



The period of T-Cyg1-04350 = ASASSN-V J201147.10+515418.7

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January 2023

Abstract: *T-Cyg1-04350 was discovered by the TrES project [1] and classified as an eclipsing binary in 2008. The authors present a phased light curve from ASAS-SN, 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.
Wolfgang Moschner, Astrocamp/Nerpio, Spain

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 of the exposures. 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 EDR3 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).

T-Cyg1-04350

Cross-IDs

= ASASSN-VJ201147.10+515418.7

= ATOID J302.9460+51.9052

= Gaia EDR3 2088456984739337216

= 2MASS20114706+5154192

Gaia EDR3 Catalog:

Right ascension: 20h11m47.0702s at Epoch=J2000

Declination: +51° 54' 19.233" at Epoch=J2000

12.4168 mag G-band mean magnitude (350-1000 nm)

12.7253 mag Integrated BP mean magnitude (330-680 nm)

11.9373 mag Integrated RP mean magnitude (640-1000 nm)

0.7880 mag BP-RP

Periods known so far:

VSX [5] 2.89040000 d

ASAS-SN [6] 2.89033420 d

ATLAS [7] 2.89109600 d

SIMBAD [8] 2.89040000 d

Results

After the discovery of the variable by the TrES project in 2008, we systematically observed T-Cyg1-04350 for a few years to check its period. The ASAS-SN database and the ATLAS database also list the variable with different periods. We

have supplemented our own minima with data from the ASAS-SN project (times of deep weakening). The presented elements were calculated by the method of least squares, taking into account all minima (see table below) and assuming that the true phase of Min II is exactly 0.5. The minima which we have derived from our measurements were weighted with 10 and the ASAS-SN minima with 1. Our ephemeris represents an improvement over the VSX, ASAS-SN and ATLAS periods. From the ASAS-SN data (Figure 1) we derive a variability approx. between 12.42 and 12.95 mag, with an amplitude for Min I given as 0.53 mag and for Min II as 0.34 mag (uncalibrated V).

T-Cyg1-04350 improved elements

Min. I = HJD 2457916.6136 + 2.8903079*E
 $\pm 0.0044 \pm 0.0000095$

Observer/Evaluator	HJD-Date Minimum	Type	Epoch	O-C (d)	Remarks
W. Moschner	2457277.8552	I	-221	-0.0003	*
W. Moschner	2457483.0758	I	-150	0.0083	*
W. Moschner	2457509.0725	I	-141	-0.0077	*
W. Moschner	2457590.0172	I	-113	0.0084	*
W. Moschner	2457916.6140	I	0	0.0004	
W. Moschner	2457955.6300	II	13.5	-0.0028	
W. Moschner	2458010.5483	II	32.5	-0.0003	
W. Moschner	2459195.5774	II	442.5	0.0025	*
W. Moschner	2459403.6820	II	514.5	0.0050	
W. Moschner	2459410.8968	I	517	-0.0060	*
W. Moschner	2459416.6726	I	519	-0.0108	*
W. Moschner	2459426.8297	II	522.5	0.0302	*
W. Moschner	2459436.9014	I	526	-0.0142	*
W. Moschner	2459549.6107	I	565	-0.0269	*
W. Moschner	2459578.5598	I	575	0.0192	*
W. Moschner	2459681.1347	II	610.5	-0.0119	*
W. Moschner	2459684.0446	II	611.5	0.0077	*
W. Moschner	2459699.9119	I	617	-0.0217	*
W. Moschner	2459802.5418	II	652.5	0.0023	
W. Moschner	2459838.6573	I	665	-0.0111	*

Table 1: Minima of T-Cyg1-04350 = ASASSN-V J201147.10+515418.7, O-C using the elements from the authors. The O-C of the secondary minima were calculated assuming that the true phase is at exactly 0.5. Remarks * = These minima were evaluated according to data from ASAS-SN by W. Moschner (Times of deep weakening).

