

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 3544

Konkoly Observatory
Budapest
21 November 1990
HU ISSN 0374 - 0676

BV LIGHT CURVES AND THE FIRST EPHEMERIS FOR THE ECLIPSING BINARY STAR
NSV 1776

NSV 1776 (CSV 464) was discovered by Shapley in 1938 on photographic plates taken at the Harvard Observatory. The coordinates for the 2000.0 epoch are:

$$\alpha = 4^{\text{h}}56^{\text{m}}06^{\text{s}} ; \delta = +10^{\circ} 05'9''$$

The New Catalogue of Suspected Variable Stars (Kukarkin et al., 1982) classifies that star as a possible eclipsing binary, with a magnitude range 12.6 - 13.5 (p); the period is unknown.

From 925 visual estimates performed by 9 observers of the GEOS since 1987, 20 minima have been obtained, confirming the eclipsing binary nature of NSV 1776.

To improve the period and obtain BV light curves, photoelectric measurements were made at the Jungfrauoch Observatory, by M. Dumont and R. Boninsegna. The measurements were performed with a photometer attached to a 76 cm telescope. B and V filter values of the Geneva system, and the B-V values have been converted into Johnson and Morgan's system.

102 photoelectric measurements were obtained in each colour on 12 nights between 1987 and 1989. Two minima were determined with a difference in amplitude close to 0.15 magnitude in V-light. The discrimination of both minima being possible, the period can be derived from the 20 visual and the 2 photoelectric minima, weighting the last two by 3.

A first ephemeris has been computed using these 22 times of minimum light:

$$\text{Min I} = \text{hel. J.D. } 2\ 447\ 888.512 + 1.102\ 45 \cdot E \quad (1)$$

+ 4 + 2

(95% level of confidence for error bars)

Figure 1 shows V and B-V light curves of NSV 1776, according to the ephemeris (1). Table I lists the 22 minima (vis = visual, ph = photoelectric) and the O-C's referring to the ephemeris above. One can see the good agreement between visual and photoelectric observations. The mean B-V value,

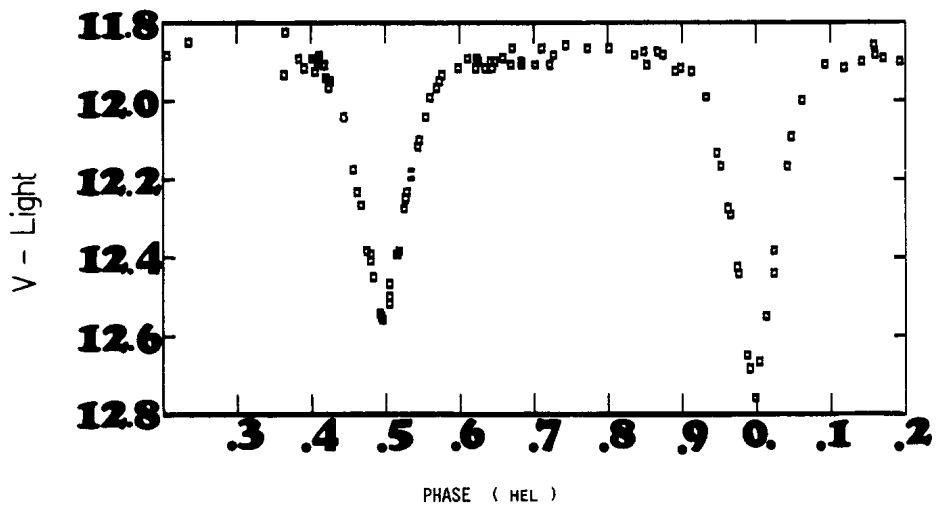


FIG 1A : V LIGHT-CURVE OF NSV 1776, ACCORDING TO THE EPHEMERIS (1).

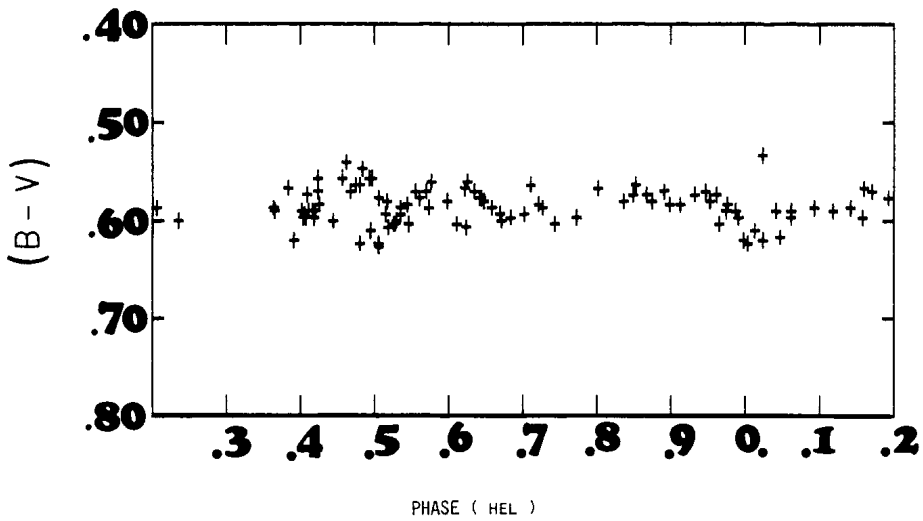


FIG 1B : B-V LIGHT-CURVE OF NSV 1776, ACCORDING TO THE EPHEMERIS (1).

TABLE I

Times of Minimum Light, According To The Following Ephemeris :

$$\text{MIN (Hel)} = 24\ 47\ 888.512 + 1.102\ 45\ E \quad (1)$$

$$\pm \quad \quad \quad \pm \quad \quad \quad \pm \quad \quad \quad \pm$$

JD HEL. 2400000 + ...	Cycles	Type	O-C (1)	Obs.
47469.592	-380	I	+0.012	vis
47479.509	-371	I	+0.007	vis
47480.593	-370	I	-0.012	vis
47502.643	-350	I	-0.011	vis
47533.509	-322	I	-0.014	vis
47542.339	-314	I	-0.003	vis
47553.369	-304	I	+0.002	vis
47558.328	-299.5	II	+0.0004	vis
47558.338	-299.5	II	+0.01	vis
47565.494	-293	I	+0.0004	vis
47568.249	-290.5	II	-0.001	vis
47596.356	-265	I	-0.006	vis
47596.365	-265	I	+0.003	vis
47596.377	-265	I	+0.015	vis
47885.444	-30	I	+0.006	vis
47887.408	-1	I	-0.001	vis
47888.5056	0	I	-0.006	ph.
47888.512	0	I	+0.0004	vis
47891.279	+2.5	II	+0.011	vis
47892.3646	+3.5	II	-0.006	ph.
47908.366	+18	I	+0.01	vis
47945.293	+51.5	II	+0.005	vis

not corrected for reddening is 0.58.

With its typical V-light curve and the quasi-constant B-V index, which does not vary during the eclipses, NSV 1776 can be catalogued as a new EA-type eclipsing binary variable, with the following elements:

magnitude range: 11.88 - 12.76 in V light

(min II: 12.59 V)

Duration of the eclipses: $D_I = 0.20$ P

$d_{II} = 0.18$ P

G. BOISTEL¹

R. BONINSEGNA¹

M. DUMONT^{1,2}

¹ GEOS
3, Promenade Venezia
F-78000 Versailles

² Palais de la Decouverte
Av Franklin D. Roosevelt
F-75008 Paris

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Shapley, H., Hanley, C.M.: 1938, Harvard Bulletin 913, p.9