

LIGHT CURVES FOR TYPE II CEPHEIDS IN THE GLOBULAR CLUSTERS M3 AND M5

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Type II Cepheids

Type II Cepheids are important as standard candles for old stellar populations and as tests for stellar pulsation theory and stellar evolution theory. We have begun a program of photometry of type II Cepheids in globular clusters to obtain new BVI light curves for these stars. These light curves will be used to reinvestigate the type II Cepheid period-luminosity relation and to study the long term period changes of type II Cepheids. To date data have been obtained for the globular clusters M2, M3, M5, M10, M12, and M13. Here we present results for two long period Cepheids in M5 and one in M3.

Observations

CCD observations were obtained in 2003, 2004, and 2005 using three telescopes:

1. The 60-cm reflector at Michigan State University
2. The 40-cm reflector at Macalester College
3. The 40-cm reflector at Central Michigan University

The data were reduced using Peter Stetson's DAOPHOT program. Photometry was tied to the Johnson B,V and Cousins I systems using local standards within each cluster.

V42 in M5

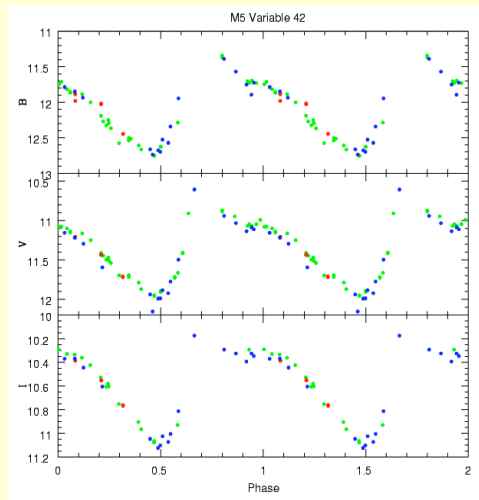


Figure 1. B, V, and I light curves for the 25.72 day period Cepheid V42 in M5. Green points are Michigan State observations, blue points are Macalester College observations, and red points are Central Michigan observations.

V84 in M5

Arp (1955 AJ 60, 1) suggested that alternating cycles of V84 in M5 might show slight differences in light curve shape. Such variations would indicate that V84 was at the transition between type II Cepheid and RV Tauri behavior. Our observations provide some support Arp's suggestion, as indicated in figures 2 and 3 below.

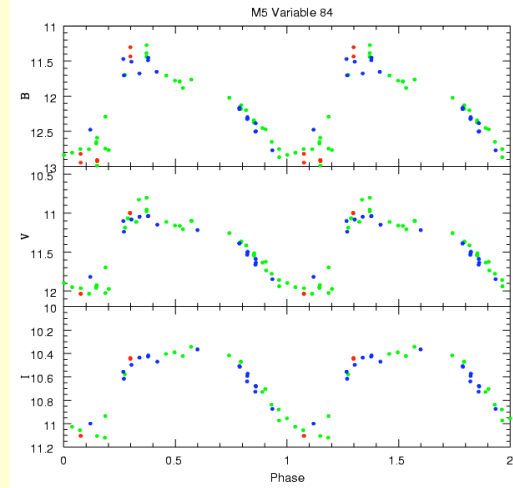


Figure 2. Observations of V84 in M5 plotted with the best single period, 26.97 days. The color key is the same as for Figure 1. Note that V84 is only slightly brighter than M5 V42.

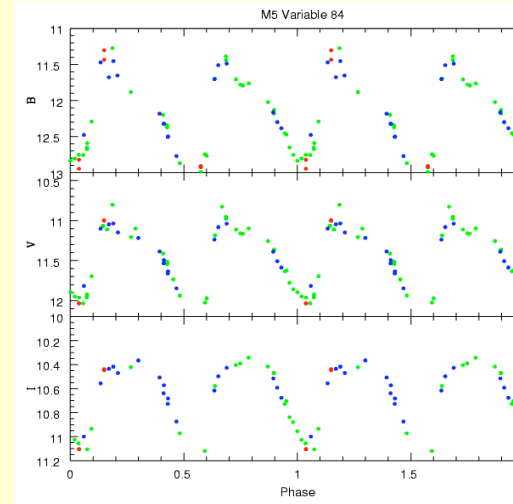


Figure 3. The light curve of V84 plotted with a period of 53.94 days, twice that used in Figure 2. There is some evidence for RV Tauri-like alternating light cycles. Colors are as in Figure 1.

V154 in M3

We have so far completed only preliminary reductions for V154. The V light curve for this 15 day Cepheid is shown in Figure 4. The "plateau" on the declining branch is typical of the light curve shape of many of the longer period type II Cepheids.

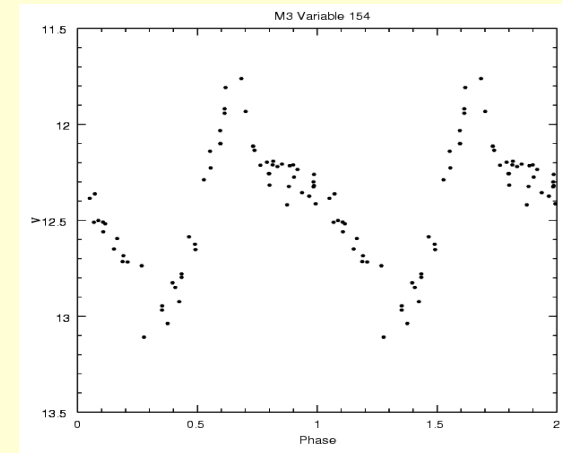


Figure 4. Preliminary V band light curve for V154, plotted with a period of 15.29 days. For M3 variables some problems remain in combining the observations from different sites.

Additional data will be taken in 2006 to augment the light curves of several variables.

Acknowledgements

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