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## The elements of NSVS 3936908

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**Abstract:** *The variability of NSVS 3936908 was discovered by Woźniak et al. in 2004 [1], who classified it as an eclipsing binary. The authors present a phased light curve from their own data, a list of primary and secondary minima, O-C diagrams and an improved period solution of the star.*

### Observations

400 mm ASA Astrograph f/3.7 - f = 1471 mm, FLI Proline 16803 CCD-Camera - V-filter - t = 120 sec.  
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### Data analysis

Muniwin [2] and self-written programs by Franz Agerer and Lienhard Pagel [3] were used for the analysis of the frames, after bias, dark and flatfield correction. The weighted average of 5 comparison stars was used.

### Explanations:

HJD = heliocentric UTC timings (JD) of the observed minima

All coordinates are taken from the Gaia DR3 catalogue [4]. The coordinates (epoch J2000) are computed by Vizier, and are not part of the original data from Gaia (note that the computed coordinates are computed from the positions and the proper motions).

## NSVS 3936908

Cross-IDs

= ASASSN-V J021257.12+471603.3

= GSC 03285-01614

= WISE J021257.0+471602

= 2MASS J02125706+4716027

= Gaia DR3 353249863118190464

Gaia DR3 catalogue:

Right ascension: 02h12m57.0630 at Epoch J2000

Declination: +47° 16' 02.759" at Epoch J2000

11.0109 mag G-band mean magnitude (350-1000 nm)

11.1391 mag Integrated BP mean magnitude (330-680 nm)

10.7227 mag Integrated RP mean magnitude (640-1000 nm)

0.4164 mag BP-RP

### Periods known so far:

VSX [5] 1.11422 d

WISE [6] 1.1137207 d

SIMBAD [7] 1.11422 d

## Results

The discovery of NSVS 3936908 was published by Woźniak et al. in the NSVS Catalogue in 2004 [1]. Type and period were transferred to the VSX database. The period is unusable. The ASAS-SN Variable Stars Database [8] designated the variable as non-periodic. The ZTF project and ATLAS project do not contain the variable. The WISE project contains the variable with a period similar to ours.

The presented improved elements were calculated by the method of least squares, taking into account the minima between JD 2457692 to 2460229 (see table below) and assuming that the true phase of Min. II is exactly at 0.5. We had 4940 of our own data points available for our analyses.

From our data (Figure 1) we derive a variability approx. between 10.97 and 11.40 mag, with an amplitude for Min. I given as 0.43 mag and for Min. II as 0.26 mag (uncalibrated V). NSVS 3936908 is an EB star with different heights of the shoulders (possible O'Connell Effect). The difference between the two shoulders is 0.06 mag. Our observations do not show evidence for a period change between 2016 and 2023.

### NSVS 3936908 improved elements

Type = EB  
 Min. I = HJD 2458112.4251 + 1.1137145\*E  
 $\pm 0.0006 \quad \pm 0.0000006$

Observer	HJD-Date Minimum	Type	Epoch	O-C d	Remarks
W. Moschner	2457692.5544	I	-377	-0.0003	
W. Moschner	2457693.6703	I	-376	0.0019	
W. Moschner	2457710.3735	I	-361	-0.0007	reduced
W. Moschner	2457712.6009	I	-359	-0.0007	reduced
W. Moschner	2457748.2404	I	-327	-0.0001	reduced
W. Moschner	2457759.3747	I	-317	-0.0029	
W. Moschner	2458078.4606	II	-30.5	0.0038	
W. Moschner	2458112.4234	I	0	-0.0017	
W. Moschner	2458750.5835	I	573	0.0000	
W. Moschner	2459083.5835	I	872	-0.0007	
W. Moschner	2459103.6307	I	890	-0.0003	
W. Moschner	2459199.4114	I	976	0.0010	
W. Moschner	2459446.6555	I	1198	0.0004	
W. Moschner	2459455.5660	I	1206	0.0013	
W. Moschner	2459561.3661	I	1301	-0.0016	
W. Moschner	2459595.3409	II	1331.5	0.0049	
W. Moschner	2459933.3440	I	1635	-0.0043	
W. Moschner	2460176.6960	II	1853.5	0.0010	
W. Moschner	2460214.5601	II	1887.5	-0.0011	
W. Moschner	2460229.5957	I	1901	-0.0006	

Table 1: Minima of NSVS 3936908 using the elements from the authors.  
 The O-C of the secondary minima were calculated assuming that the true phase is at exactly at 0.5.

