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On the misclassification of CK Aquarii *

CK Aqr is classified in the General Catalogue of Variable Stars (1985) (here after GCVS) as a δ Sct star varying from 12.9 to 13.8p. The elements given in the GCVS were obtained by Tsesevich (1964,1969):

$$\text{Min} = \text{HJD } 2437547.319 + 0.12406245 \cdot E$$

The variability of this star was originally discovered by Shapley and Hugues (1935) who gave the same range of variation and period than in the GCVS but with the indication "cluster type" variable.

In the frame of our study of faint δ Sct stars, CK Aqr has been measured in the Johnson photometric system on 1984 October 21,22 and 27 with the 1 meter telescope of Pic du Midi Observatory (France) by J.F. Le Borgne and A. Figer and on 1987 July 2 and 3 with the 1 meter telescope of European Southern Observatory (La Silla, Chile) by E. Poretti. 57 measurements through Johnson U,B and V filters were obtained at Pic du Midi and 176 measurements through Johnson B and V filters at ESO. The resulting light curves are characteristic of a W UMa type eclipsing binary and not of a δ Sct star. The V magnitude varies from 12.86 to 13.47. There is a slight B-V variation from 0.70 to 0.78. Only a mean value of U-B can be obtained from Pic du Midi measurements: 0.08 ± 0.18 .

The analysis of the light curves of the 5 nights allows to calculate the period without ambiguity, especially from the light minimum times given in the table below even if the large gap between the two series of observations does not allow to link Pic du Midi and ESO minima.

Date	Observatory	V minimum (HJD)
21 OCT 1984	Pic du Midi	2445995.368
22 OCT 1984	"	2445996.356
27 OCT 1984	"	2446001.318
02 JUL 1987	ESO	2446979.935:
03 JUL 1987	"	2446980.788
03 JUL 1987	"	2446980.929

List of V and B light minimum times of CK Aqr

The period obtained is 0.2833 ± 0.0002 day. The period given by Tsesevich is an alias of half the value of the true period. The two folded light curves are given in the figure. The V light curve is characterized by minima and maxima at different magnitude: V

* Based on observations collected in part at European Southern Observatory, La Silla, Chile

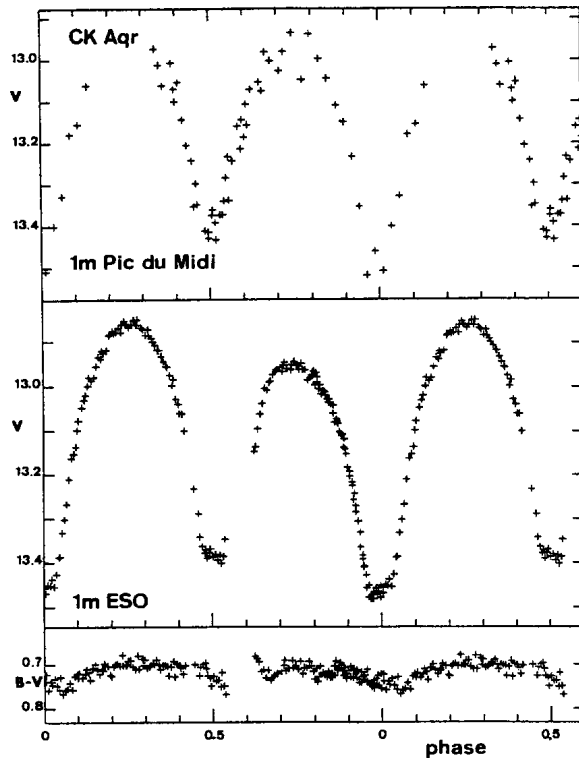


Figure 1

maxima at 12.86 and 12.95, minima at 13.38 and 13.47. Such a light curve is known to characterize binary systems with circumstellar matter. Note also that at the minima the light curve is not perfectly regular and that is why the minima of the B-V curve do not coincide with the V minima but occur during the ascending branches. Moreover, the eclipses may be total. The mean value of B-V, not corrected for interstellar reddening, is in good agreement with Eggen's (1967) period- colour relation. The colours of CK Aqr are compatible with the colours of unreddened G5-G8 stars.

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