

Two new variable stars in the field of the RR Lyrae star MW Lyr

F.-J. HAMBSCH^{1,2}

1) Bundesdeutsche Arbeitsgemeinschaft für Veränderliche Sterne e.V. (BAV), Germany

2) Vereniging Voor Sterrenkunde, Belgium, hamsch @ telenet . be

Abstract: Two new variable stars (HMB04 = USNO A2 1200 09129739 = USNO B1.0 1219-0327636 and HMB05 = USNO A2 1200 09130700 = USNO B1.0 1218-0322538) have been identified in the field of the RR Lyrae type variable MW Lyr. A full light curve for the star HMB04 = USNO A2 0900 02059141 = USNO B1.0 1219-0327636 is presented, which also indicates that this star is an EW variable star. The other star's type and light curve are so far undetermined.

For HMB04 a period $P = 0.23087 \pm 0.00044$ [d] with the epoch $E_0 = \text{JD } 2453930.7448$ and a variation of $\Delta m = 0.8 \pm 0.1$ mag. has been found.

Following the light curve variation of the RR Lyrae star MW Lyr in the constellation Lyra has resulted in several days of CCD observations of the field using a 50 cm f/8.2 Ritchey Chrétien telescope and the STL11000XM CCD camera with a clear filter. The field covered by this CCD is 30×20 arcmin². During inspection of the stars in the field with the program package C-Munipack (**Motl, 2006**) two other stars showing variability were detected. The first star HMB04 = USNO A2 1200 09129739 = USNO B1.0 1219-0327636 (I - Mag. 16.37) in the list is at Right ascension: 18h 18m 40.1s and Declination: +31 57' 39.69". The star has been observed during 3 nights July 14, 18 and 20, 2006. This resulted in 291 CCD observations. No filter was used during the investigation. The image exposure was 60 sec. As comparison star the star GSC2627-1126 was used. Its position and magnitude (based on data from GUIDE8 (**Gray, 2006**)) are:

18h20m06.578s +31 58' 56.17" 0.2" 13.25±0.41 star

The comparison and check stars have been the same as for MW Lyr and since the field of view of the CCD is rather large, those stars are not on the small finder charts given in Fig. 1, 4. The resulting light curve of the star is given in Fig. 1. Relative magnitude differences are given. A very symmetric light curve is visible. The secondary minimum is not as deep as the primary one. The period was found with the period analysis software Peranso 2.11 (**Vanmunster, 2006**). The derived elements for the minima of this star are the following:

$P = 0.23087 \pm 0.00044$ [d] with the epoch $E_0 = \text{JD } 2453930.7448$ and an amplitude of the light variation of $\Delta m = 0.8 \pm 0.1$ mag.

The following minima for this star could be deduced:

Delta Mag.	Type of Minimum	JD	Error
4.93	primary	2453930.7448	0.0016
4.95	primary	2453934.9019	0.0017
4.86	secondary	2453936.8574	0.0015

