



Four new Eclipsing Binaries in the field of DP CMa

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Abstract: *4 new eclipsing binaries (3UCAC 146-060990, 3UCAC 146-061534, 3UCAC 145-061591, 3UCAC 146-061594) are presented, which were found in a search for new variables in the field of DP CMa.*

Introduction

During an investigation of the field of DP CMa with a robotic telescope at Siding Spring Observatory, Australia, four variable objects attracted our attention, which were subsequently analyzed in detail. According to AAVSO VSX two variable objects were still unknown (MoV17 CMa = 3UCAC 145-061591, MoV18 CMa = 3UCAC 146-061594), while the other two were already noted in the VSX as a variable, but without type and elements (MoV15 CMa = 3UCAC 146-060990, MoV16 CMa = 3UCAC 146-061534).

Observations

The observations were carried out with a 0.43 m f/6.8 Dall-Kirkham Telescope equipped with cooled FLI Proline 16803 CCD-Camera and V-Filter between December 2014 and May 2016. The exposure time was between 60 and 120 seconds. The telescope was controlled from Lennestadt via the internet.

Data analysis

Muniwin [1] and a self-written program by F. Agerer were used for the analysis of the frames. The period analysis was performed with Peranso [2], the magnitudes of the variable (Max) and of the comparison stars were obtained from GUIDE 9 [3].

The presented elements were calculated by taking into account all minimas (see tables below) with the method of least squares. The given amplitudes are uncorrected instrumental values.

MoV15 CMa = 3UCAC 146-060990 (14.53)

Right ascension: 07h24m06.9120s (2000)

Declination: -17 24' 42.340"

2MASS J-K = 0.56

Comparison star = 3UCAC 146-060992 (13.31) J-K = 0.14

Check Star = 3UCAC 146-061025 (13.30) J-K = 0.74

Amplitude Min I: 0.62 (instr.) Min II: 0.50 (instr.)

