UBV PHOTOMETRY OF AW PEGASI

E. DERMAN and O. DEMIRCAN

Ankara University Observatory and Department of Astronomy, Science Faculty, Tandogan, Ankara, Turkey

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Abstract. New UBV observations of the classical Algol system AW Peg were presented. The photometric minima times were collected and used together with the new determinations in a period study. No sign of any period change was found from observations covering more than sixty years. The B and V light curves are analyzed by means of the Wilson–Devinney approach. It was verified that the system is semi-detached with a Roche lobe filling secondary.

1. Introduction

The photometric observations of AW Pegasi (HD 207956) have been published by Jacchia (1931), Rügemer (1932), Lukatskaya (1952), Fresa (1966), and Wesselink et al. (1980). Struve (1945) and Slocum (1947) found that different absorption lines give different velocity curves. A3–5V + F5IV spectral types for the more massive (≈ 2.0 M⊙) primary and less massive (≈ 0.32 M⊙) more evolved secondary were found by Hilton and McNamara (1961) who also derived a very low mass ratio (q ≈ 0.16) for the system. Strong Hz wings and cycle-to-cycle variation of the brighter stars radial velocity curve was interpreted in terms of the presence of circumstellar matter (or probably a disc) around hotter star. An analysis of Fresa’s (1966) observations by him and Cester et al. (1978) resulted with almost same elements which are quite different from the elements obtained by Wilson and Mukherjee (1988, hereafter referred to as WM) who used Fresa’s (1966) and Wesselink et al.’s (1980) light curves in their analysis.

We present the new UBV observations in Section 2, a period study in Section 3, photometric analysis of our observations in Section 4. The final section is devoted to a discussion on the system parameters.

2. Observations

New photoelectric observations of AW Peg were made on 103 nights between 1981 and 1989, using the 30 cm Maksutov telescope of Ankara University Observatory. The EMI 6256S and EMI 9789QB response tubes were used before and after 1987, respectively. Differential observations in the sense variable minus comparison (BD + 24° 4486) were obtained in UBV passbands. The constancy of the comparison was occasionally checked during the observations against BD + 24° 4489. ΔV = −0.255 ± 0.029 from 138 measurement ΔB = −0.332 ± 0.024 from 134 measurement ΔU = −0.0356 ± 0.082 from 130 measurement Δ(B − V) = −0.081 ± 0.047 from 132 measurement Δ(U − B) = −0.022 ± 0.081 from 125 measurement were obtained. Differential observations of AW Peg resulted in

complete $U$, $B$, and $V$ light curves (Figure 1) are listed in Table I. The observations are corrected for atmospheric extinction. The new light elements from Section 3 were used for the phase calculation.

Although Hilton and McNamara (1961) noted a total primary eclipse in their own photoelectric observations we could see no sign of totality. WM's analyses verifies that the primary minimum is indeed a partial eclipse. Our observations show (Figure 1) with no doubt a partial primary eclipse. Perhaps AW Peg resembles mass transferring Algol-type binaries RZ Cas (Arganbright et al., 1988), RW Per (Hall, 1969), and U Cep (Hall and Keel, 1977) which have partial eclipses, but occasionally appear to have total eclipses.

![Fig. 1. The light and colour curves of AW Pegasi.](image-url)