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New elements of MoV60 Cyg (Change of period)

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Abstract: *MoV60 Cyg was discovered by Wolfgang Moschner and classified as EW type eclipsing binary in 2016. The discovery was published with first elements in BAVJ 21 in 2018. Supplementary observations up to the year 2021 show a period change in the O-C diagram.*

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 [1] and self-written programs by Franz Agerer and Lienhard Pagel [2] 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 DR3 catalogue [3]. 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).

G-band mean magnitude	= 350-1000 nm
Integrated BP mean magnitude	= 330- 680 nm
Integrated RP mean magnitude	= 640-1000 nm

MoV60 Cyg

Cross-ID's
= UCAC3 285-155734 **= Gaia EDR3 2088472519644472960**
= ATOID J303.0780+52.3166

Gaia EDR3 Catalog:
Right ascension: 20h12m18.7168s at Epoch=J2000
Declination: +52° 18' 59.686" at Epoch=J2000
15.3621 mag G-band mean magnitude
15.8473 mag Integrated BP mean magnitude
14.7071 mag Integrated RP mean magnitude
1.140122 mag BP-RP

Periods known so far:

VSX (AAVSO) [4]	0.2824403 d	(BAVJ21) [5]
ASAS-SN [6]	no information	
ATLAS [7]	0.2824420 d	
ZTF [8]	0.28244503 d	

Results

The observations over the entire period between 2016 and 2021 show a change in period around JD 2458700. The new elements are valid for the period after the change in period. The period has increased by 0.6 seconds. The variable should be monitored further in the future, since further period changes are to be expected. A physical interpretation of the phenomenon cannot be made here. The presented elements were calculated by the method of least squares, taking into account all our minima from JD 2458700 to JD 2459505 (see table below). Data from this star were also recently processed by the ATLAS project [7].

MoV60 Cyg new elements

These elements are valid from approx. JD 2458700

Min. = HJD 2458755.50780 + 0.2824471*E
±0.00070 ±0.0000003

Observer	HJD-Date Minimum	Type	Epoch	O-C (d)	Source
W. Moschner	2457574,4796	II	-4181,5	0,0243	
W. Moschner	2457574,6244	I	-4181	0,0279	
W. Moschner	2457576,4573	II	-4174,5	0,0249	
W. Moschner	2457581,5393	II	-4156,5	0,0229	
W. Moschner	2457605,4102	I	-4072	0,0270	
W. Moschner	2457605,5481	II	-4071,5	0,0237	
W. Moschner	2457623,3462	II	-4008,5	0,0276	
W. Moschner	2457623,4862	I	-4008	0,0264	
W. Moschner	2457691,4125	II	-3767,5	0,0241	
W. Moschner	2457955,4996	II	-2832,5	0,0232	
W. Moschner	2457963,4074	II	-2804,5	0,0225	
W. Moschner	2457963,5443	I	-2804	0,0182	
W. Moschner	2457979,3635	I	-2748	0,0203	
W. Moschner	2457979,5054	II	-2747,5	0,0210	
W. Moschner	2457979,6369	I	-2747	0,0113	
W. Moschner	2458010,4272	I	-2638	0,0148	
W. Moschner	2458015,3681	II	-2620,5	0,0129	
W. Moschner	2458015,5130	I	-2620	0,0166	
W. Moschner	2458329,4446	II	-1508,5	0,0083	
W. Moschner	2458329,5875	I	-1508	0,0099	
W. Moschner	2458330,4350	I	-1505	0,0101	
W. Moschner	2458330,5768	II	-1504,5	0,0106	
W. Moschner	2458352,4633	I	-1427	0,0075	
W. Moschner	2458352,6063	II	-1426,5	0,0092	
W. Moschner	2458397,3717	I	-1268	0,0068	
W. Moschner	2458720,4835	I	-124	-0,0009	
W. Moschner	2458755,3678	II	-0,5	0,0012	
W. Moschner	2458755,5075	I	0	-0,0003	
W. Moschner	2459053,4895	I	1055	0,0000	
W. Moschner	2459053,6324	II	1055,5	0,0016	
W. Moschner	2459069,4480	II	1111,5	0,0002	
W. Moschner	2459069,5875	I	1112	-0,0014	
W. Moschner	2459102,4934	II	1228,5	-0,0006	
W. Moschner	2459140,3462	II	1362,5	0,0043	
W. Moschner	2459403,5856	II	2294,5	0,0029	
W. Moschner	2459426,4629	II	2375,5	0,0020	
W. Moschner	2459426,6008	I	2376	-0,0013	
W. Moschner	2459469,3893	II	2527,5	-0,0036	
W. Moschner	2459505,4030	I	2655	-0,0018	