Type: WUMa type eclipsing binary

Min I = HJD 2457053.0849 + 0.2978430*E
 + -0.0006 + -0.0000002

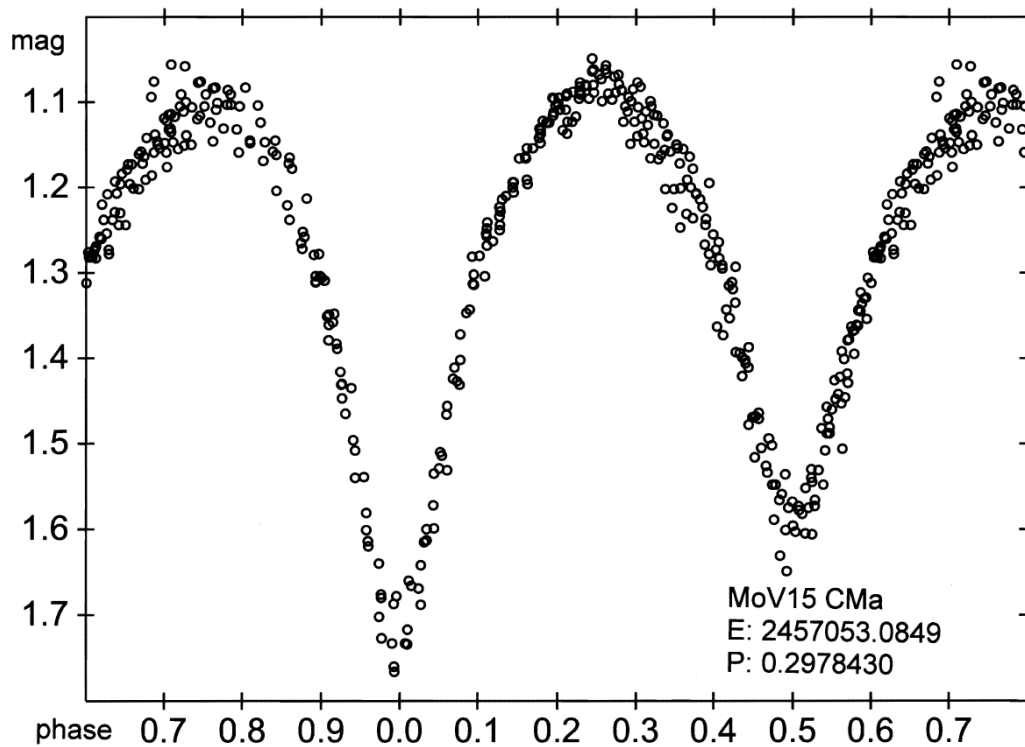


Fig 1: Phased lightcurve of MoV15 CMa = 3UCAC 146-060990 using the ephemeris given above.

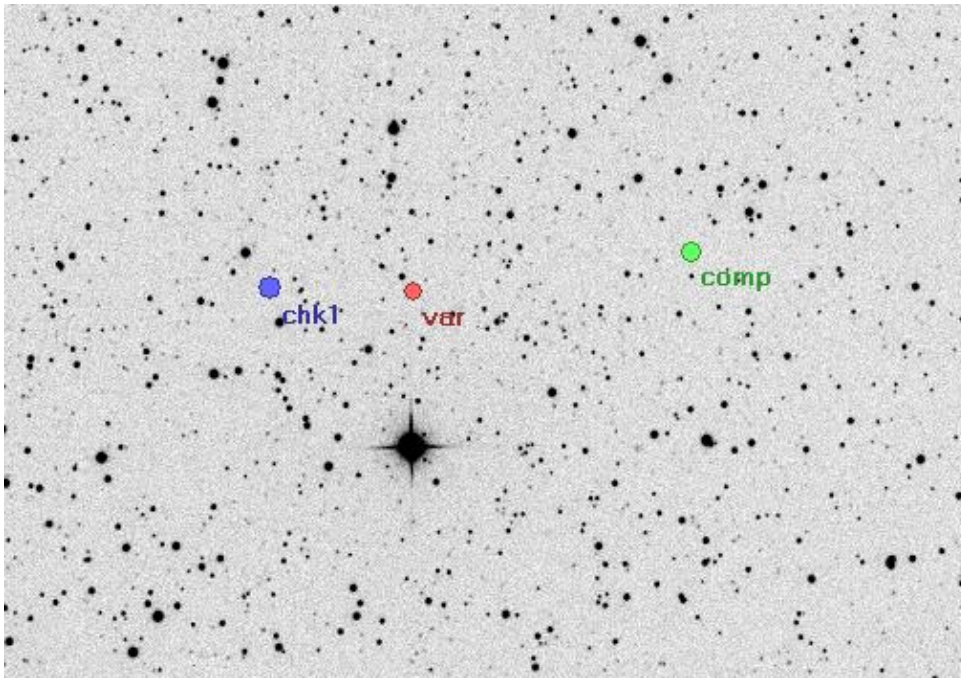


Fig 2: MoV15 CMa = 3UCAC 146-060990 (var) in the field of DP CMa. (comp) is the comparison star and (chk1) is the check star. North is right and East is up.

Table 1: Minima of MoV15 CMa = 3UCAC 146-060990

Observer	HJD-Date Minimum	Type	Epoch	O-C (d)
W. Moschner	2457053,0849	I	0	0,0000
W. Moschner	2457119,9511	II	224,5	0,0004
W. Moschner	2457419,1328	I	1229	-0,0011
W. Moschner	2457435,0697	II	1282,5	0,0012
W. Moschner	2457438,0436	II	1292,5	-0,0034
W. Moschner	2457442,9605	I	1309	-0,0009
W. Moschner	2457444,0051	II	1312,5	0,0013
W. Moschner	2457465,0014	I	1383	-0,0004
W. Moschner	2457469,0252	II	1396,5	0,0026
W. Moschner	2457474,9801	II	1416,5	0,0006

Remarks: MoV15 CMa is noted in the VSX as a variable without type and elements (GDS_J0724069-172442); possibly O'Connell-Effect.

