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K1040 - A NEW 4.3 HOUR RED GIANT VARIABLE STAR IN M15

It has been reported that G512, a star located at the top of the red giant branch of the C-M diagram in the globular cluster M4, has light variation with a quasi period of about 66 minutes (Yao Bao-an et al. 1981). We believe that the short-period variation is a common phenomenon among this kind of stars, so other globular clusters are being searched for.

Here we report the variation of another similar star K1040 (Küstner 1921) = S6 (Sandage 1970) in the globular cluster M15.

K1040 is located at the top of the red giant branch too (see Fig.1). The magnitude and colors of this star given by Sandage are V=13.35, B-V=1.21, U-B=0.84. The proper motion study (Cudworth 1976) shows that K1040 is a cluster member (Pc=0.99).

The star was observed by us with the RCA CCD at the Cassegrain focus of the Zeiss 1-m reflector (f/13.3) at the Yunnan Observatory in November 1988. This detector contains 320 X 512 pixels at a scale of 0".47/pixel, thus covering a 2'.5 X 4' field. Two series of 590-second exposures taken in rapid succession over an interval of about 3.4 and 3.7 hours were obtained on 1988 November 12 and 15 (36 yellow, 4 blue). The seeing was between 1".2 and 2".5 (FWHM). The red star K1073 was used as the comparison star, it is constant to at least $<$ 0.01 mag by comparing with other stars within the nights we observed. Because the distance between K1040 and K1073 is only 67" and the difference of the instrumental color index B-V between them is only 0.13 mag, so the differential extinction correction can be neglected. The CCD frames were reduced by DAOPHOT (Stetson 1987) in IRAF which is mounted in the Vax8350 computer of the Yunnan Observatory. Due to the fact that there are several faint nearby stars around K1040, though they are 5 magnitudes fainter than K1040 in brightness, the CCD magnitudes of K1040 are less accurate than that of K1073. The standard error of V(K1073) - V(K1040) is about 0.006 mag.

From the "real time " light curve it can be seen directly that the star has a period value between 0.12 and 0.5 day. In addition, it may have long-term period behavior because the mean magnitude of the star on 12 November is fainter than that on 15 November by 0.014 mag. However, aiming at the short-period variation, the zero point shift of different nights was adjusted by adding a constant and the period was searched for within the range $0^d.12 - 0^d.5$.

The folded light curve got by P=0.1787 day with the peak to peak amplitude about 0.04 mag is given in Fig.2.

Further observations are needed to monitor the possible long-term variation.

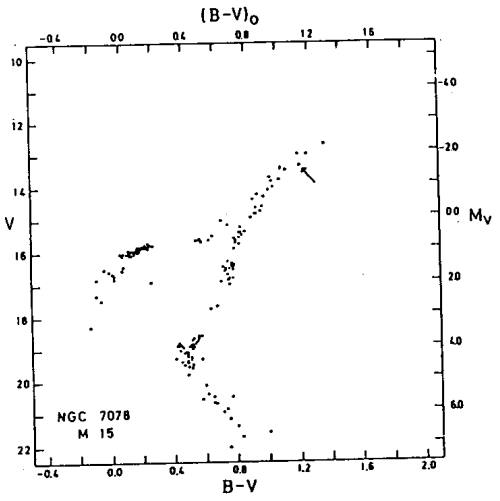

Figure 1

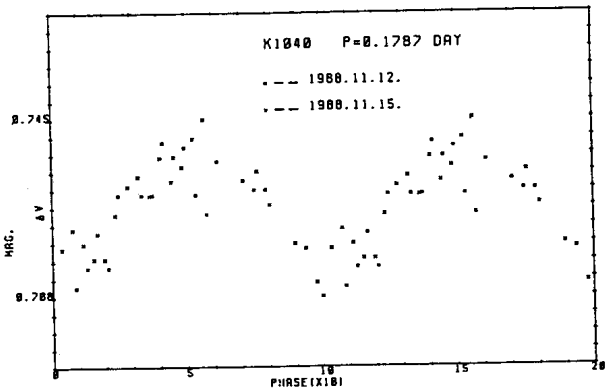

Figure 2

I thank Chen Fu-xiang for help with observing. I am indebted to Lou En-rui for help with running IRAF.

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