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**NSV 1012: A NEW ECLIPSING BINARY**

BERTHOLD, THOMAS<sup>1,3</sup>; VERROT, JEAN-PAUL<sup>2</sup>; VANDENBROERE, JACQUELINE<sup>2</sup>;  
MARTIGNONI, MASSIMILIANO<sup>1,2</sup>; KROLL, PETER<sup>1,4</sup>

<sup>1</sup> Bundesdeutsche Arbeitsgemeinschaft für Veränderliche Sterne e.V. (BAV), Munsterdamm 90,  
D-12169 Berlin, Germany

<sup>2</sup> Group Européen d'Observations Stellaires (GEOS), 23 Parc de Levesville, F-28300 Bailleau l'Evêque, France,  
e-mail: j.vandenbroere@skynet.be, maxmartignoni@inwind.it, jp.verrot@wanadoo.fr

<sup>3</sup> Bruno-H.-Bürgel-Sternwarte Hartha, Töpelstr. 43, D-04746 Hartha, Germany, e-mail: tb.stwhartha@web.de

<sup>4</sup> Sternwarte Sonneberg, Sternwartestr. 32, D-96515 Sonneberg, Germany, e-mail: pk@stw.tu-ilmenau.de

The variability of this star (GSC 4317 0505) was discovered by Strohmeier (1959), who describes it as an eclipsing binary with light changes ranging between photographic magnitudes 11<sup>m</sup>0 to 11<sup>m</sup>8. A confirmation was published later by Strohmeier and Knigge (1961). This information, together with the spectral type of A4, is listed in the NSV catalogue (Kholopov 1982). Visual observations performed by Verrot and Vandenbroere have yielded a first period of 2<sup>d</sup>273 (Verrot 2000). This value could be confirmed by photoelectric observations made by Martignoni, but his measurements cover only a part of the light curve without the ascending branch of the minimum. Observations on Sonneberg Sky-Patrol plates (Berthold) were used to refine the elements with the help of a long time base. Due to the very large number of plates available for the region of NSV 1012, estimations were performed in only two intervals of time. The first set includes 341 plates out of the years 1962–1967 and a comparable number of plates out of the years 1981–1985 was searched for weakenings.

A least squares fitting of all available minima has yielded the following linear ephemeris:

$$\text{Min. I} = \text{HJD } 2451450.242 + 2^{\text{d}}2726178 \times E. \quad (1)$$
$$\pm 0.007 \pm 0.0000020$$

The corresponding photographic light curve is given in Figure 1. A decision whether the given epoch in ephemeris (1) denotes the primary or secondary minimum is still outstanding. Further CCD photometry is urgently needed. Using blue magnitudes from the TYCHO2 catalogue for the comparison stars in Table 1, NSV 01012 shows photographic light changes within 11<sup>m</sup>85 and 12<sup>m</sup>90. The difference to the range of variation reported by Strohmeier obviously results from a systematic error in his comparison scale. The magnitudes derived from the Sonneberg plates are well in agreement with the values given for the uneclipsed star in some modern catalogues (USNO A2.0: 12<sup>m</sup>1 pg; TYCHO2: 11<sup>m</sup>841  $B_T$ ).

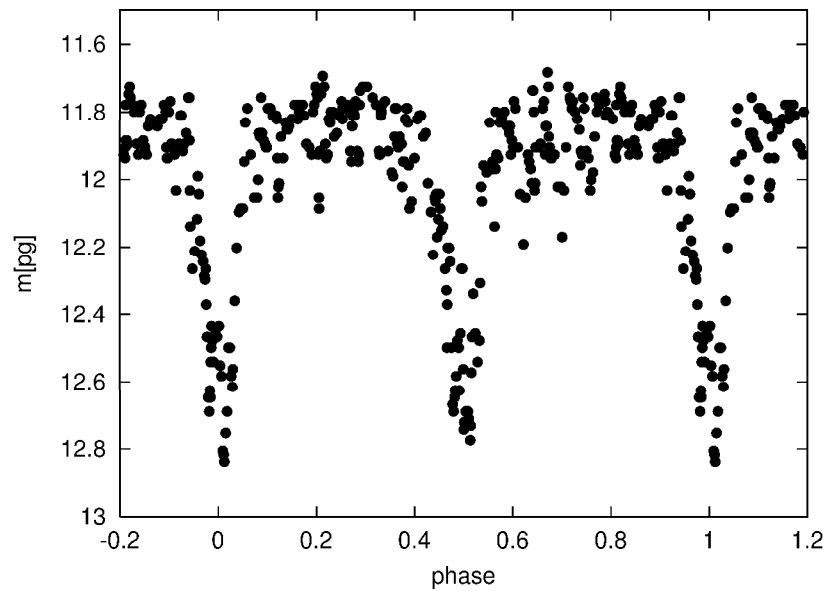
Table 2 clearly points out the constancy of the period within the whole investigated interval. Each of the photographic instants in this table was derived only from a single sky-survey plate, so the scatter of the  $O - C$  values is comprehensible.