MoV16 CMa = 3UCAC 146-061534 (14.37)

Right ascension: 07h24m57.3807s

Declination: -17 17' 21.110"

2MASS J-K = 0.40

Comparison star = 3UCAC 146-061592 (12.81) J-K = 1.00

Check Star = TYC 5970 462 (12.41) B-V = -0.09

Amplitude Min I: 0.20 (instr.) Min II: 0.20 (instr.)

Type: WUMa type eclipsing binary

Min I = HJD 2457419.0328 +0.41214930*E
 +0.0010 +0.0000002

A differentiation between Min I and Min II was not possible.

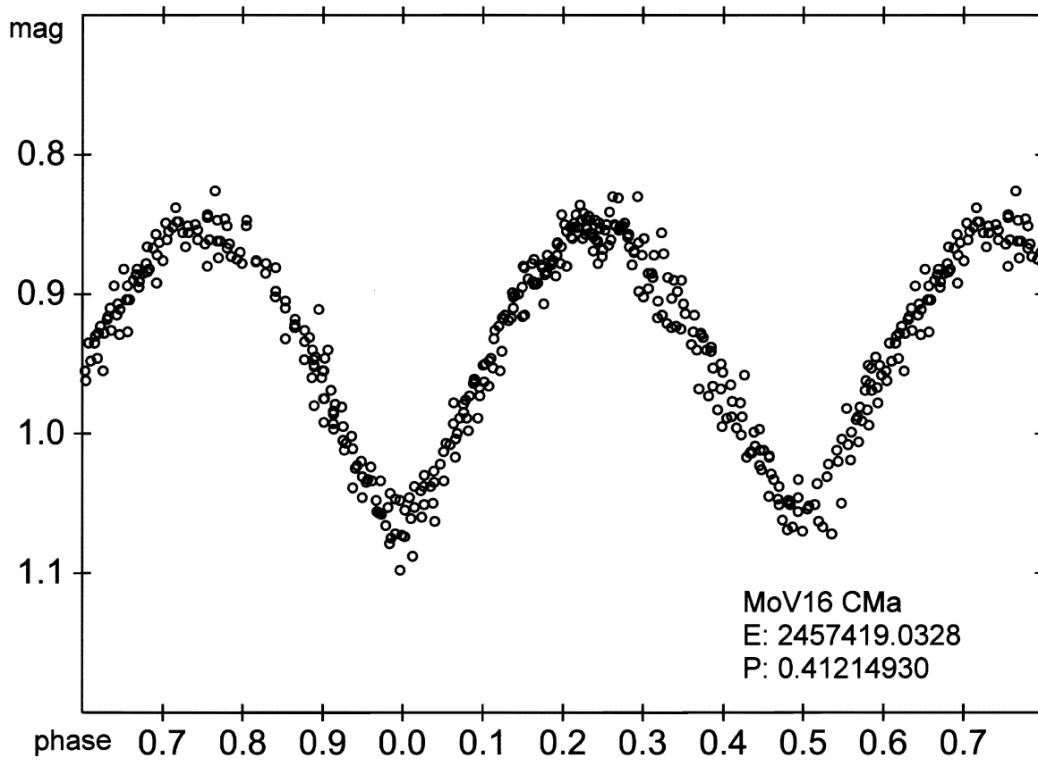


Fig 3: Phased lightcurve of MoV16 CMa = 3UCAC 146-061534 using the ephemeris given above.