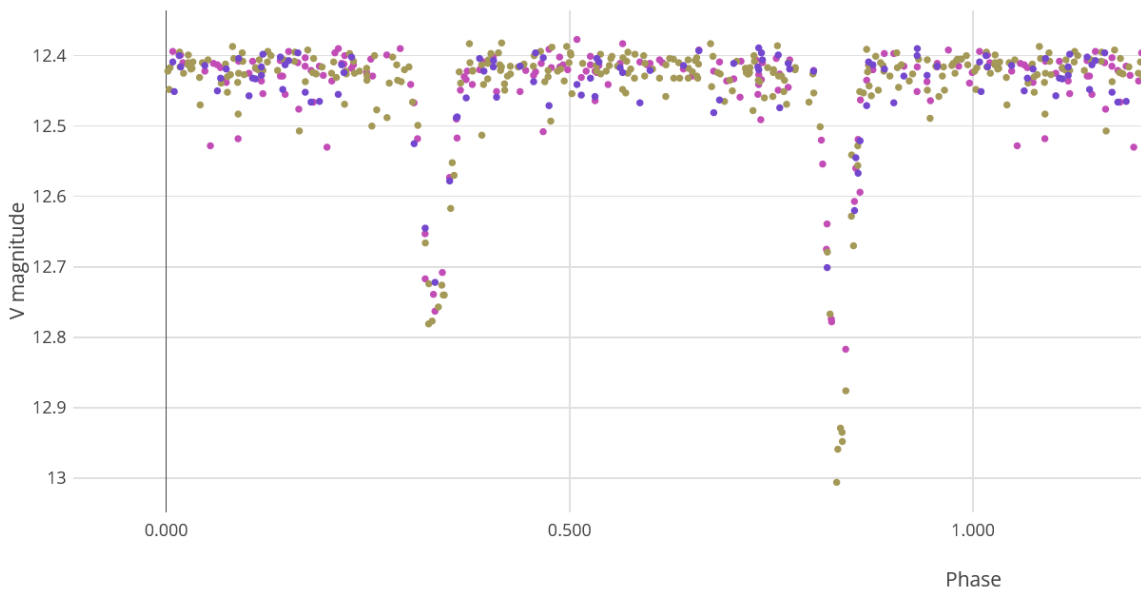


Figure 1: Phased light curve of T-Cyg1-04350 = ASASSN-V J201147.10+515418.7 using the period and data (V-Band) from ASAS-SN. This graphic is taken from the ASAS-SN website.

