

A STUDY OF THE ALGOL-TYPE BINARY AS VELORUM
USING STRONGREN FOUR-COLOUR PHOTOMETRY

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RESUMEN:Presentamos un estudio fotométrico del sistema binario eclipsante AS Velorum basado en observaciones realizadas en el European Southern Observatory (La Silla, Chile).

ABSTRACT:We present a photometric study of the eclipsing binary AS Vel based on observations made at the European Southern Observatory (La Silla, Chile).

Key words: PHOTOMETRY — STARS-BINARY

OBSERVATIONS AND PHOTOMETRIC ANALYSIS

AS Vel (HD 71872, A3 V; P=1.6 days) is an eclipsing binary system classified as Algol-type for which no photoelectric light curves have been published. We performed photometric observations during years 1985 and 1987, with the 50 cm Danish telescope at La Silla (Chile), equipped with a six-channel spectrophotometer. In total we obtained 566 observations in each colour for AS Vel including several times of minima from which new ephemeris (2446144.54206 + 1.5578850 E) were calculated. A detailed description of the observations and the complete light curves will be published elsewhere.

Taking into account the former clasification of the star as Algol-type, favored by the shape of the light curves, we decided to use the Wilson-Devinney (1971 and updates to 1983) code. Runs were made initially in mode 5, forcing the cool component to fill its Roche lobe. The effective temperature of the hotter component, T_A , was calculated from standard colour indices. Different solutions for 11 values of the mass ratio, q, ranging from 0.08 to 0.5 were performed. For any of them, semi-detached configuration proved to be a local minimum of the function $\Sigma(O-C)$, but systematic deviations could not be removed. The theoretical minima were too sharp, and the model stars not as deformed as to reproduce the observed light variations outside eclipses. No clear trends in the $\Sigma(O-C)$ could be noticed as a function of q.

When a detached configuration was tried another minimum in the $\Sigma(O-C)$ function was found, but much deeper than for the semi-detached configuration. Now a trend was clear in the behaviour of $\Sigma(O-C)$ versus q. Both minima and the light variations outside eclipses are well fitted by the model. Adopted and convergence parameters are given in Table 1.

From this preliminary study, it turns out that AS Vel is, apparently, a detached system, contrary to all expectations based on the appearance of its light curve. This makes the system to be a very valuable one for testing evolutionary models for cool stars in the main sequence, and it is extremely important to get precise spectroscopic data in order to obtain the absolute dimensions.

Table 1. Photometric Elements for AS Velorum (y colour)

	A	x(y)	q	T(K)	Ω	L(y)	r_{pole}	r_{point}	r_{side}	r_{back}	i	q
comp. A	1.0	0.5	1.0	8000.	5.534	0.998	0.198	0.200	0.199	0.200	88° 86	0.45
comp. B	0.5	0.9	0.32	3194.	5.274	0.002	0.112	0.113	0.112	0.113		

REFERENCES

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