

COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS
Number 3839

Konkoly Observatory
Budapest
9 February 1993
HU ISSN 0324 - 0676

NEW PROBABLE ECLIPSING BINARY GSC 1383_600

On December 28-29, 1992, I observed minor planet (4179) Toutatis. The observations were done with 0.18-m, f/5.6 Maksutov and SBIG ST-6 CCD-camera; eleven R and eight V images were taken, each exposure 2 minutes long. Already during the observations I noticed that one 11-magnitude star in the field of view changed its brightness by about 0.6 mag in the course of observing session. The variable star is GSC 1383_600. Observing conditions on December 28-29 were not fully photometric (cirrus clouds interference in a part of the night), so two additional (V and R) images were taken on the photometric night of January 2, 1993, to assure absolute photometric calibration of the images. Results of photometric reduction of the images are presented in Table 1 and a sparse composite lightcurve is shown in Figure 1.

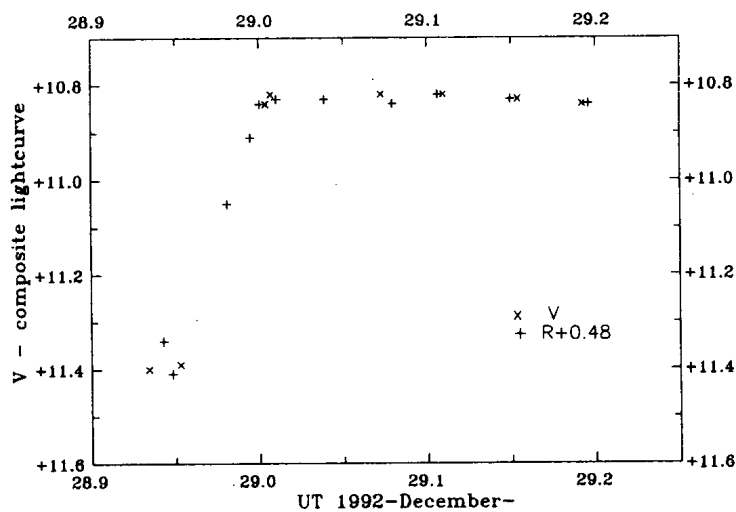


Figure 1: Composite lightcurve of the variable star GSC 1383_600 on December 28-29, 1992. R-points were shifted by +0.48 to meet V-points.

Table 1: V and R magnitudes of the variable star GSC 1383.600.

| UT | $JD - 2448000$ | V | R |
|-------------------|----------------|------------------|------------------|
| 1992 Dec. 28.9343 | 985.4343 | 11.40 ± 0.03 | - |
| 28.9430 | 985.4430 | - | 10.86 ± 0.03 |
| 28.9481 | 985.4481 | - | 10.93 ± 0.03 |
| 28.9530 | 985.4530 | 11.39 ± 0.03 | - |
| 28.9808 | 985.4808 | - | 10.57 ± 0.03 |
| 28.9950 | 985.4950 | - | 10.43 ± 0.03 |
| 29.0006 | 985.5006 | - | 10.36 ± 0.02 |
| 29.0041 | 985.5041 | 10.84 ± 0.03 | - |
| 29.0071 | 985.5071 | 10.82 ± 0.03 | - |
| 29.0105 | 985.5105 | - | 10.35 ± 0.02 |
| 29.0389 | 985.5389 | - | 10.35 ± 0.02 |
| 29.0725 | 985.5725 | 10.82 ± 0.02 | - |
| 29.0794 | 985.5794 | - | 10.36 ± 0.02 |
| 29.1061 | 985.6061 | - | 10.34 ± 0.02 |
| 29.1095 | 985.6095 | 10.82 ± 0.03 | - |
| 29.1494 | 985.6494 | - | 10.35 ± 0.02 |
| 29.1538 | 985.6538 | 10.83 ± 0.02 | - |
| 29.1919 | 985.6919 | 10.84 ± 0.02 | - |
| 29.1957 | 985.6957 | - | 10.36 ± 0.02 |
| 1993 Jan. 02.0345 | 989.5345 | 10.84 ± 0.02 | - |
| 02.0369 | 989.5369 | - | 10.38 ± 0.02 |

Mean V-R is 0.48 ± 0.01 , no significant color change was detected. There is no variable star at that position listed in the fourth edition of GCVS (Kholopov *et al.*, 1985). The shape of the lightcurve suggests that the variable star is an eclipsing binary. An amplitude of the brightness change is 0.57 mag in V (10.83 – 11.40). The brightness is nearly constant during its minimum for at least 27 minutes, and there is rather steep rising branch with maximal duration of 68 minutes (lower limit of the mean rate is 0.50 mag/hour).

There is a convenient comparison star for photoelectric and other photometry, GSC 1383.1005, which is located at distance of 99 arcsec approximately in SSE direction. Positions (from GSC, 1989) and photometric parameters (measured, errors 0.01-0.02) of both stars are listed in Table 2. One of the R-images (taken on January 2, 1993) is reproduced in Figure 2.

Table 2: The variable star and convenient comparison star.

| Star | R.A. (2000) | Decl.(2000) | V | V-R |
|---------------|--|------------------------|-------------|-----|
| GSC 1383.600 | $08^{\text{h}}29^{\text{m}}39.36^{\text{s}}$ | $+17^{\circ}17'01.8''$ | 10.83–11.40 | 0.4 |
| GSC 1383.1005 | $08^{\text{h}}29^{\text{m}}43.00^{\text{s}}$ | $+17^{\circ}15'38.1''$ | 11.34 | 0.2 |

I conclude that GSC 1383.600 is probably an eclipsing binary with an amplitude of $0.57 (\pm 0.02)$ mag and maximal brightness corresponding to 10.83 (± 0.01) mag in V-band. Further studies could confirm the type of variability suggested, determine a period and find a detailed lightcurve.

The author is grateful to Dalibor Hanžl for his valuable help.

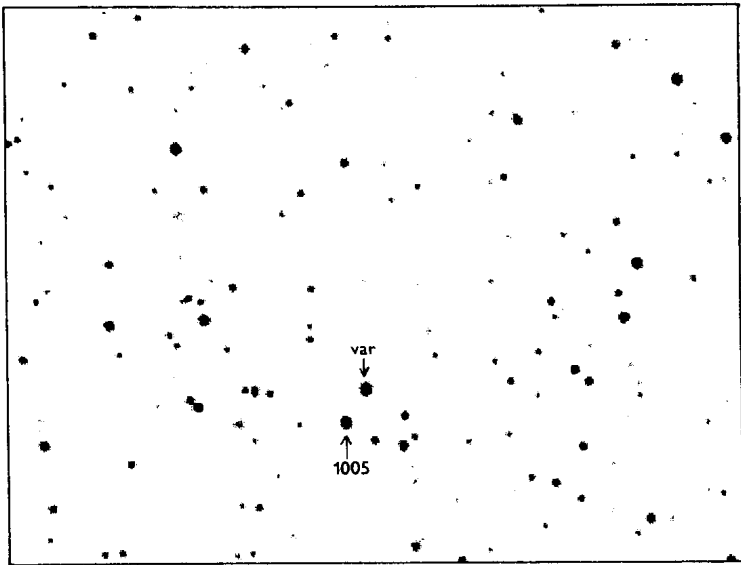


Figure 2: R-image of the field of the variable star GSC 1383_600, taken on January 2, 1993. The size of the area imaged is 31×23 arcmin², north is up. The star GSC 1383_1005 is also marked.

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References:

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