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40 New Variables Stars Discovered at the Maidanak Astronomical Observatory: Field Center α= 20h 07m δ= +38d 25m (J2000.0)

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#	Name	Other	Coord (J2000)	Type	Max	Min	System	Period	Epoch (JD)	type	Sp	Comment	L.Curve	Find.Chart	Data
1		DR3 2061828844665062144	20 05 52.110 +38 22 23.03	EA	15.15	15.65	R	1.687	2460147.2830	min			lc_25058.png	fc_25058.png	d25058.dat
2		DR3 2061883820250669056	20 05 54.113 +38 33 06.46	EA	17.88	18.60	R	3.34	2460158.3472	min		Comm. 2	lc_23568.png	fc_23568.png	d23568.dat
3		DR3 2061884296962774016	20 05 57.670 +38 35 41.73	LB	15.34	15.48	R			other		Comm. 3	lc_07759.png	fc_07759.png	d07759.dat
4		DR3 2061829428781023104	20 06 01.774 +38 25 08.99	LB	14.38	14.41	R			other		Comm. 4	lc_07632.png	fc_07632.png	d07632.dat
5		DR3 2061835338656060672	20 06 04.824 +38 26 14.22	LB	15.74	15.79	R			other		Comm. 5	lc_11547.png	fc_11547.png	d11547.dat
6		DR3 2061829394421287040	20 06 05.549 +38 25 12.78	EA	17.27	17.88	R	2.479	2460148.3461	min			lc_07698.png	fc_07698.png	d07698.dat
7		DR3 2061886053632594432	20 06 08.495 +38 39 14.36	GDOR:	13.62	13.68	R	0.273	2460157.3426	max			lc_05278.png	fc_05278.png	d05278.dat
8		DR3 2061836743084244224	20 06 13.033 +38 31 15.71	BY:	17.25	17.47	R	0.8826:		max			lc_09537.png	fc_09537.png	d09537.dat
9		DR3 2061836884844467840	20 06 17.154 +38 32 42.00	BY	15.26	15.29	R	6.69		max		Comm. 9	lc_08941.png	fc_08941.png	d08941.dat
10		DR3 2061839255665913984	20 06 32.683 +38 38 56.96	LB	15.50	15.56	R			other		Comm. 10	lc_05380.png	fc_05380.png	d05380.dat
11		DR3 2061811664795643648	20 06 41.773 +38 11 58.11	LB	14.12	14.17	R			other		Comm. 11	lc_00521.png	fc_00521.png	d00521.dat
12		DR3 2061837778197132288	20 06 46.245 +38 33 46.45	LB	15.39	15.44	R			other		Comm. 12	lc_08482.png	fc_08482.png	d08482.dat

