Variable Stars in the Vicinity of CI Cam

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#	Name	Other	Coord (J2000)	Type	Max	Min	System	Period	Epoch (JD)	type	Sp	Comment	L.Curve	Find.Chart	Data
1		GSC 3723-00104	04 19 45.02, +55 57 36.1	DSCT	12.39	(0.033)	V	0.05063180	2453960.5822	max		[Comm. 1](#)	[lc1.jpg](#)	[map1.jpg](#)	[datafile.txt](#)
2		GSC 3723-00602	04 19 52.42, +56 00 51.8	EW	14.081	14.146	V	0.4657358	2454086.5650	min		[Comm. 2](#)	[lc2.jpg](#)	[map1.jpg](#)	[datafile.txt](#)
3		Var 5	04 19 20.69, +55 58 55.5	LB	14.18	15.00	V			other		[Comm. 3](#)	[lc3.jpg](#)	[map1.jpg](#)	[datafile.txt](#)

Comments:

1. Multimode pulsator. Our frequency analysis of this star was performed using discrete Fourier transform for the time series with an arbitrary data spacing (Deeming, 1975). Goranskij's EFFECT software was used for calculations. First, we cleaned our set for the low-frequency noise (f < 5 cycle/day) to extract the high-frequency components of this star better. The Fourier decomposition and prewhitening procedures were used to clean the noise and extract the periodic components. We estimated the significance levels of the peaks in the amplitude spectra in the empirical way as described by Terebizh (1992). The estimates are based on the statistical study of artificial chaotic series created by mixing original sets, so that each individual time of observation is accompanied with a magnitude accidentally chosen from the same set. The highest peaks in the spectra are accompanied with a pair of lower-amplitude one-day aliases. True pulsation components can be easily extracted because the December 2006 observations continued as long as 12 hours on many nights, so the aliases are essentially depressed. The following six periods were found (the full amplitudes are given): $P(1) = 0.0506318(+/-5)$ day (Ampl=0.0040 mag); $P(2) = 0.0377470(+/-3)$ day (Ampl=0.0023 mag); $P(3) = 0.0314978(+/-2)$ day (Ampl=0.0023 mag); $P(4) = 0.0391142(+/-3)$ day (Ampl=0.0018 mag); $P(5) = 0.0606147(+/-7)$ day (Ampl=0.0018 mag); $P(6) = 0.0396115(+/-4)$ day (Ampl=0.0015 mag). The residual spectrum shows many significant peaks that suggest the presence of other lower-amplitude pulsation components in this star. The predominating wave has a full amplitude of 0.0040 mag. The light elements of this wave are given. The Figure presents both the phased light curve for individual data points and the mean light curve (red circles).

2. Min II = 14.135.

3. Very red. 2MASS 04192075+5558552. The 2MASS magnitudes are the following: J=8.06, H=6.96, K=6.51. This star is mentioned as a variable star of SR+L type in the NSVS list of 8678 red variables by Wozniak et al. (2004) having an R-band magnitude of 12.48, Ampl.(R)=0.546 mag, and a period of 79 days. This period contradicts our data, but no satisfactory period can be found.

Remarks:
Our CCD V-band observations were taken in three seasons of 2005 and 2006 using a MEADE Pictor-416 camera installed in the prime focus of the 50-cm Maksutov telescope of the SAI Crimean Station. The total number of frames is about 3000. The aim of these observations was to study the rapid light variations of the B[e]/X-ray binary CI Cam. The CCD observations were reduced using Goranskij's WinFITS software in the aperture mode, the frames were corrected for bias, dark and flat field. The accuracy of individual photometric measurements is about 0.002-0.003 mag for a 12 mag star and 0.005-0.008 mag for a 14 mag star. The brightest star in this field after CI Cam itself, GSC 3723.104, was first used as a comparison star, but later it was suspected in variability because its low-amplitude short-period variation was found in the light curves of CI Cam and a check star. We remeasured all the frames using another comparison star, GSC 3723.392, marked as #1 in our 7.3' x 5.5' chart. Four stars were selected as check stars, and two more of them were again found to be variable. A check star in the field of the chart is marked #2.

References:
Deeming, T.J., 1975, Astrophys. and Space Sci., 36, 173
Terebizh, V.Yu., 1992, Analysis of Time Series in Astrophysics. Nauka, Moscow
Wozniak, P.R., Williams, S.J., Vestrand, W.T., Gupta, V., 2004, Astron. J. V.128, 2965