Table 1: Minima MoV60 Cyg, O-C using the new elements.

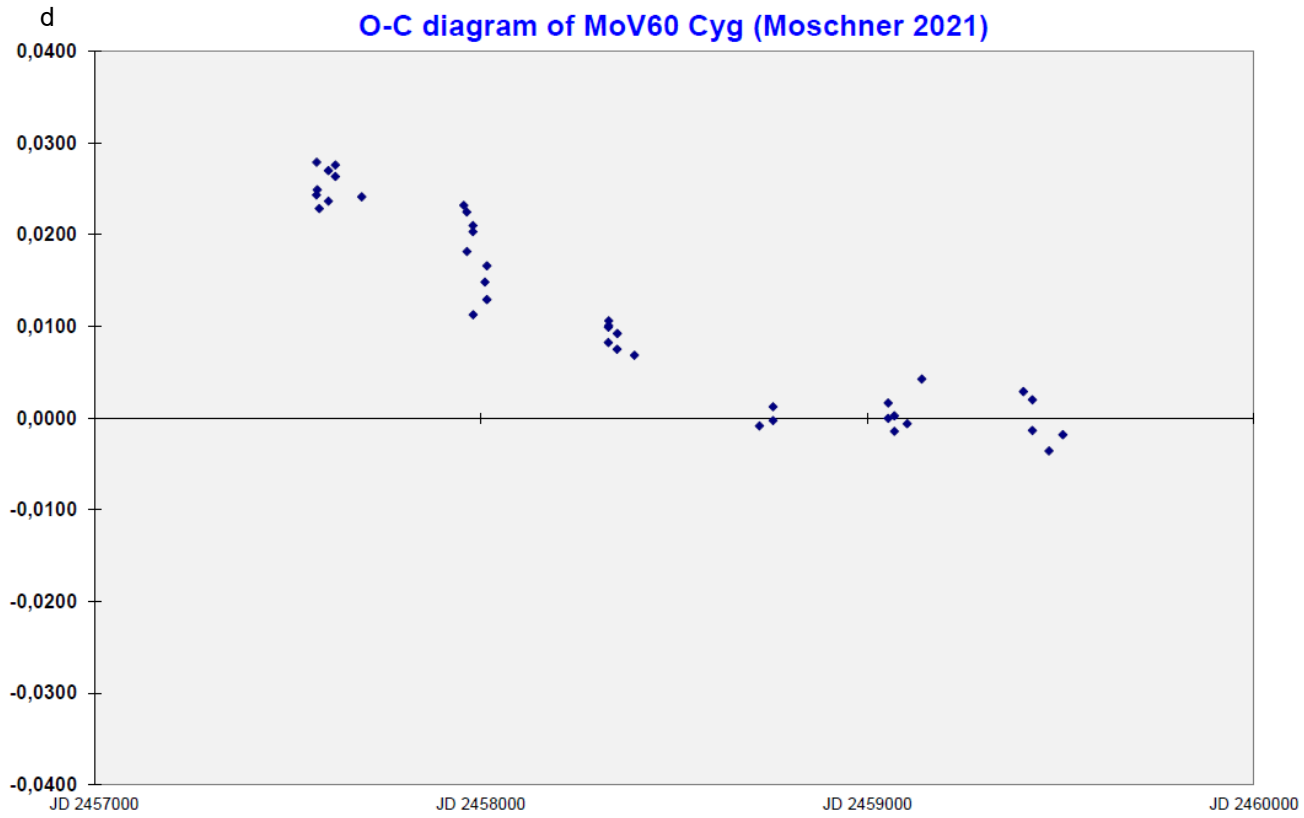

Figure 1: O-C-diagram from MoV60 Cyg using the new elements.