13		DR3 2061861756970736256	20 06 49.676 +38 38 15.41	LB	13.88	13.94	R			other		Comm. 13	lc_05543.png	fc_05543.png	d05543.dat
14		DR3 2061861417698990336	20 06 57.217 +38 36 42.27	EA	17.38	17.95	R	3.315	2460144.4471	min		Comm. 14	lc_07332.png	fc_07332.png	d07332.dat
15		DR3 2061817574670606720	20 07 02.602 +38 15 08.45	BY:	14.77	14.85	R	0.608		max		Comm. 15	lc_01803.png	fc_01803.png	d01803.dat
16		DR3 2061821178122009344	20 07 02.842 +38 25 47.24	LB	14.09	14.14	R			other		Comm. 16	lc_11385.png	fc_11385.png	d11385.dat
17		DR3 2061814104336978176	20 07 05.412 +38 09 55.06	BY	15.77	15.83	R	18.4		max		Comm. 17	lc_32431.png	fc_32431.png	d32431.dat
18		DR3 2061858187883497216	20 07 06.453 +38 34 35.37	BY	15.72	15.77	R	7.23		max		Comm. 18	lc_08162.png	fc_08162.png	d08162.dat
19		DR3 2061858595874808448	20 07 06.948 +38 37 13.19	LB	13.68	13.71	R			other		Comm. 19	lc_05907.png	fc_05907.png	d05907.dat
20		DR3 2061818399304852096	20 07 08.097 +38 18 59.13	LB	14.80	14.85	R			other		Comm. 20	lc_03351.png	fc_03351.png	d03351.dat
21		DR3 2061833586309032064	20 07 10.610 +38 30 26.16	LB	14.96	15.03	R			other		Comm. 21	lc_09827.png	fc_09827.png	d09827.dat
22		DR3 2061821319882794240	20 07 11.849 +38 24 53.54	*	14.78	14.88	R	2.71:	2460145.4051	max		Comm. 22	lc_07811.png	fc_07811.png	d07811.dat
23		DR3 2061819842413943552	20 07 20.237 +38 21 40.45	EA	16.47	16.84	R	1.916	2460144.3997	min		Comm. 23	lc_04445.png	fc_04445.png	d04445.dat
24		DR3 2061845161217119488	20 07 22.951 +38 28 37.86	LB	13.24	13.31	R			other		Comm. 24	lc_10452.png	fc_10452.png	d10452.dat
25		DR3 2061813618977932288	20 07 23.463 +38 11 04.41	BY:	14.10	14.19	R	1.34		max			lc_00244.png	fc_00244.png	d00244.dat
26		DR3 2061860593065196288	20 07 23.937 +38 41 05.95	EA	15.02	15.44	R	2.840	2460158.198	min		Comm. 26	lc_04581.png	fc_04581.png	d04581.dat
27		DR3 2061814035624474112	20 07 24.018 +38 13 25.98	EA	13.87	14.03	R	1.266	2460146.4568	min		Comm. 27	lc_01088.png	fc_01088.png	d01088.dat
28		DR3 2061820667048035072	20 07 26.096 +38 26 21.21	LB	14.40	14.44	R			other		Comm. 28	lc_11283.png	fc_11283.png	d11283.dat
29		DR3 2061813760739548160	20 07 28.126 +38 12 35.76	LB	14.91	14.96	R			other		Comm. 29	lc_00841.png	fc_00841.png	d00841.dat
30		DR3 2061817162354338432	20 07 36.137 +38 21 03.52	LB	15.49	15.54	R			other		Comm. 30	lc_04176.png	fc_04176.png	d04176.dat
31		DR3 2061815650532218112	20 07 40.438 +38 16 46.27	EB	16.91	17.20	R	0.5051	2460155.3076	min		Comm. 31	lc_02520.png	fc_02520.png	d02520.dat
32		DR3 2061847398925470592	20 07 43.545 +38 35 14.52	LB	15.49	15.59	R			other		Comm. 32	lc_07832.png	fc_07832.png	d07832.dat
33		DR3 2061845612224503040	20 07 45.409 +38 32 38.73	EA	18.10	18.75	R	2.655	2460145.2509	min		Comm. 33	lc_08866.png	fc_08866.png	d08866.dat
34		DR3 2061817020593045248	20 07 46.956 +38 21 03.51	LB	14.90	14.93	R			other		Comm. 34	lc_04198.png	fc_04198.png	d04198.dat
35		DR3 2061628011995962368	20 07 52.582 +38 14 26.81	BY:	17.45	17.71	R	0.852		max		Comm. 35	lc_01661.png	fc_01661.png	d01661.dat
36		DR3 2061840045941136640	20 08 08.953 +38 23 23.49	LB	15.45	15.57	R			other		Comm. 36	lc_06431.png	fc_06431.png	d06431.dat
37		DR3 2061853789836743168	20 08 10.019 +38 40 09.35	EA	14.99	15.42	R	4.835	2460144.1953	min		Comm. 37	lc_04861.png	fc_04861.png	d04861.dat
38		DR3 2061846711730522112	20 08 15.829 +38 34 58.23	LB	16.00	16.07	R			other		Comm. 38	lc_07880.png	fc_07880.png	d07880.dat
39		DR3 2061852896459124864	20 08 17.892 +38 37 56.39	EA	18.10	18.65	R	1.0548	2460152.2099	min		Comm. 39	lc_05620.png	fc_05620.png	d05620.dat
40		DR3 2061853167033187840	20 08 32.706 +38 39 35.10	LB	16.53	16.65	R			other		Comm. 40	lc_26431.png	fc_26431.png	d26431.dat

