COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1880

Konkoly Observatory
Budapest
1980 December 5
HU ISSN 0374-0676

SUPPLEMENTARY OBSERVATIONS OF AR Lac IN 1974

After the detection of radio outbursts in the RS CVn type eclipsing binary AR Lac by Hjellming and Blankenship (1973), there was a concentration of observations on this object in 1974 and the following years. Chambliss (1976) published photoelectric broad band photometry obtained between 1972 and 1974. Weiler (1978) carried out photoelectric spectrophotometry of the H and K and Hα line regions. Previous detailed spectroscopic investigations are available by Sanford (1951), and Naftilan and Drake (1977). Various authors looked succesfully for emission line variability of Hydrogen and Ca II.

This paper reports some results of 131 photoelectric measurements in V, obtained from May 29 to August 7, 1974 (JD 2442197-2442267) and 55 spectra obtained from June 1 to November 7, 1974 (JD 2442200-2442359). The photoelectric measurements have been obtained with the 36 cm Cassegrain telescope of Hoher List Observatory; the spectra have been taken with the Cassegrain spectrograph at the 106 cm telescope of Hoher List Observatory. The spectra cover a range of 3800 Å to 4900 Å with a dispersion of 29 Å/mm.

The photoelectric measurements (Fig.1), plotted and compared with those by Chambliss, fill some of the gaps of this light curve. Of particular interest are the phases 0.72 and 0.47. Hall et al. (1976) claimed a minimum of the suggested RS CVn-wave like distortion in AR Lac at phase 0.72 in 1974. The measurements shown here do not confirm this result. They form a smooth light curve from phase 0.6 to 0.8 showing only the small curvature by the aspect changes of the slightly distorted components. On the other hand, an interpolation between the meas-

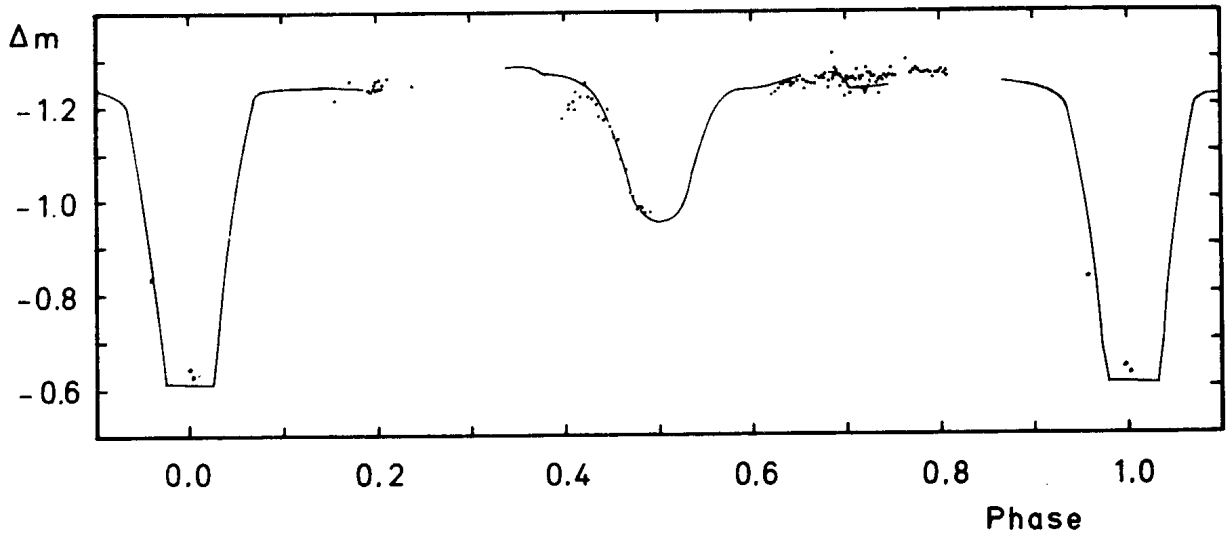

Figure 1.: V observations of AR Lac reduced to the comparison star used by Chambliss (1976). The central line of Chambliss' observations is plotted as solid line.

urements at phases 0.25 and 0.40 favour a lower first maximum of the light curve. Thus the analysis of the wave like distortion in AR Lac should be treated as preliminary for the 1974 entry.

Weiler reported an unusual decrease of the H and K emission line strength at phase 0.47 and interpreted it as eclipse effect of an active region on the secondary. The measurements shown here indicate a depression of the light curve around the first contact of the secondary eclipse. These measurements have been made at JD 2442197 and 2442201, 3.5 months apart from Weiler's observations. At JD 2442205 a spectrogram taken at phase 0.44 shows an unusually weak emission profile of the secondary components Ca II K line (the H line is less suited for such conclusions because of the blending with the Hε line). After phase 0.52 the 1974 light curve is the maximum of the three observation series by Chambliss, leading to an inclined transit minimum. It is suggested that all these phenomena are related to the same origin, indeed most probably the existence and eclipse of an active area on the secondary. This shall not exclude that also the Ca II emitting primary exhibits magnetic activity too.

The spectra, which are well spread over the phases with exception of a gap between $0^p.25$ and $0^p.43$, unfortunately do not show a significantly established variation of individual line strengths between the differently bright maxima or at phase 0.08 when Chambliss' 1974 measurements indicate another depression.

At primary minimum there seems to be a faint emission of Hβ, as found by Naftilan (1975) for RS CVn and duscussed by Naftilan and Drake (1976). This is virtually enhanced at phase 0.03, probably because of a mixture of the first Hβ absorption parts of the other component emerging from eclipse and the weaker Fe line at λ4859.7 Å of the secondary.Blending with Fe lines prevents a conclusion on emission in the Balmer lines of higher order.

M. HOFFMANN

Observatorium Hoher List
5568 Daun / Eifel, BRD

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