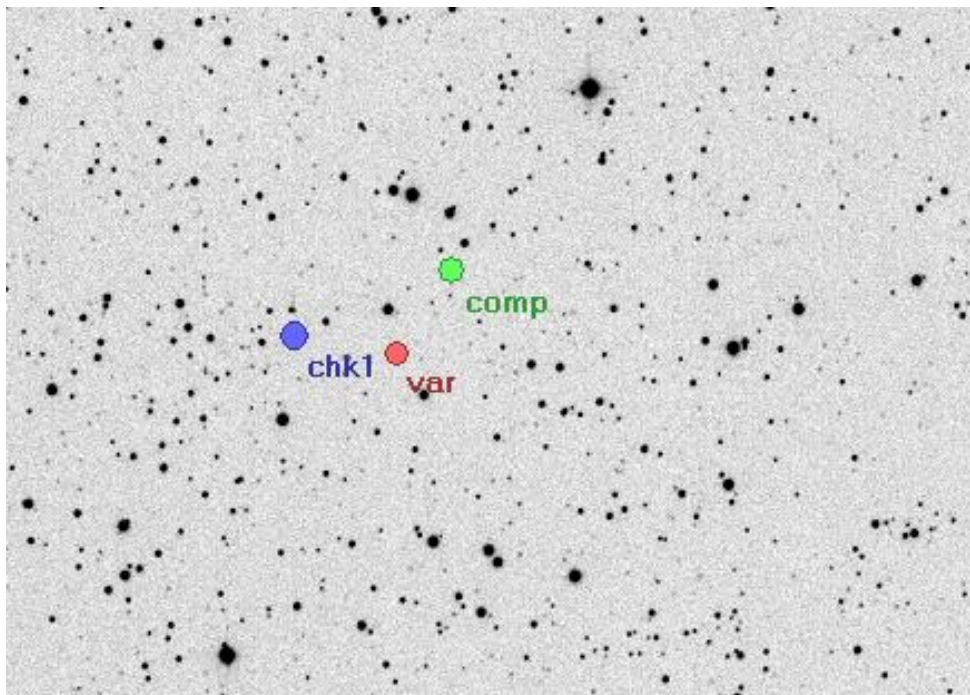


Fig 4: MoV16 CMa = 3UCAC 146-061534 (var) in the field of DP CMa. (comp) is the comparison star and (chk1) is the check star. North is right and East is up.

Table 2: Minima of MoV16 CMa = 3UCAC 146-061534

Observer	HJD-Date Minimum	Type	Epoch	O-C [d]
W. Moschner	2457053,0435	I	-888	-0,0007
W. Moschner	2457419,0328	I	0	0,0000
W. Moschner	2457437,9892	I	46	-0,0025
W. Moschner	2457442,9329	I	58	-0,0046
W. Moschner	2457443,9671	II	60,5	-0,0007
W. Moschner	2457464,9852	II	111,5	-0,0022

Remarks: MoV16 CMa noted in the VSX as a variable without type and elements (GDS_J0724573-171721).

MoV17 CMa = 3UCAC 145-061591 (14.20)

Right ascension: 07h23m03.7853s
 Declination: -17 33' 40.515"
 2MASS J-K = 0.24

Comparison star = 3UCAC 146-060315 (11.97) J-K = 0.34
 Check Star = 3UCAC 146-060270 (12.86) J-K = 0.08

Amplitude Min I: 0.28 (instr.) Min II: 0.22 (instr.)

