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# HD 112082: A NEW SEMIREGULAR VARIABLE

We report the discovery of the variability of the star HD 112082. The object has been observed as a comparison star for the semiregular variable TU CVn, but turned out to be variable.

Although HD 112082 is a rather bright object ($m_V = 7\overset{m}{.}45$) its variability was unknown. Schild (1973) found a spectral type of M3III while the SAO catalogue gives M0. The General Catalogue of Radial Velocities lists a radial velocity of $-25.6$ km/s. The star has been observed by IRAS. Its [12]$-$[25] colour index of $0\overset{m}{.}11$ indicates that this object has no circumstellar dust.

The observations were obtained by using the Phoenix 10 Robotic Telescope at Mt.Hopkins in spring 1996. The telescope observes in the Johnson $UBV$ system using a diaphragm of $60''$ in diameter. The internal standard error of the data lies below 20 mmag. As check star for our comparison star we used HD 112570, a K0 giant with $m_V = 6\overset{m}{.}12$.

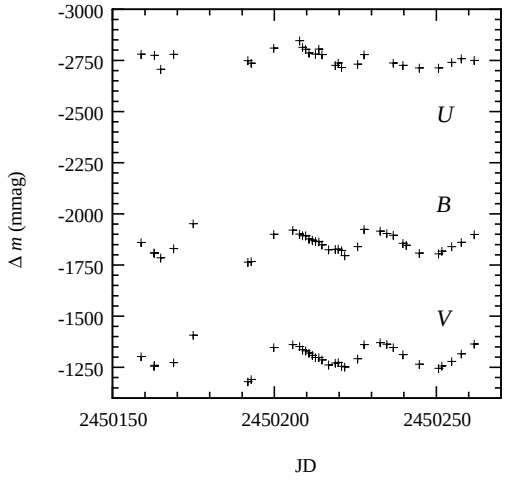


Figure 1. Observed light changes of HD 112082 relative to HD 112570 in Johnson $U$, $B$ and $V$

Without having a second nonvariable star for comparison we can only suspect that HD 112082 is the variable object. The six published values for the $V$ brightness of the K-giant differ by less than $0\overset{m}{.}04$ and in addition, Eggen (1992) found that most of the M-type giants are variable. Thus the variability of HD 112082 seems to be very likely. Due to the absence of an observer at the telescope we had to check the possibility of a misidentification.

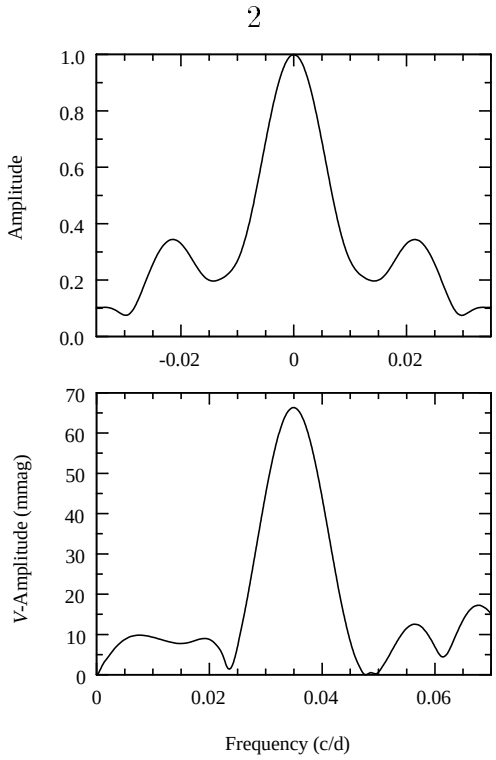


Figure 2. Results of the Fourier analysis of the observational data. The upper plot shows the spectral window, the lower plot the amplitude spectrum

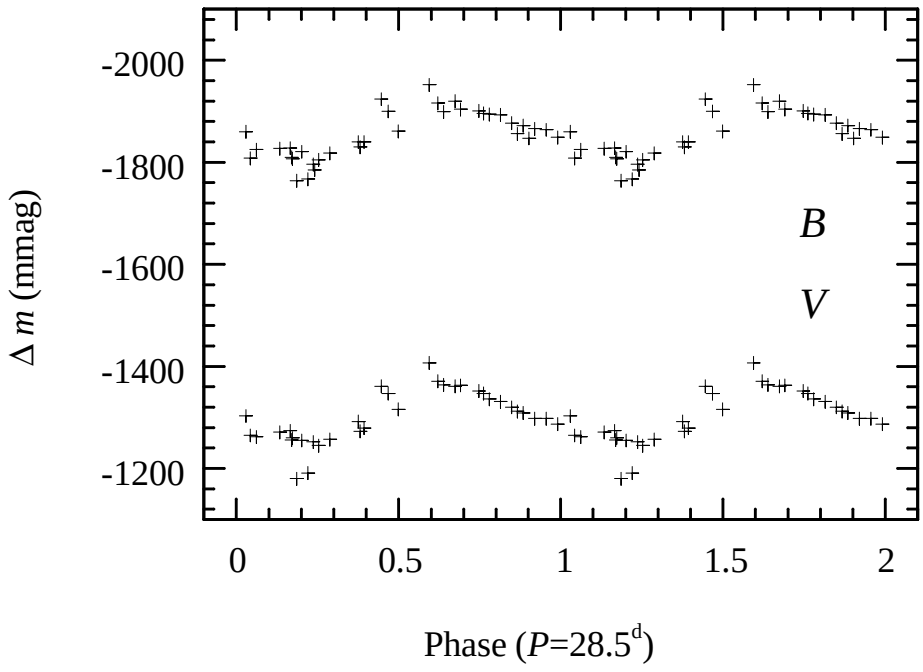


Figure 3. Phase diagram for HD 112082 based on a period of 28.5 days. For a better illustration of the variation the data points have been repeated for a second cycle

Influence by a nearby object or a wrong pointing of the telescope can be excluded: No nearby object is bright enough to disturb the measurement. The measured $B-V$ value of about $1\overset{m}{.}55$ for the variable is typical for early M-type stars and is very close to the data found in the literature (Schild 1973). But there is no M-type star within 1 degree, except the 'original' program star, TU CVn. Therefore we are convinced that the correct star has been observed.

Figure 1 shows the variations measured relative to HD 112570 in $U$, $B$ and $V$. The star varies cyclically with a full amplitude of about $0\overset{m}{.}14$. Two light cycles are well defined, a third one is sampled more sparsely. The light curve shows a strong asymmetry which seems to change after JD 2450250. The $B-V$ color index is changing irregularly only up to about $0\overset{m}{.}02$, and these variations are within the observational errors.

In order to derive a period for the light variations we did a Fourier analysis of the data. The results for the $V$ measurements are plotted in Figure 2. From this analysis we found a period of about 28.5 days. The $B$ data lead to a very similar result. With this period we plotted a phase diagram for the $B$ and $V$ measurements (Figure 3).

We think that HD 112082 is a semiregular variable of type SRb due to its small amplitude although its light changes seem to be rather regular. Using the classification for SRVs defined by Kerschbaum and Hron (1992) we classify this star as 'blue' SRV. This classification is based on the amplitude, the period and the IRAS [12]–[25] color. All these values found for HD 112082 are typical for 'blue' SRVs.

The fact that the variability of such a bright star has not been discovered earlier is very interesting for the investigation of semiregular variables, because it indicates that even samples of bright SRVs are not complete.

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