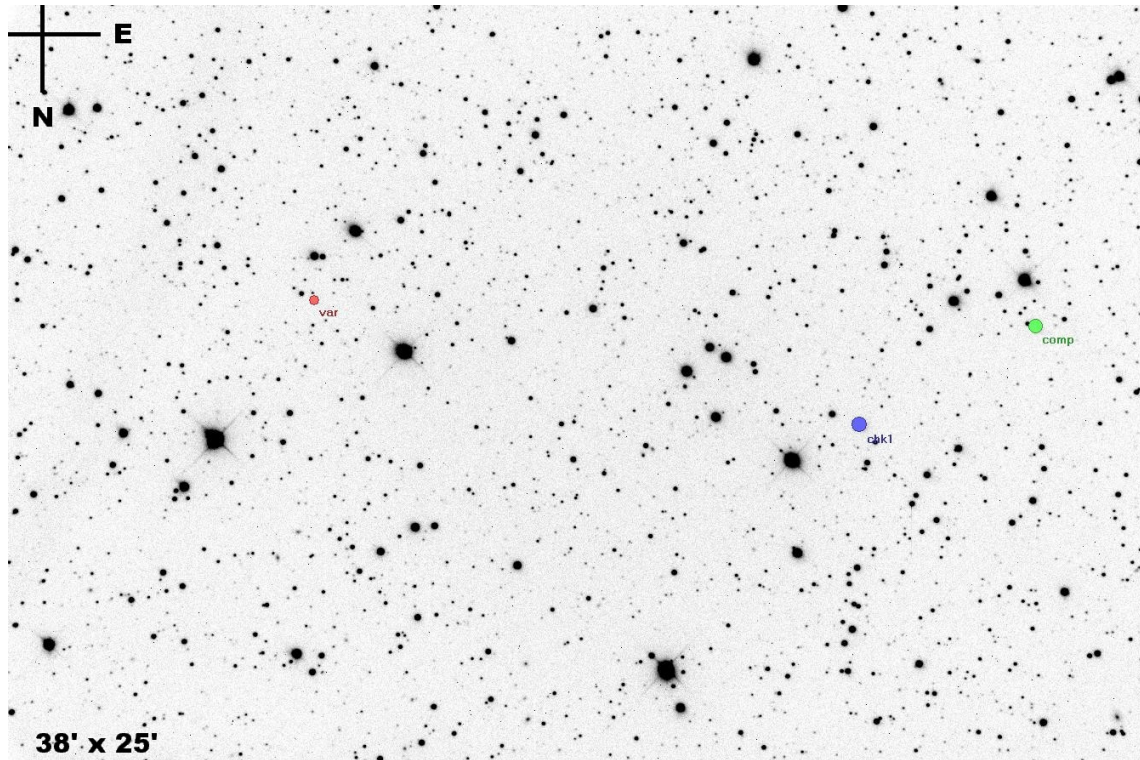


Fig. 1. Finding chart of the star HMB04 = USNO A2 1200 09129739 = USNO B1.0 1219-0327636. The star is indicated by the red circle. Comparison star (green circle) and check star (blue circle) are also given.

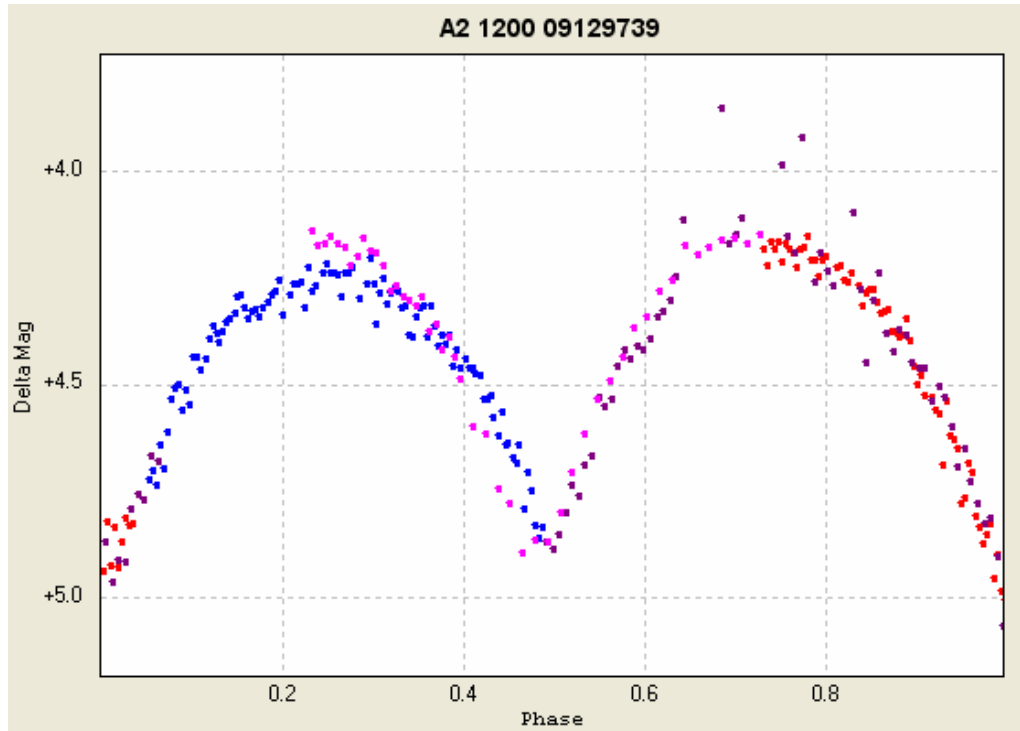


Fig. 2. Phase diagram of the star HMB04 = USNO A2 1200 09129739 = USNO B1.0 1219-0327636. The different colours are the different observing runs covering a period of 3 days.

A second star HMB05 = USNO A2 1200 09130700 = USNO B1.0 1218-0322538 (I-Mag. 16.71) at position Right ascension: 18h 18m 43s and Declination: +31° 48' 55" is also variable. Since the star has been observed only during 2 nights in July (July, 18 and 20, 2006) no information about the type and light curve for this star could be deduced from the measurements. Fig.3 shows the segments of the light curve so far observed and in Fig. 4 the finding chart for HMB05 is given. The star is definitely variable.