Type: Algol type eclipsing binary

Min I = HJD 2457437.9553 +1.9587727*E
 +-0.0031 +-0.0000004

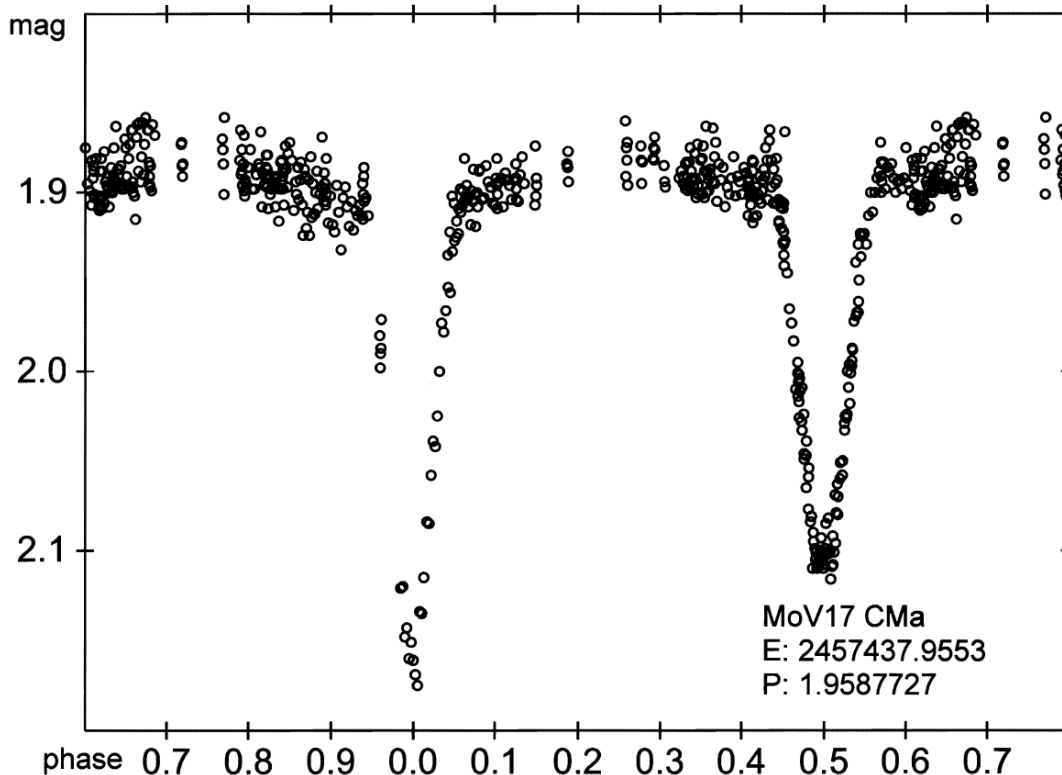


Fig 5: Phased lightcurve of MoV17 CMa = 3UCAC 145-061591 using the ephemeris given above.