Table 1: Comparison stars

Designation	GSC	TYCHO2 <i>B</i> mag
a	4317 1077	11.11
b	4317 0923	11.55
c	4317 0913	11.89
d	4317 0960	12.62
e	4317 0671	12.95

Table 2: Minima of NSV 1012 according to ephemeris (1)

HJD 24. . .	Epoch	<i>O</i> - <i>C</i>	Observer	HJD 24. . .	Epoch	<i>O</i> - <i>C</i>	Observer
38856.540	-5541.5	0.010	Berthold	39390.595	-5306.5	-0.001	Berthold
38739.458	-5593	-0.033	Berthold	39499.678	-5258.5	-0.003	Berthold
38530.480	-5685	0.070	Berthold	45074.487	-2805.5	0.074	Berthold
38555.438	-5674	0.029	Berthold	45223.312	-2740	0.043	Berthold
38556.494	-5673.5	-0.051	Berthold	45407.310	-2659	-0.041	Berthold
38613.414	-5648.5	0.054	Berthold	45583.467	-2581.5	-0.012	Berthold
38622.410	-5644.5	-0.041	Berthold	45650.497	-2552	-0.024	Berthold
38638.390	-5637.5	0.031	Berthold	45674.408	-2541.5	0.024	Berthold
38239.465	-5813	-0.050	Berthold	45907.390	-2439	0.063	Berthold
38288.398	-5791.5	0.022	Berthold	45940.349	-2424.5	0.069	Berthold
38322.385	-5776.5	-0.080	Berthold	45990.256	-2402.5	-0.022	Berthold
38372.444	-5754.5	-0.019	Berthold	46200.460	-2310	-0.035	Berthold
38407.708	-5739	0.020	Berthold	51185.482	-116.5	-0.000	Vandenbroere
38413.403	-5736.5	0.033	Berthold	51459.330	4	-0.003	Verrot
38415.683	-5735.5	0.040	Berthold	51460.418	4.5	-0.051	Verrot
38440.659	-5724.5	0.018	Berthold	51492.295	18.5	0.010	Verrot
38473.626	-5710	0.032	Berthold	51509.306	26	-0.024	Verrot
37939.575	-5945	0.046	Berthold	51525.233	33	-0.006	Verrot
37940.623	-5944.5	-0.042	Berthold	51550.247	44	0.009	Verrot
38089.474	-5879	-0.048	Berthold	51575.257	55	0.021	Verrot
38113.403	-5868.5	0.019	Berthold	51576.334	55.5	-0.038	Verrot
39023.533	-5468	-0.035	Berthold	51600.286	66	0.052	Verrot
39040.574	-5460.5	-0.039	Berthold	51601.346	66.5	-0.026	Verrot
39056.520	-5453.5	-0.001	Berthold	51609.323	70	-0.003	Verrot
39088.256	-5439.5	-0.081	Berthold	51793.372	151	-0.035	Verrot
39205.393	-5388	0.016	Berthold	51842.279	172.5	0.010	Verrot
39256.472	-5365.5	-0.039	Berthold	51908.236	201.5	0.062	Verrot
39289.443	-5351	-0.021	Berthold	51934.313	213	0.003	Verrot
39355.398	-5322	0.028	Berthold	51951.290	220.5	-0.064	Verrot
39380.371	-5311	0.002	Berthold	51984.322	235	0.014	Verrot
39388.372	-5307.5	0.049	Berthold				



**Figure 1.** Photographic light curve of NSV 1012. The dots refer to sliding means ( $N = 3$ ) of the individual estimates

References:

- ESA, 1997, The Hipparcos and Tycho Catalogues, ESA SP-1200  
Kholopov, P.N., editor, 1982, New Catalogue of Suspected Variable Stars, Moscow  
Monet, D., et al., 1998, The USNO Catalogue,  
<http://ftp.nofs.navy.mil/projects/pmm/catalogs.html>  
Strohmeier W., 1959, *Bamb. Ver.*, **5**, No. 3  
Strohmeier W., Knigge, W., 1961, *Bamb. Ver.*, **5**, No. 10  
Verrot, J.P., 2000, *GEOS NC*, **919**