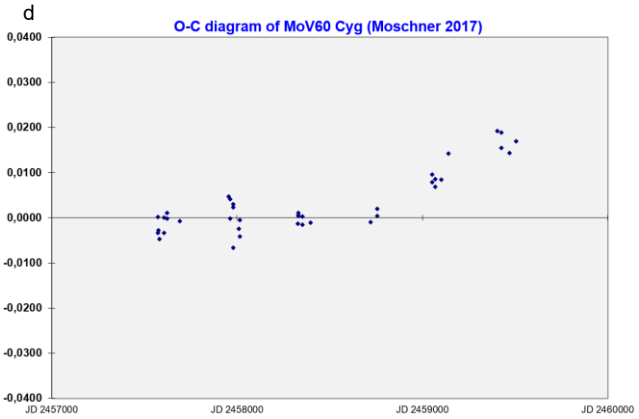

Figure 2

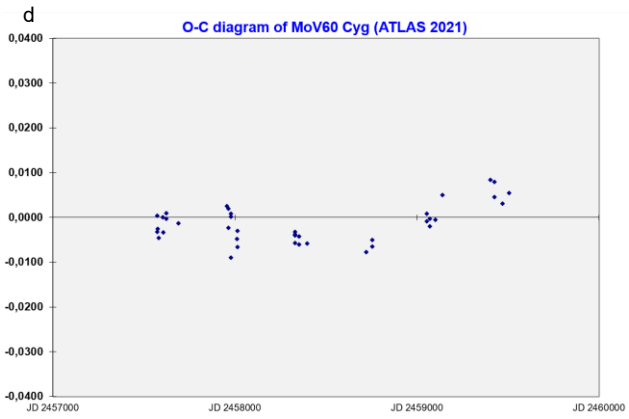

Figure 3

Figure 2: O-C-diagram from MoV60 Cyg using the period from VSX and BAVJ 21 (0.2824403 d).

Figure 3: O-C-diagram from MoV60 Cyg using the period from ATLAS (0.282442 d).

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References

[1] Motl, David: MuniWin
http://c-munipack.sourceforge.net

[2] Pagel, Lienhard: Starcurve
https://www.bav-astro.eu/index.php/weiterbildung/tutorials

[3] Gaia EDR3 (Gaia Collaboration. 2020)
European Space Agency.
http://vizier.u-strasbg.fr/viz-bin/VizieR?-source=I/350

[4] The International Variable Star Index
https://www.aavso.org/vsx/index.php?view=search.top

[5] BAV Journal No. 21 (2018)
https://www.bav-astro.eu/images/Up_Journal/BAVJ_21_first_elements_6_new_Variable_Part_VI_kor4_final-1.pdf

[6] All-Sky Automated Survey for Supernovae ASAS-SN
http://www.astronomy.ohio-state.edu/asassn/index.shtml
Shappee et al., 2014, ApJ, 788, 48S
https://ui.adsabs.harvard.edu/abs/2014ApJ...788...48S
Jayasinghe et al., 2019, MNRAS, 485, 961J
https://ui.adsabs.harvard.edu/abs/2019MNRAS.485..961J:

[7] A first catalog of variable stars measured by ATLAS (Heinze+, 2018)
http://vizier.u-strasbg.fr/cgi-bin/VizieR-3?-source=J/AJ/156/241/table4

[8] ZTF Zwicky TransientFacility, Systematic Exloration of the Dynamic Sky
https://www.ztf.caltech.edu/