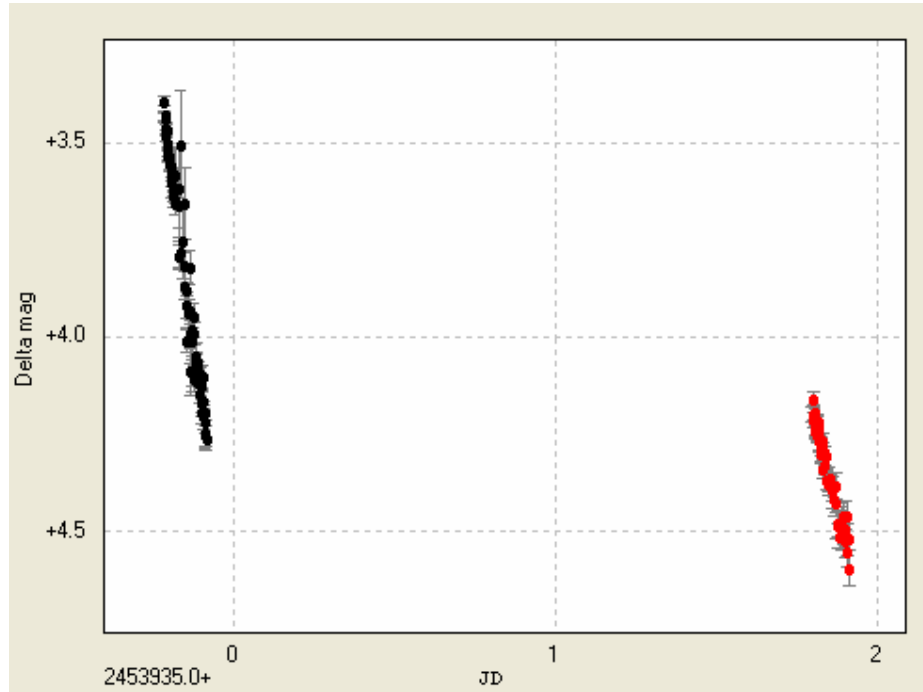


Fig. 3. Observed light curve segments of the star HMB05 = USNO A2 1200 09130700 = USNO B10 1218-0322538. The different colors are for the different observing runs July 18 and 20, 2006.

The International Variable Star Index Database (VSX) of the AAVSO (AAVSO, 2006) has been consulted and checked whether the two mentioned new variable stars are already known. This was not the case.

The following table gives a summary about the information on the newly detected variables:

Name	Magnitude	Delta-Mag.	Epoch (JD)	Period [d]
HMB04	16.4-17.2	0.8 +/- 0.1	2453930.7448	0.23087 +/- 0.00044
HMB05	16.2-17.x	> 1	?	?

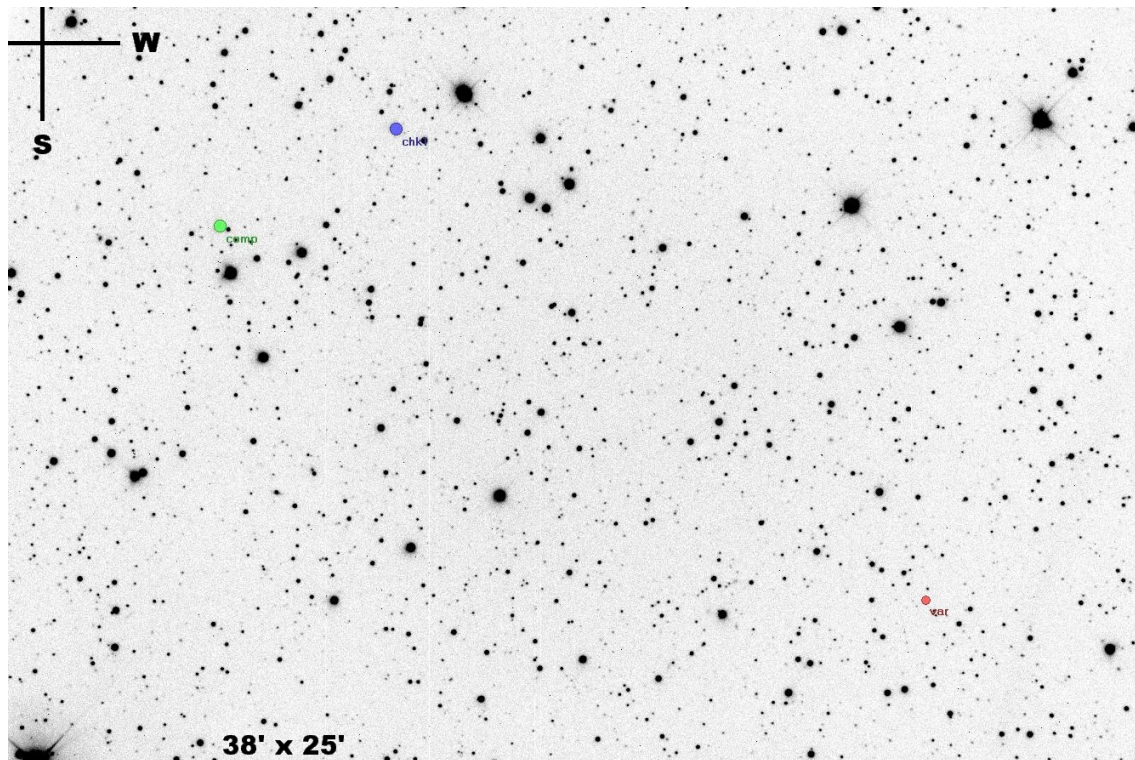


Fig. 4. Finding chart of the star HMB05 = USNO A2 1200 09130700 = USNO B10 1218-0322538. The star is indicated by the red circle. Comparison star (green circle) and check star (blue circle) are also given.

Acknowledgements:

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References:

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