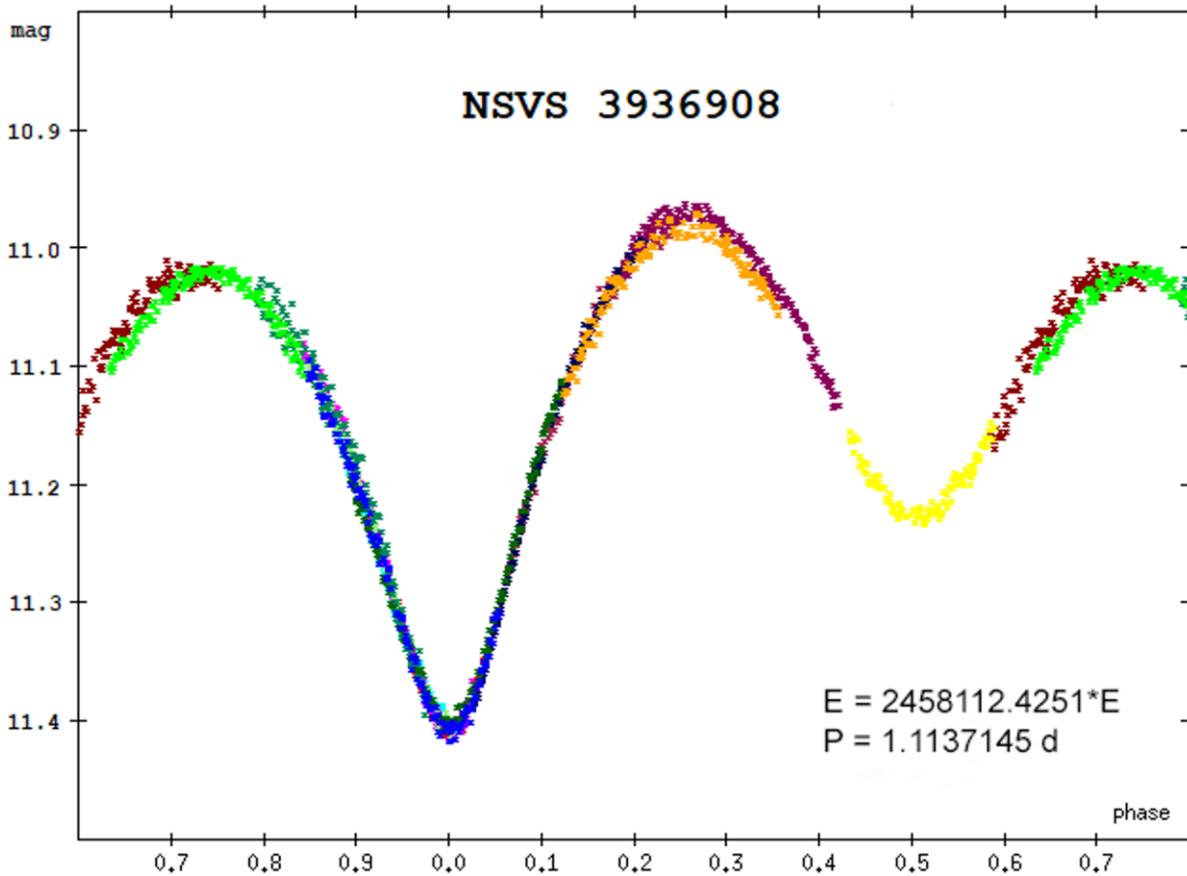


Figure 1: Phased light curve of NSVS 3936908 using the ephemeris given by the authors. The vertical axis shows uncalibrated V magnitudes. Different colors denote different observing nights. Only the data points from the better nights were used to display the light curve. A FLI Proline 16803 camera + V-filter (2017-2019) was used.

