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ON THE PERIOD OF GU CANIS MAJORIS

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Variability of GU CMa has been discovered by Claria (1974a) who reported a photoelectric peak-to-peak amplitude of $\Delta V = 0.23$ mag. Spectral type of GU CMa is B2 Vne (Claria, 1974b) and the star was classified as a γ Cas-type variable in the General Catalog of Variable Stars (GCVS-IV). GU CMa is a visual binary (ADS 5713, Δm = 0.7, $\rho = 0.6''$). Finally, a $1^{\rm d}.610137$ period was found from HIPPARCOS photometry (ESA, 1997).

We observed GU CMa in 1987–1998 at Mt. Maydanak within the framework of "ROTOR" programme (Shevchenko, 1989) using the UBVR pulse counting photometer attached to a 0.48-m reflector. BD $-10°1734$ (V = 7.875, U−B = −0.511, B−V = −0.053, $\rm V-R_c = -0.021$) was used as a comparison star. We obtained a total of 320 individual UBVR measurements during 12 observing seasons; the accuracy of the individual data is about 0.01 mag in all filters. We usually did not observe the star more than once per night, however, we monitored it four times during several hours in 1998 and detected no short-term variability.

We have derived two periods with equal probability from our data: 1.610158 (Fig. 1) and 0.80508 (Fig. 2) days.

The light curve shown in Fig. 1 is typical for binary systems consisting of two stars with nearly equal radii and effective temperatures. However, a preliminary analysis of 0.7 Å resolution spectra of GU CMa taken in 1991 with the 6-m SAO RAS telescope revealed no traces of the secondary. Thus radial velocities of He I lines, which are clearly discernible in all spectrograms, should exhibit variations with an amplitude of ±300–400 km/s, however, according to our spectroscopic data the actual amplitude does not exceed ±30 km/s, i.e., 10–15 times smaller than expected for a binary consisting of two components of equal mass $\sim 5 \div 10\,M_\odot$.

The above upper limit implies that the mass of the secondary is at least 5 times smaller than that of the primary, and therefore the short period should be preferred (see Fig. 2). Thus the new light elements are:

$$\text{Min JD}_{\rm hel} = 2447078.115 + 0^{\rm d}.80508 \times E.$$

The scatter of data points on the light curve is too high to be accounted for by observational errors. It may be due to irregular variability of the secondary.

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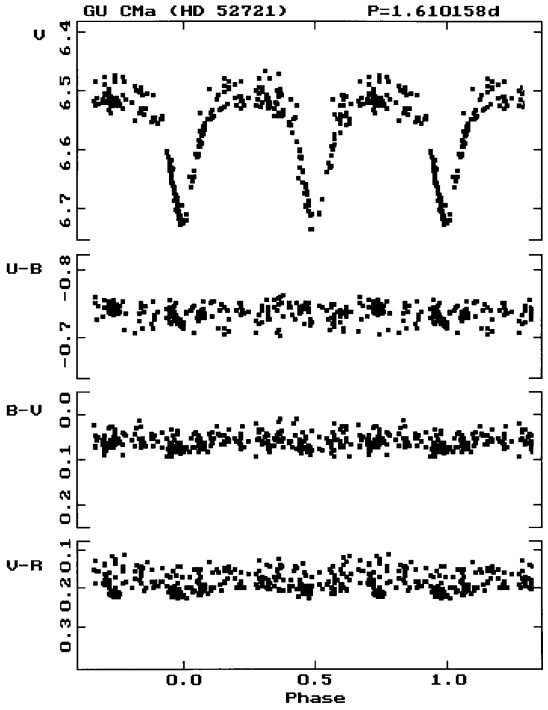

Figure 1.

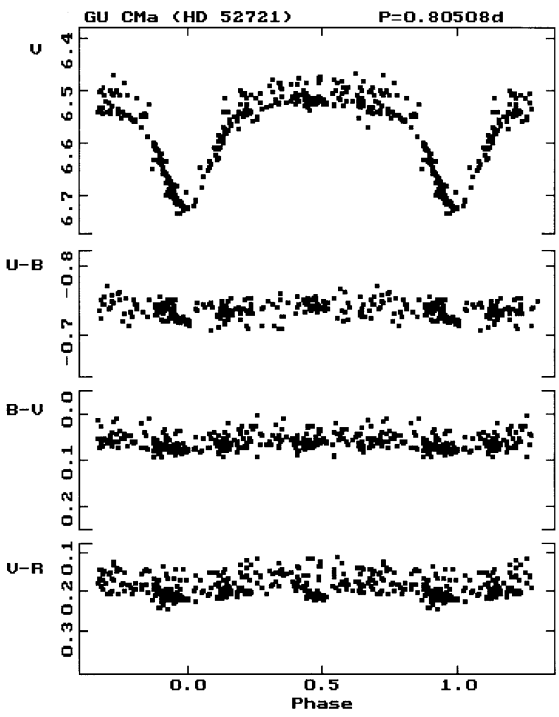

Figure 2.

References:

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