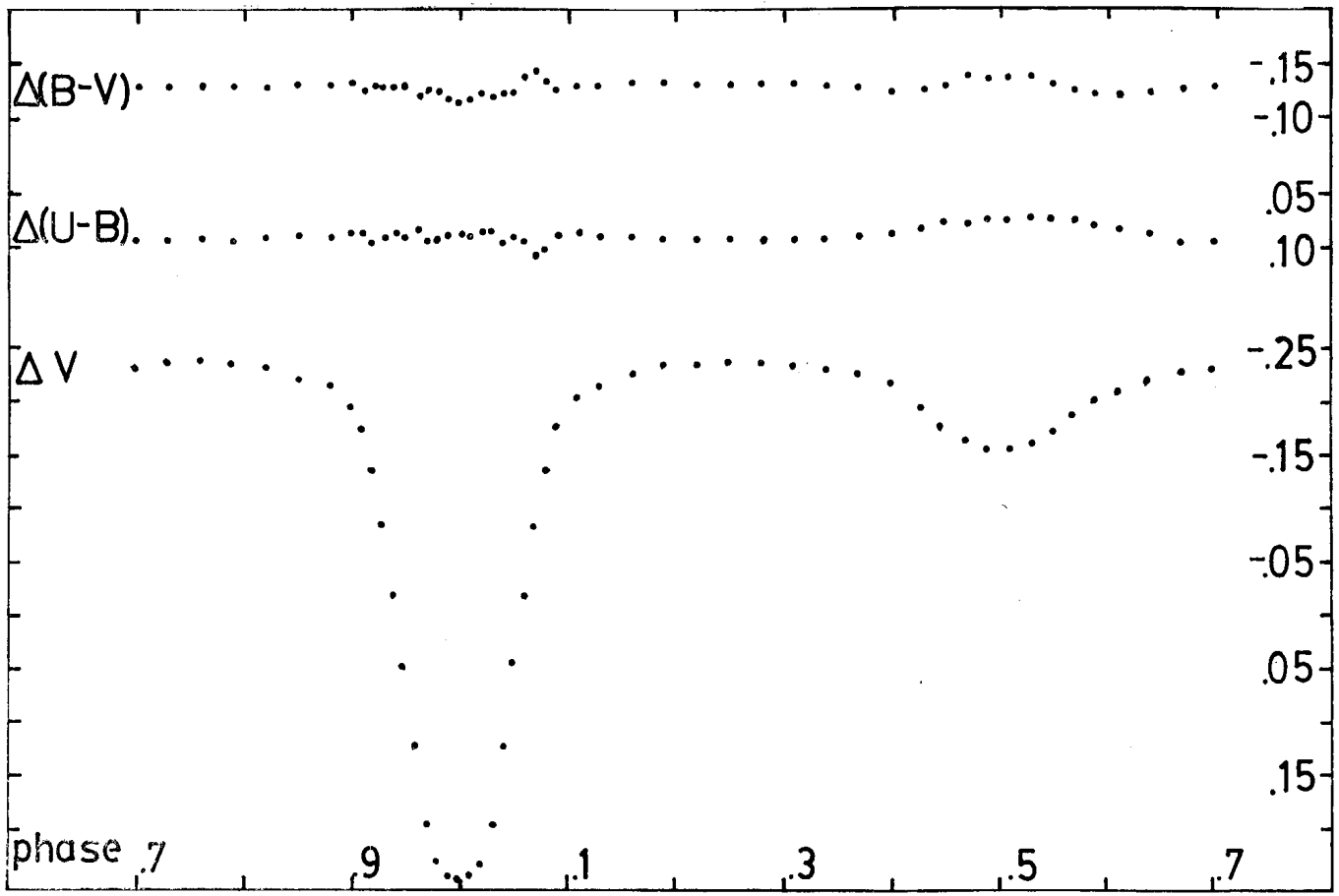

Figure 1. Mean light and colour curves of AG Phe.

is decreasing at a ratio of about 2.6×10^{-2} sec/year. However photographic residuals are very large, therefore more photoelectric observations are needed in order to establish the period-decrease.

The light curves (Figure 1) show partial eclipses with minima fairly different in depth, the amplitude of the symmetrical primary minimum is $0^m.49$, while that of the secondary is $0^m.08$, displaying its descending branch steeper than the ascending one. The secondary eclipse is centered around phase 0.5, but due to its asymmetry and shallowness small eccentricities are not excluded. The light and colours outside eclipses are almost constant.

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