T-Cyg1-04350 - Atlas

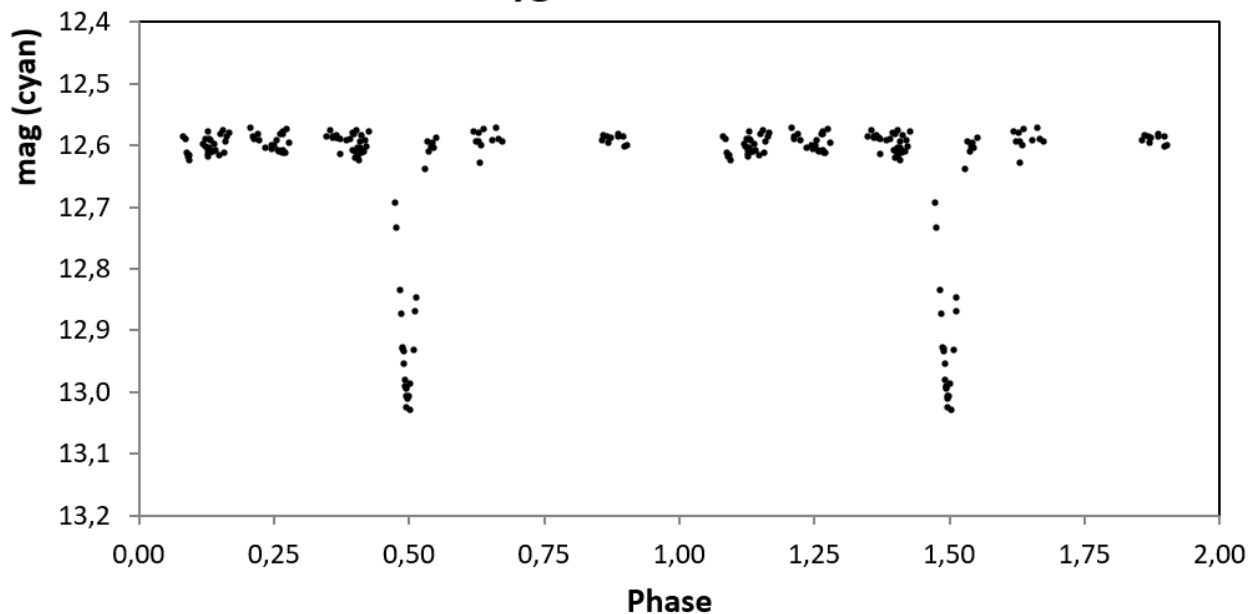


Figure 2: Phased light curve of T-Cyg1-04350 = ASASSN-V J060836.30+515728.7 using the improved elements and data from ATLAS (Cyan-Filter 420-650 nm). There is a data gap here at the time of Minimum I. At the time of minima 1 there were no observations at the ATLAS project.

O-C diagram of ASASSN-VJ201147.10+515418.7 Cyg (Moschner 2022)

