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THE STELLAR SYSTEM AW Cam

The star AW Cam, originally named BV 412, was discovered as a variable star by Strohmeier, Knigge and Ott (1963). The Cracovian Annual for 1992 describes it as a 8.0 magnitude star, with minima of amplitude $0^m.35$ and $0^m.06$ respectively.

Photometrically and spectroscopically it is considered that the principal minimum is a transit. The spectral classes of the two components are A0V and F2. The bigger star is also the hotter.

The Seventh Catalogue of the Orbital Elements of Spectroscopic Binary Systems presents its orbit as an elliptical one with:

$$\omega = 10^\circ \text{ and } e = 0.12.$$

This star was introduced in our observational program because until now the light curve determination has been very poor and the elements computed are not very accurate.

Our observations are performed at Bucharest Observatory with a 50cm Cassegrain telescope using an EMI 9502B photomultiplier. The numbers of the observational points are 371 in U, 372 in B and 403 in V filters respectively.

Using the ephemeris:

$$P = 2438738^d.4522 + 0^d.7713468 \times E$$

two minima were calculated. The O−C values obtained are respectively:

Julian Date	O−C	Min	Filter
2445408.2819	−0.0061	I	V
2447972.2460	+0.0013	I	V

We used a Wood model for the determination of the elements the system. Because the observational scatter is large, we have used an "alternate directions" method for light curve solution with six steps in computation. In the first two steps, we try to obtain solutions using two different routes to perform the differential corrections on the mathematical hypersurface

$$(i, \omega, e, a_1, k, u_2, T_2)$$

of the solution:

$$[(i, a_1, k, T_2)o(\omega, e)] \text{ and } [(\omega, e)o(i, a_1, k, T_2)],$$

respectively, for calculating the influence of the pair (ω, e). The values obtained by two different routes are partly different from those given by Batten et al. (1978).

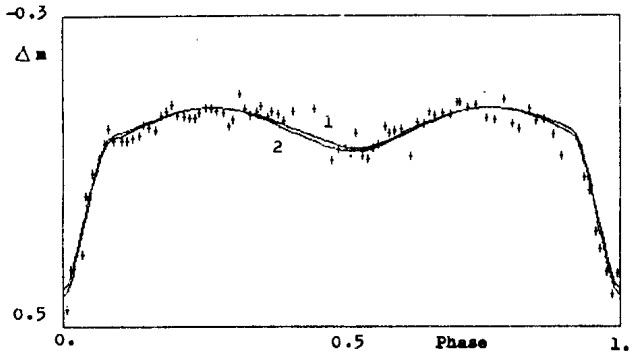

Figure 1. AW Cam B filter; lines–model 1, 2; pluses–obs. points

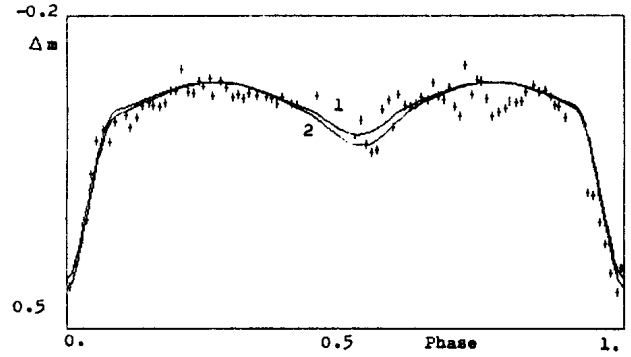

Figure 2. AW Cam V filter; lines–model 1, 2; pluses– obs. points

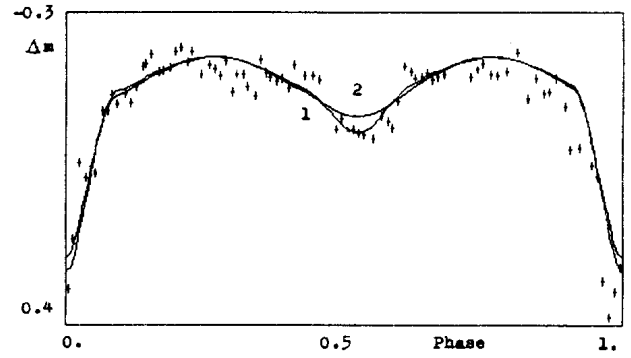

Figure 3. AW Cam U filter; lines– model 1, 2; pluses–obs. points

The next steps were taken by an alternation of

$$[(u_2, T_2), (i, a_1, k, T_2)] \text{ calculations.}$$

During this process two "relative minima" were found, with practically the same $\Sigma\ (\ O-C\ )^{\ 2}\ =\ 0.05$ values. The larger scatter of the observed light curve does not permit us to discriminate better between these two solutions. The results for the two minima in B filter are:

ELEMENT	SOLUTION 1 B	SOLUTION 2 B
i	78.3	78.2
esinω	0.071	0.095
ecosω	0.040	0.046
u_1	0.6	0.6
u_2	0.3	0.28
a_1	0.36	0.376
k	0.55	0.537
β_1	0.25	0.25
β_2	0.25	0.25
T_1	9520	9520
T_2	5030	4687
q	0.5	0.5
$\Sigma(O-C)^2$	0.053	0.052

The observational UBV data will be published in Romanian Astronomical Journal.

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