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THE PERIOD AND LIGHTCURVE OF NSV 4497

The variability of NSV 4497 (= SVS 863 UMa = GSC 2997_1204, $\alpha = 9^{\text{h}} 29^{\text{m}} 0^{\text{s}}.59$, $\delta = +43^{\circ} 44' 2''.0$, J2000.0) was discovered by Parenago (1938). He classified the star as an eclipsing binary and gave two times when the star was found near minimum light on a photographic plate. The star had been then neglected for a long time, except for an inconclusive visual survey of Locher (1984). We started to observe NSV 4497 in 1992 with an 18-cm telescope and a SBIG ST-4 CCD camera. The observations were continued in 1993–94 with the same telescope but better ST-6 camera. These early observations, made without a filter, confirmed the type of variability and yielded four times of minima and a preliminary period.

In 1996 we performed a regular photometry of NSV 4497 with a 65-cm telescope and the ST-6 camera. Standard *V* Johnson and *R* Cousins photometric filters were used. The technical configuration of the telescope, normally used for other purposes, did not allow to change the filters automatically. Instead, in some cases, only one filter was used in a particular night. Typical exposures were as long as 120–180 seconds and the high signal-to-noise ratio enabled the relative precision of one measurement of about 0.010 mag in *R* and 0.015 mag in *V* filter to be reached. Altogether 418 measurements in *R* and 158 in *V* have been obtained.¹ GSC 2997_1178 was used as the comparison star and GSC 2997_1472 as the check star. The magnitudes were transformed to the absolute scale using the standard stars according to Landolt (1992) and checked by the Guide Star Catalog. Due to the uncertainties in extinction, low precision of photometric data in the GSC and other instrumental effects, the absolute calibration is less certain and a systematic shift as high as 0.1 mag is possible. We derived the magnitude of the comparison and the check star as $V = 12.2$, $V - R = 0.40$ and $V = 12.3$, $V - R = 0.49$, respectively. The probable error of the color indices is 0^m03. The variable, comparison and check stars are identified in Figure 1.

All times of primary minima are given in Table 1. Using only our minima, we derived the following light elements:

$$\text{JD}_{\text{hel}} (\text{min}) = 2\,448\,691.3670 \pm 7 + 0.7747160 \pm 4 \times E.$$

The $O - C$ residuals relative to these elements are also given in Table 1. Parenago's two minima show negative $O - C$ residuals, probably larger than the error of observation. This suggests that the period of the star was slightly longer in the past but the lack of data prevents to draw a firm conclusion.

¹ The table of observational data (in ASCII format) is available as the 4402-t3.txt file together with the electronic version of the Bulletin.

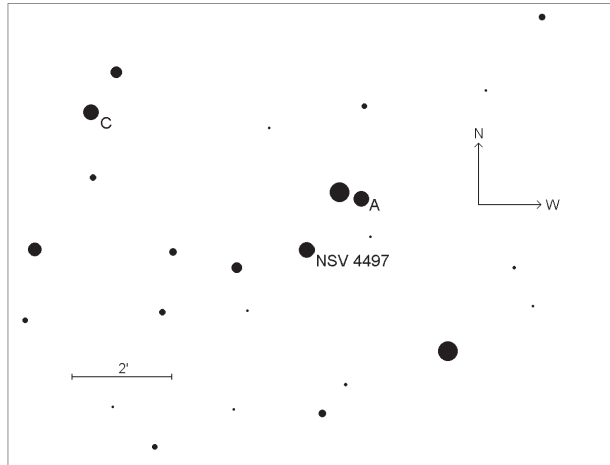


Figure 1. Identifications chart of NSV 4497. The size of the field is $12'.6 \times 9'.6$. The comparison star is denoted with A and the check star is C.

Table 1. The times of minima of NSV 4497

$JD_{\text{hel}} - 2\,400\,000$	f	N	w	E	$O - C$	source
17 321.41	pg	1	0	-40492	-0.16	Parenago (1938)
28 625.38	pg	1	0	-25901	-0.07	"
48 691.367 \pm 0.002	-	17	1	0	-0.000	18-cm, ST-4
49 028.370 \pm 0.007	-	9	1	435	+0.002	18-cm, ST-6
49 031.467 \pm 0.002	-	13	1	439	-0.000	"
49 423.473 \pm 0.004	-	15	1	945	-0.001	"
50 141.6354 \pm 0.0002	R	48	5	1872	+0.0000	65-cm, ST-6
50 142.4097 \pm 0.0004	R	40	5	1873	-0.0004	"
50 152.4807 \pm 0.0002	V	35	5	1886	-0.0007	"
50 396.5178 \pm 0.0003	R	27	5	2201	+0.0009	"

f: filter, N : number of measurements, w : weight, E : epoch

Table 2. The lightcurve parameters of NSV 4497

	M_{max}	A_{I}	A_{II}
V-band	11.9	0.50 ± 0.03	0.08 ± 0.03
R-band	11.7	0.48 ± 0.02	0.11 ± 0.02

M : magnitude, A : amplitude [mag]

I, II - primary and secondary minimum, respectively

The mean lightcurve of NSV 4497 in the V and R filters is given in Figure 2. It is a typical lightcurve of an Algol-type eclipsing binary. The eclipses are partial and their duration is $3^{\text{h}}1$, i.e. 17% of the period. No sign of asymmetry is present. The magnitudes are summarized in Table 2.

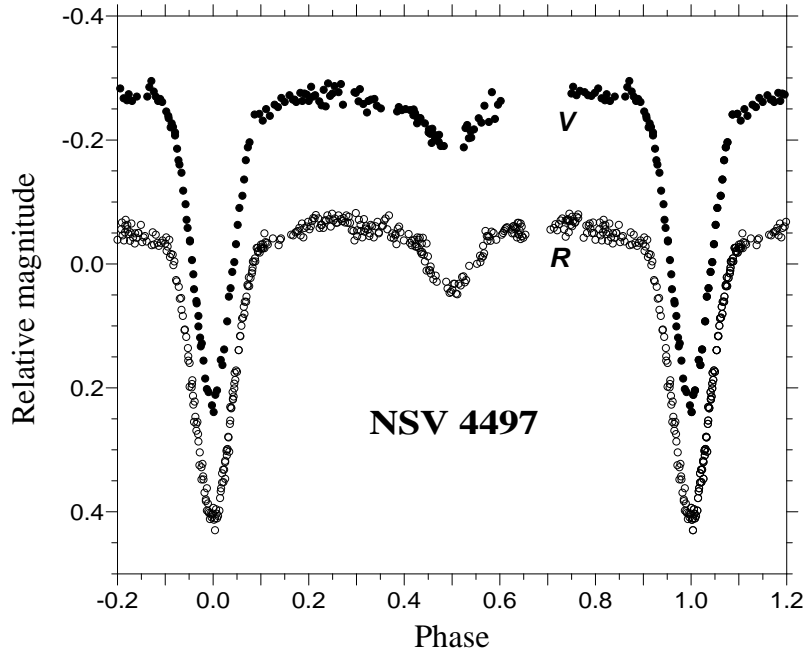


Figure 2. The mean lightcurve of NSV 4497. Relative V, R magnitudes to the comparison star A are given

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References:

- Landolt, A., 1992, *Astron. J.*, **104**, 340
 Locher, K., 1984, *B.B.S.A.G. Bull.*, No. 70
 Parenago, P., 1938, *Perem. Zvezdy*, **5**, 206