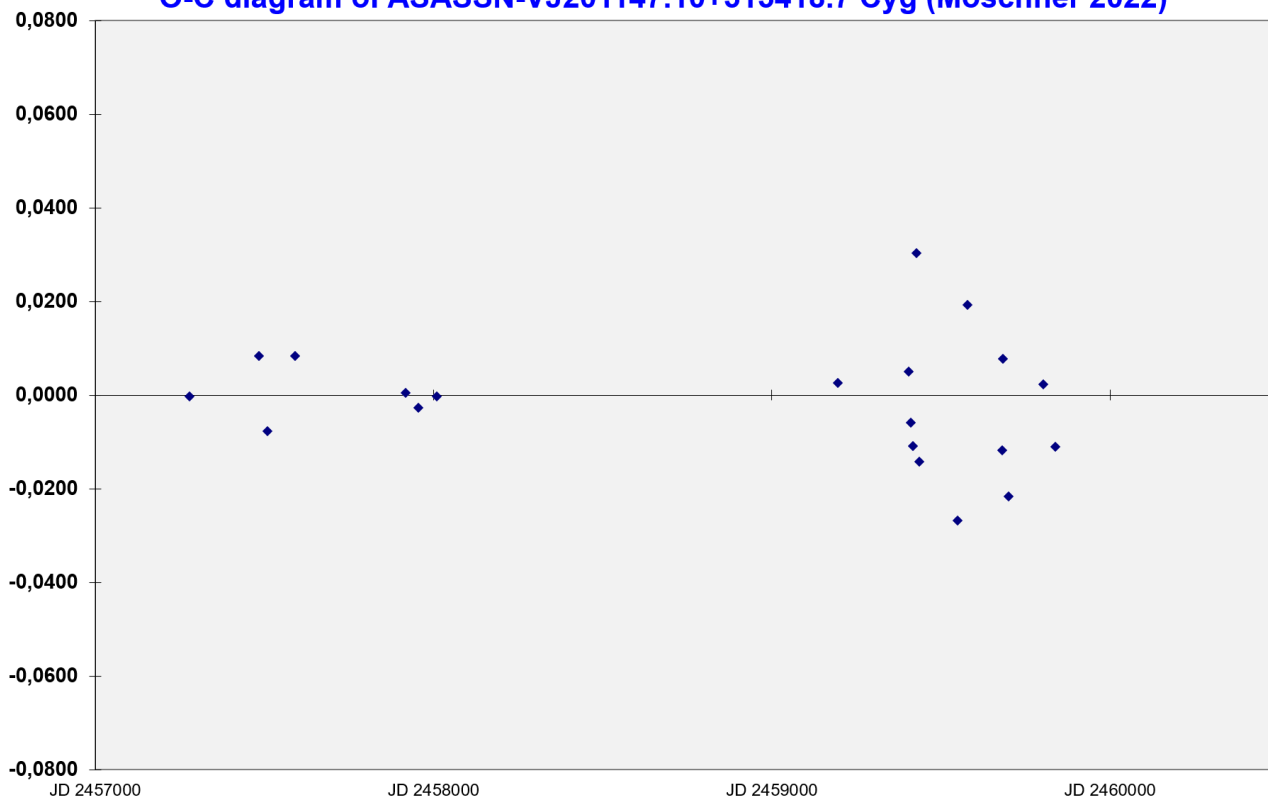


Figure 3: O-C-diagram of T-Cyg1-04350 = ASASSN-V J060836.30+515728.7 using the ephemeris given by the authors.

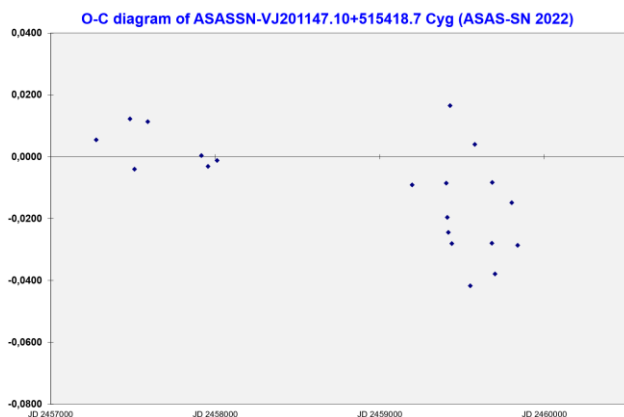


Figure 4

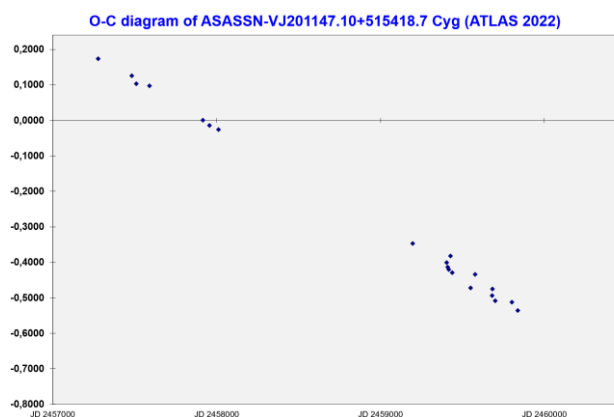


Figure 5

Figure 4: O-C-diagram of T-Cyg1-04350 using the period from the ASAS-SN project (2.8903342 d).

Figure 5: O-C-diagram of T-Cyg1-04350 using the period from the ATLAS project (2.8910960 d).

Acknowledgements

This research has made use of the SIMBAD database, operated at CDS, Strasbourg, France, the International Variable Star Index (VSX) database, operated at AAVSO, Cambridge, Massachusetts and the ATLAS project developed by the University of Hawaii and funded by NASA.

The authors thank David Motl for providing his MuniWin photometry program, Franz Agerer (BAV) and Lienhard Pagel (BAV) for providing their personal data analysis program.

References

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[5] The International Variable Star Index (VSX)

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[6] All-Sky Automated Survey for Supernovae ASAS-SN

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[id?bibyear1=1850&bibyear2=%24currentYear&submit=Display&Ident=%405492083&Name=%5BDCO2008%5D+T-Cyg1-04350&bibdisplay=refsum&bibyear1=1850&bibyear2=%24currentYear#lab_bib](http://simbad.u-strasbg.fr/simbad/sim-id?bibyear1=1850&bibyear2=%24currentYear&submit=Display&Ident=%405492083&Name=%5BDCO2008%5D+T-Cyg1-04350&bibdisplay=refsum&bibyear1=1850&bibyear2=%24currentYear#lab_bib)