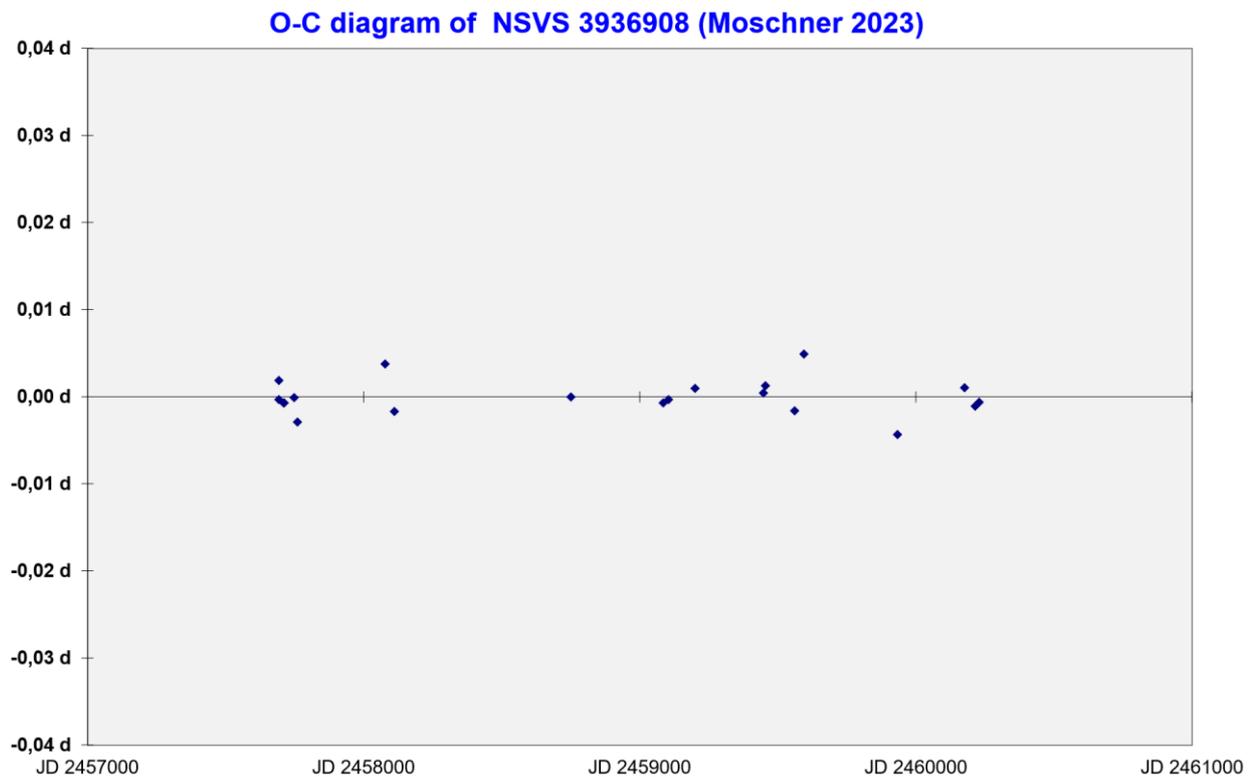


Figure 2: O-C-diagram of NSVS 3936908 using the improved ephemeris from the authors.

