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OBSERVATIONS OF SOUTHERN dMe STARS IN 1975 †

In November 1975 (JD 2442721 to JD 2442736) 13 southern red dwarfs have been measured several times each night with the 50cm ESO telescope (La Silla/Chile) and its standard UBV photometer. The aim was to detect small scale BY Dra type variability. Besides the well known dMe star AU Mic two other dMe stars showed a significant variability. For "detectability limit" the following definition has been adopted: For a given night the comparison stars yield an empirical relation photometric error (standard deviation) / magnitude. Variability is then assumed, if the measurements of a programme star vary by more than twice the photometric errors for each single night of comparison stars with comparable brightness.

The dMe stars satisfying this condition are:

1) AU Mic

With the light elements

$$\text{JD } 2442720.75 + 4^{\text{d}}.865 \text{ E}$$

the B and V light curves in Figs. 1 and 2 have been plotted. The period is by Torres and Ferraz Mello (1973). Since their observations of 1971 the V amplitude has dropped from $0^{\text{m}}.30$ to $0^{\text{m}}.12$. The (B-V) amplitude is now $0^{\text{m}}.02$. The shape of the light curve has also changed considerably. The complete rise to the maximum takes only $0^{\text{p}}.20$. Since the magnitude at maximum has slightly decreased and the brightness of the minimum has increased, it can be concluded that the variability causing spots on AU Mic are now spread more uniformly over all longitudes.

† Based on observations made at the European Southern Observatory (La Silla/Chile)

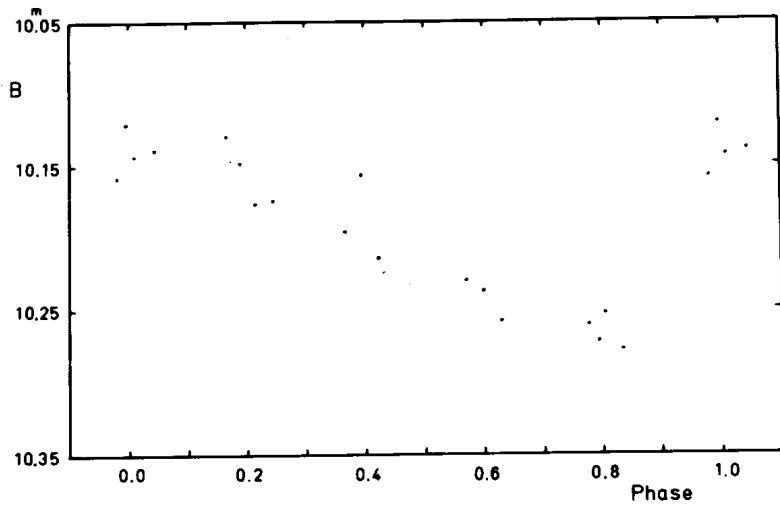


Figure 1 B light curve of AU Mic

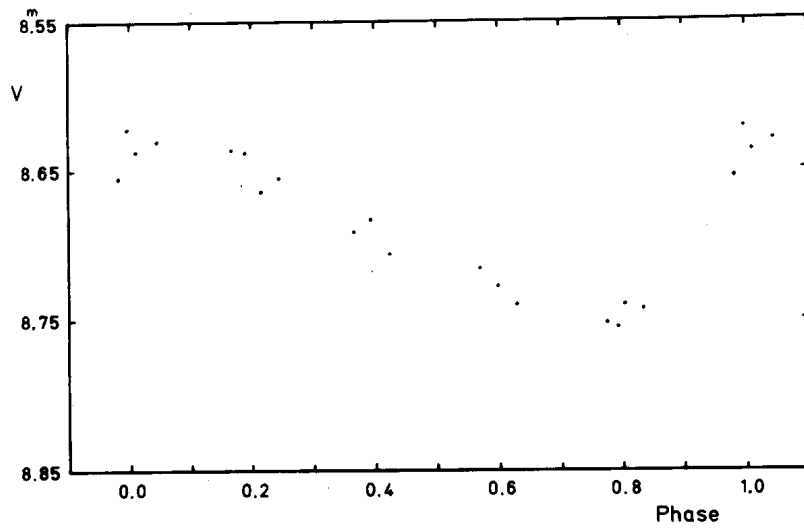


Figure 2 V light curve of AU Mic

2) Gliese 54.1

Although no significant BY Dra syndrome could be detected, this star showed the strongest variability among the programme stars: during one night it exhibited a flare with a B amplitude of at least $0^m.73$. Measurements of that night:

JD hel. 2442733.6222	V	$11^m.911$
.6653		11.725
.6687		11.761
.7131		11.824
.7494		11.895
JD hel. 2442733.6204	B	$13^m.873$
.6636		13.147
.6653		13.239
.7099		13.641
.7131		13.673
.7470		13.747

3) CD-23^o693

Unlike the other programme stars this one shows a sinusoidal brightness modulation of $0^m.015$ amplitude. Although this amplitude is small, it satisfies formally the above mentioned condition, which would set a significance limit at $0^m.010$. The V light curve is shown in Fig. 3.

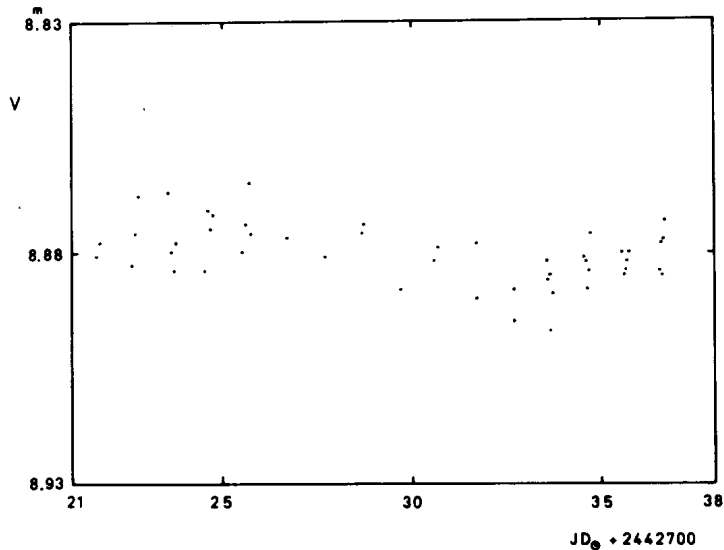


Figure 3 V observations of CD-23^o693

A doubtful case is CD-37^o15492. The 65 observations of this dMe star (the brightest of the programme stars and excellently placed in the sky for observations) form an irregularly variable sequence on a time scale of a few days with

an amplitude of $0^m.15$. Perhaps a longer observing run on this object can reveal a periodicity for this modulation.

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M. HOFFMANN

Observatorium Hoher List
5568 Daun / Eifel, BRD

Reference:

Torres, C. A. O., Ferraz Mello, S., 1973, Astron. Astrophys.
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