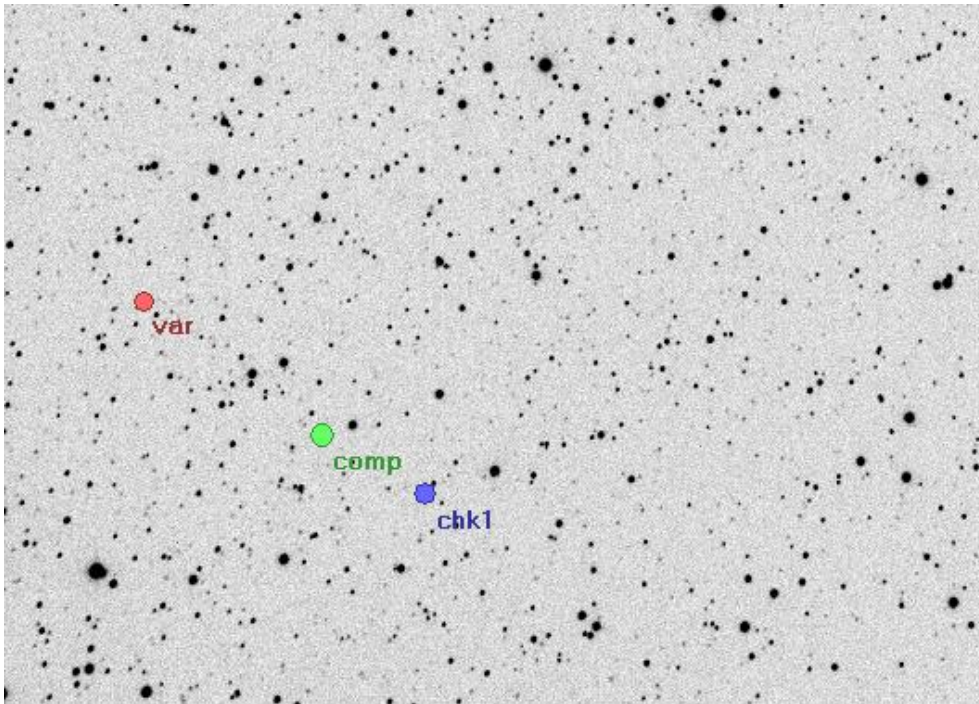


Fig 6: MoV17 CMa = 3UCAC 145-061591 (var) in the field of DP CMa. (comp) is the comparison star and (chk1) is the check star. North is right and East is up.

Table 3: Minima of MoV17 CMa = 3UCAC 145-061591

Observer	HJD-Date Minimum	Type	Epoch	O-C [d]
W. Moschner	2457053,0565	II	-196,5	0,0000
W. Moschner	2457435,0154	II	-1,5	-0,0017
W. Moschner	2457437,9553	I	0	0,0000

MoV18 CMa = 3UCAC 146-061594 (15.56)

Right ascension: 07h25m03.7958s

Declination: -17 21' 42.366"

2MASS J-K = 0.56

Comparison star = 3UC146-061592 (12.81) J-K = 1.00

Check Star = TYC 5970 462 (12.41) B-V = -0.09

Amplitude Min I: 0.59 (instr.) Min II: 0.59 (instr.)

