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NEW PERIOD FOR GS Cep

The eclipsing binary GS Cep (BD +57°2885) has been observed photoelectrically at the N. Copernicus Observatory and Planetarium in Brno with a 40 cm reflector. As already noted by Hanžl (1990), most of the minima as predicted by the ephemeris given in GCVS (Pri.Min. = HJD 2426350.375 + $0^d.772002 \cdot E$ did not appear. It was only possible to satisfy the measurements from the years 1988 and 1989 with a different period, the preliminary value of which was $1^d.47162$ [please note that the date in Hanžl (1990), Table II, should read 715 instead of 716]. In order to check the new period, recent measurements have been done during this year in V and B colours (by D.H.). The results obtained are given in Table 1 (where also the times of minima as reported by Hanžl (1990) are repeated). A new ephemeris was calculated using LSM:

$$\text{Pri.Min.} = \text{HJD } 2447414.4350 \pm 28 + 1^d.471625 \pm 6 \cdot E$$

Table 1

Photoelectric Data

Time of minimum HJD 2440000+	Filter	Epoch	O - C
7414.4346	V	0	-.0004
.4346	B		-.0004
.4359	U		+.0009
7776.4546	V	246	-.0002
.4539	B		-.0009
8060.4838	V	439	+.0054
.4845	B		+.0061
8085.4936	V	456	-.0024
.4936	B		-.0024
8088.4365	V	458	-.0027
.4358	B		-.0034
8102.4205	V	467.5	+.0008
.4198	B		+.0001

Table 2

Sonneberg Plates

HJD 2400000+	Epoch	O-C	HJD 2400000+	Epoch	O-C
38242.524	-6232.5	-.007	41593.454	-3955.5	.032
38371.271	-6145.0	-.029	41596.385	-3953.5	.019
38410.297	-6118.5	-.001	41604.449	-3948.0	-.011
38557.507	-6018.5	.047	42306.408	-3471.0	-.017
38579.531	-6003.5	-.003	42359.363	-3435.0	-.040
38649.375	-5956.0	-.062	42601.506	-3270.5	.021
38813.272	-5844.5	-.240	42713.362	-3194.5	.033
39025.441	-5700.5	.004	42807.268	-3130.5	-.244
39053.389	-5681.5	-.009	42988.506	-3007.5	-.017
39059.378	-5677.5	.094	43008.394	-2994.0	.004
39063.395	-5674.5	-.303	43016.490	-2988.5	.006
39145.368	-5619.0	-.006	44116.492	-2241.0	-.030
39331.534	-5492.5	-.001	44195.280	-2187.5	.025
39359.469	-5473.5	-.027	44456.446	-2010.0	-.023
39443.363	-5416.5	-.016	44823.482	-1760.5	-.157
39671.467	-5261.5	-.013	44846.430	-1745.0	-.019
39685.482	-5252.0	.022	45138.502	-1546.5	-.065
39819.380	-5161.0	.001	45556.496	-1262.5	-.012
40145.382	-4939.5	.038	45674.271	-1182.5	.032
40173.311	-4920.5	.006	45935.436	-1005.0	-.016
40201.260	-4901.5	-.005	45946.374	-997.5	-.115
40476.461	-4714.5	.002	46373.289	-707.5	.029
40501.442	-4697.5	-.035	46648.464	-520.5	.010
40504.426	-4695.5	.006	46704.350	-482.5	-.026
40749.496	-4529.0	.051	46707.346	-480.5	.027
40827.448	-4476.0	.006	47094.342	-217.5	-.015
40914.297	-4417.0	.029	47139.224	-187.0	-.017
41512.483	-4010.5	.000			

It can be seen from the column O-C that the fit is very good. The secondary minimum agrees with the ephemeris too, i.e., the orbit is probably circular. The depths of the primary and secondary minima are $0^m.4$ (in both colours) and $0^m.3$, respectively; the width of both is $0^d.14$.

For many years, the times of minima have been reported as satisfactorily fitting the GCVS ephemeris [determined by Strohmeier et al. (1962)]. Mr. Lichtenknecker kindly sent us the list of all published photographic and visual minima. Some of these 58 minima do agree with our ephemeris - among them also one of two photographic minima observed by P. Frank (in Huebscher et al. 1989). Two of us (P.N., P.H.) estimated the brightness of the star on about 600 plates of the Sonneberg Observatory collection, and found 55 plates with a lower

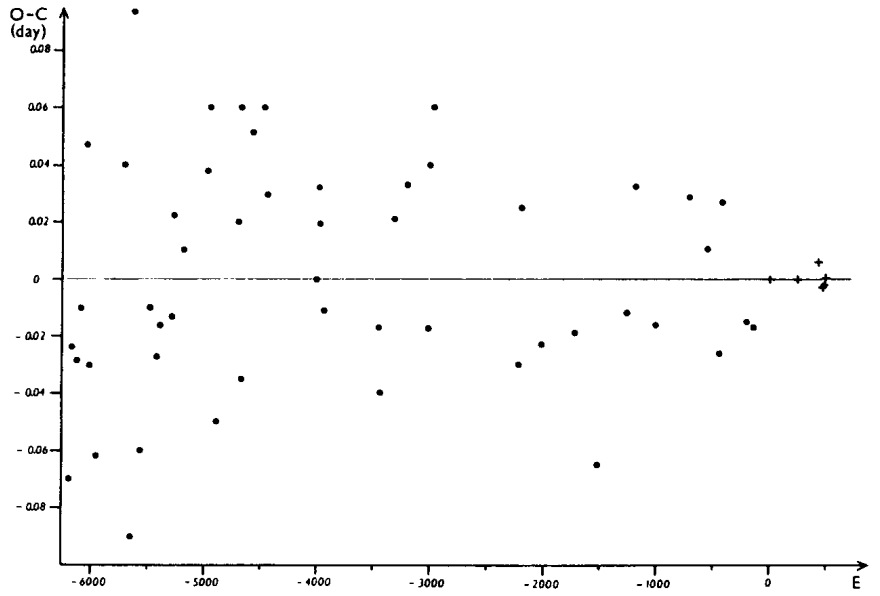

Figure 1 O-C values for the star GS Cep. Dots (●) represent photographic and crosses (+) photoelectric observations

brightness than the rest. These times are listed in Table 2 and illustrated in Figure 1 along with our measurements. With the exception of nine of them, they agree with the new ephemeris ($O-C \leq 0^{d}.050$). The older - mostly incorrect - visual data probably can be explained by the low amplitude of minima, which is not suitable for visual estimations. The original Bamberg data produced a rather suspicious light curve. The reason why it shows such a large amplitude ($0^{m}.9$ in the primary minimum) and why the period seemed well determined remains unknown.

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