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DOUBLE MODE CEPHEID V367 Sct IN OPEN CLUSTER NGC 6649

Some years ago we found for V367 Sct the period $6^d.2930$ and suggested that the scatter on its light curve is caused by secondary period (1). The problem is very important because V367 Sct is the cepheid member of the open cluster NGC 6649 (2).

Our conclusions were disputed by Tammann (3) who obtained the period $5^d.118$ and somewhat peculiar light curve and recently by Madore and van den Bergh(4) who found the period $5^d.2551$ rejecting a number of observations. However, both periods contradict to the 320 photographic observations of V367 Sct which are at our disposal. The plates were obtained during JD 2418529-42303.

Using the photoelectric observations published in (2,3,4) we have searched for secondary period of V367 Sct. Periodicity in the set of residuals relative to a mean curve corresponding to the period $6^d.2930$ (Fig.1a) was searched for, the computer programme X-3a (5) being used. In the interval $1^d.5-10^d$ only two possible periods, $4^d.3802$ and $4^d.3849$, were found. It were the photographic observations that permitted to ascertain that the secondary period is $4^d.3849$. The period ratio 0.696 is close to that for all beat cepheids and we believe that the period $6^d.2930$ is the fundamental one whereas the period $4^d.3849$ corresponds to the first overtone. The photoelectric light curves (Figs.1b and 1c) were derived by Stobie's iterative technique (6).

The star has the longest period among double mode cepheids and it is the only beat cepheid in open clusters. The membership of V367 Sct in a young cluster and its position in the colour-magnitude diagram indicate that beat cepheids are classical ones. The star is, however not essentially brighter than cluster main sequence stars as cepheids usually do. The Fig. 1 from (7) indicates the pulsational mass 2 - 2.5 in solar units whereas evolutionary mass of a six-day cepheid is about $6 M_{\odot}$, and the star conforms to period-luminosity and period-age relations for classical cepheids. There is probably some-

thing wrong in determinations of pulsation mass of beat cepheids.

The membership of V367 Sct in a cluster implies the star is a clue to the nature of beat cepheids and deserves exceptional attention.

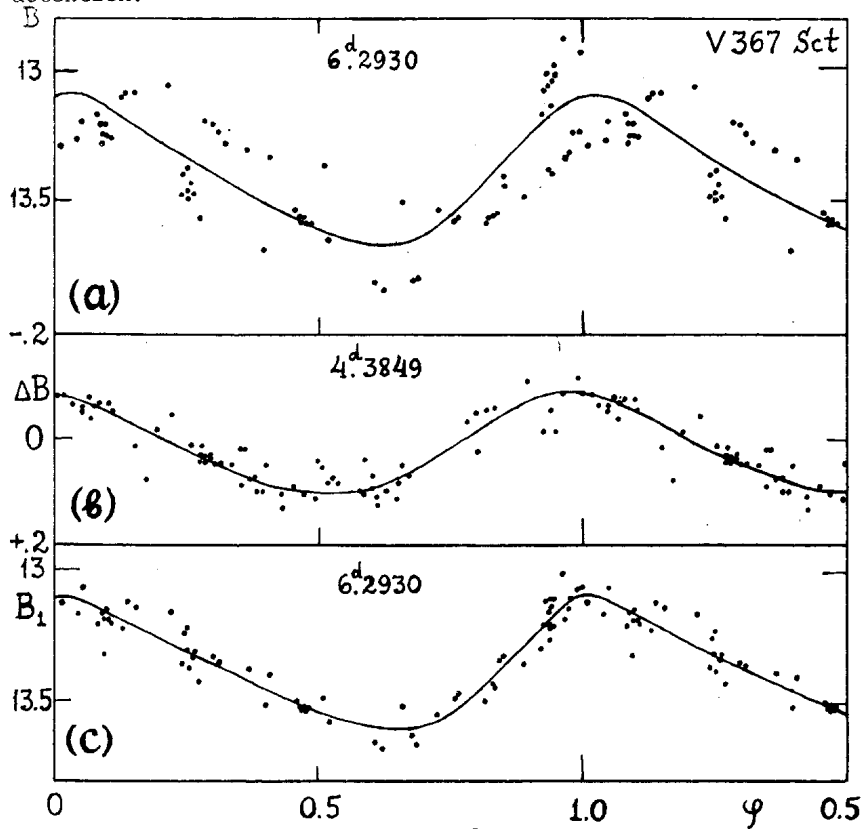


Figure 1

YU.N. EFREMOV

P.N. KHOLOPOV

Sternberg Astronomical Institute, Moscow.

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