Type: WUMa type eclipsing binary

Min I = HJD 2457419.0418 +0.4087517*E
 +0.0008 +-0.0000002

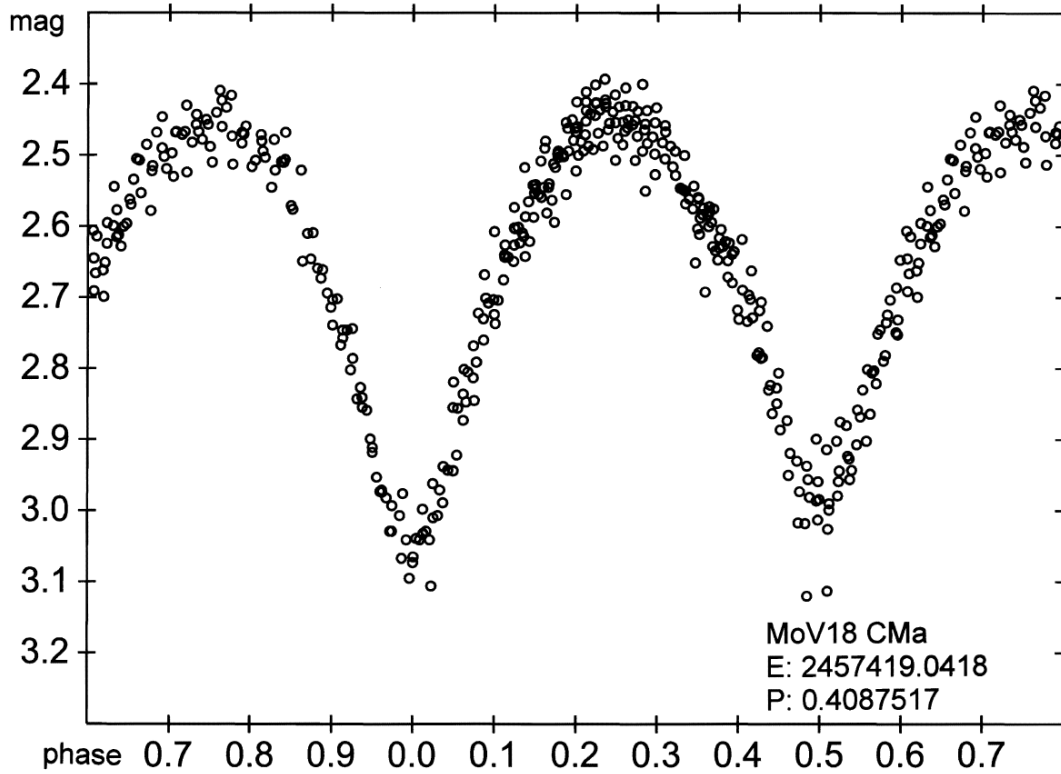


Fig 7: Phased lightcurve of MoV18 CMa = 3UCAC 146-061594 using the ephemeris given above.

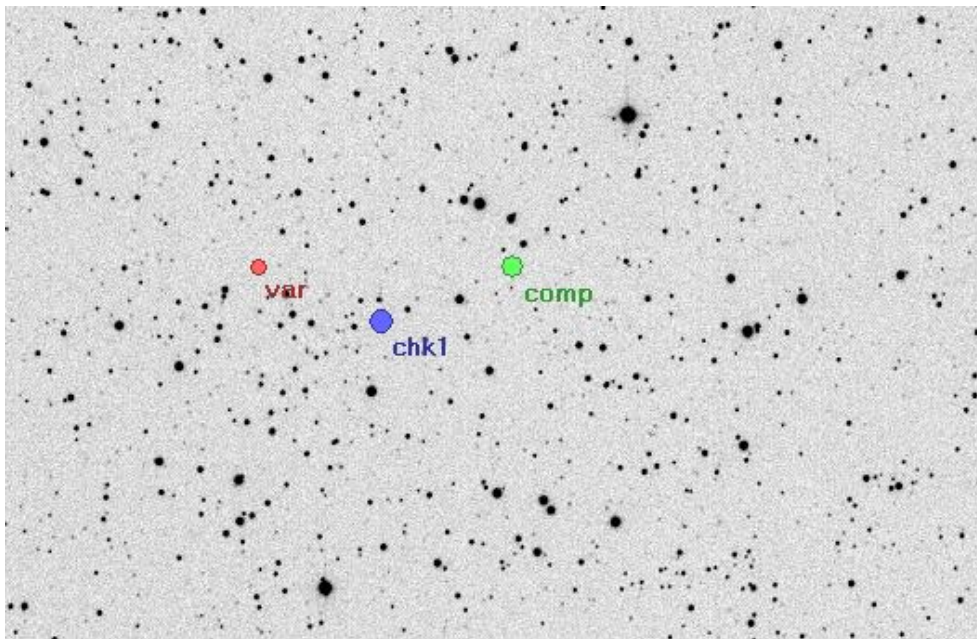


Fig 8: MoV18 CMa = 3UCAC 146-061594 (var) in the field of DP CMa. (comp) is the comparison star and (chk1) is the check star. North is right and East is up.

Table 4: Minima of MoV18 CMa = 3UCAC 146-061594

Observer	HJD-Date Minimum	Type	Epoch	O-C [d]
W. Moschner	2457053,0045	II	-895,5	-0,0002
W. Moschner	2457419,0418	I	0	0,0000
W. Moschner	2457434,9809	I	39	-0,0022
W. Moschner	2457438,0482	II	46,5	-0,0006
W. Moschner	2457442,9536	II	58,5	-0,0002
W. Moschner	2457443,9752	I	61	-0,0005
W. Moschner	2457465,0269	II	112,5	0,0005
W. Moschner	2457475,0405	I	137	-0,0003

Acknowledgements

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References

- [1] Motl, David: MuniWin, <http://c-munipack.sourceforge.net>
- [2] Vanmunster, Tony: Peranso, <http://www.peranso.com/>
- [3] Guide 9: <http://www.projectpluto.com>