### O-C diagram of NSVS 3936908 (WISE 2023)

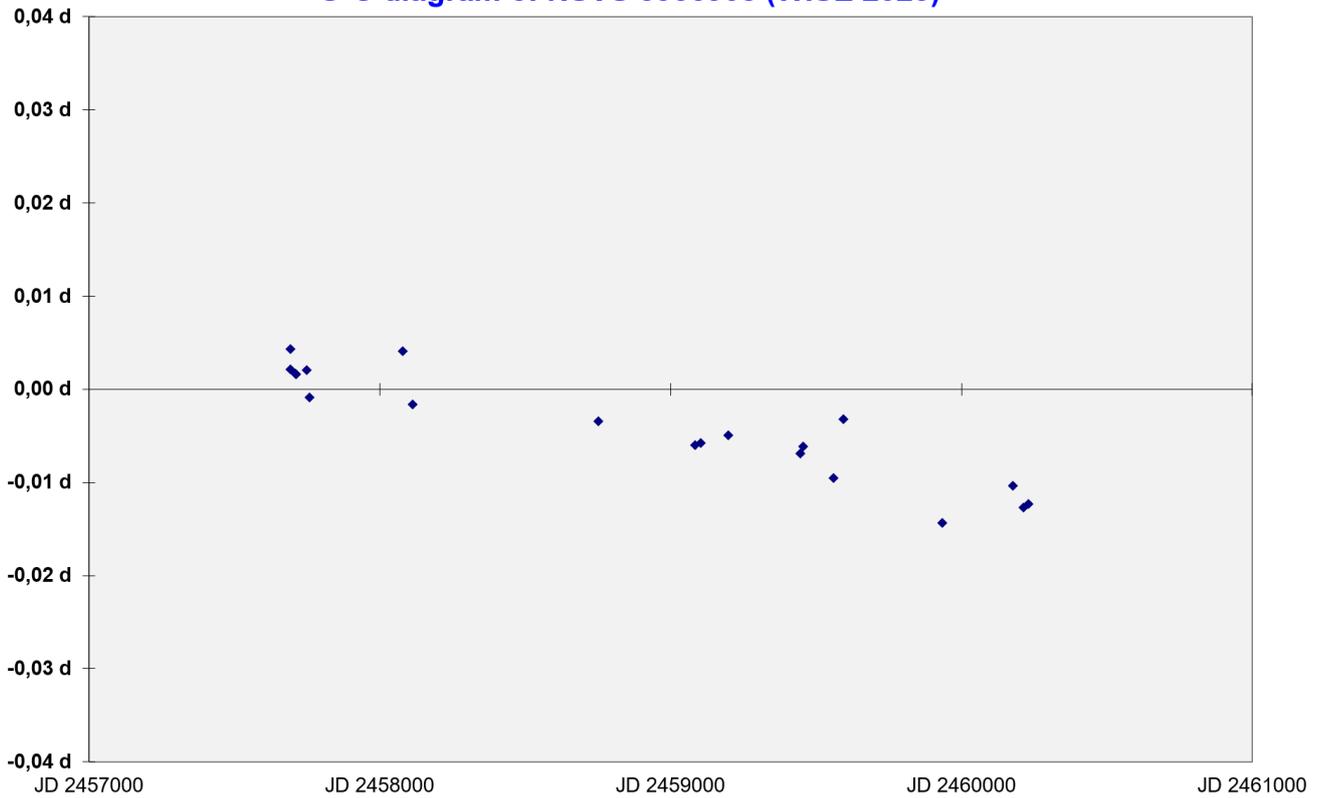


Figure 3: O-C-diagram of NSVS 3936908 using the period from the WISE project (1.1137207 d).

### O-C diagram of NSVS 3936908 (VSX 2023)

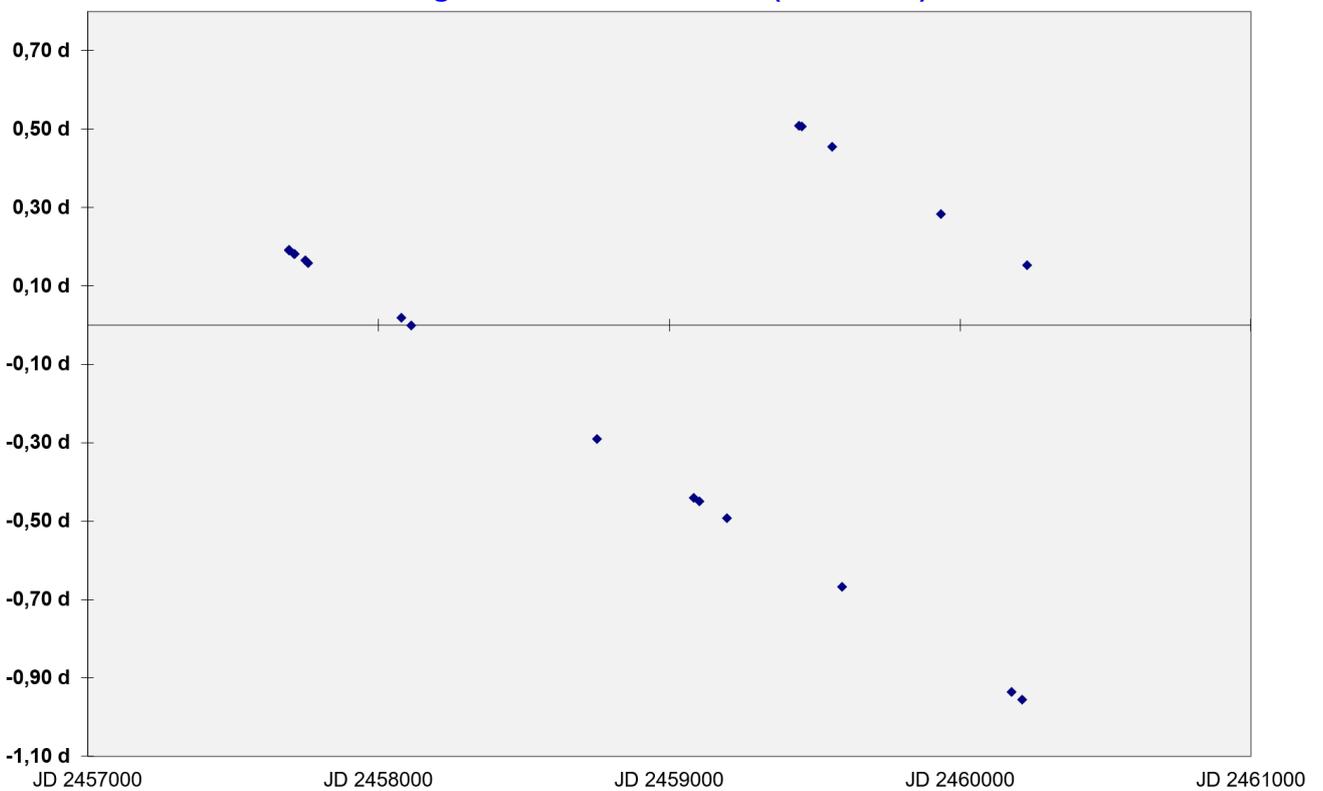


Figure 4: O-C-diagram of NSVS 3936908 using the period from the VSX database (1.11422 d).

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