Comments:

2. MinII = 18.43.

3. J = 12.309, H = 11.597, K = 11.348 (2MASS).

4. J = 10.226, H = 9.158, K = 8.813 (2MASS).

5. ZTF18absjuwv. J = 11.392, H = 10.299, K = 9.917 (2MASS).

9. The star is variable according to GAIA DR3 with a type ROT and no period.

10. J = 11.050, H = 9.906, K = 9.507 (2MASS).

11. ZTF18abucmhr. J = 9.851, H = 8.813, K = 8.446 (2MASS).

12. J = 11.039, H = 9.949, K = 9.573 (2MASS).

13. J = 9.319, H = 8.324, K = 7.937 (2MASS).

14. Twice shorter period is possible. MinII = 17.82.

15. The star is variable according to GAIA DR3 with a type VAR and P = 0.60852 d.

16. ZTF18aayowvs. J = 9.753, H = 8.731, K = 8.363 (2MASS).

17. The star is variable according to GAIA DR3 with a type RS and no period.

18. The star is variable according to GAIA DR3 with a type ROT and no period.

19. J = 9.368, H = 8.331, K = 7.950 (2MASS).

20. J = 10.554, H = 9.452, K = 9.104 (2MASS).

21. J = 10.314, H = 9.244, K = 8.854 (2MASS).

22. Waves with shorter time scales are superposed.

23. The star is variable according to GAIA DR3 with a type E and P = 0.95849 d.
MinII = 16.60.

24. J = 10.366, H = 9.308, K = 8.972 (2MASS).

26. The star is variable according to GAIA DR3 with a type E and P = 5.6881 d.
MinII = 15.16.

27. MinII = 13.93. O'Connell effect.

28. J = 10.366, H = 9.308, K = 8.972 (2MASS).

29. J = 10.716, H = 9.634, K = 9.270 (2MASS).

30. J = 10.806, H = 9.768, K = 9.388 (2MASS).

31. MinII = 17.10.

32. J = 9.963, H = 8.851, K = 8.365 (2MASS).

33. MinII = 18.70.

34. J = 10.718, H = 9.623, K = 9.282 (2MASS).

35. J = 14.343, H = 13.398, K = 13.283 (2MASS).

36. J = 10.815, H = 9.673, K = 9.240 (2MASS).

37. MinII = 15.37.

38. J = 11.085, H = 9.936, K = 9.450 (2MASS).

39. MinII = 18.52.

40. J = 11.599, H = 10.339, K = 9.923 (2MASS).

Remarks:

We present the results of searching for variable stars in a field with the center at $\alpha = 20^h\ 07^m$, $\delta = +38^d\ 25^m$ (J2000.0). The field of view is 30′. We inspected the available databases containing information on variable stars: GCVS (Samus et al., 2017), AAVSO VSX, ZTF (Chen et al., 2020) via the SNAD ZTF viewer (Malanchev et al., 2023), ASAS-SN Variable Stars Database and found no records for the objects listed in the table except several cases specially mentioned in comments. The coordinates were extracted from Gaia DR3 (Gaia Collaboration et al., 2023). The infrared JHK magnitudes were drawn from the 2MASS catalogue (Skrutskie et al. 2006).

Our observations were carried out at the Maidanak Astronomical Observatory of the Astronomical Institute of the Academy of Sciences of the Republic of Uzbekistan (Ehgamberdiev, 2018) using the 0.5-meter AMT-1 telescope with Mathis Instruments MI-750/1000 equatorial fork mount equipped with an Apogee Alta U16M (4K×4K) CCD camera. The physical size of a CCD pixel is 9 microns. We used 2×2 binning, which corresponds to 0.907″/pixel, and the field of view of 30.9′×30.9′. The exposure times were 180 seconds in the Bessel R filter. The temperature of the camera was set to –15° C. Calibration images as bias, dark and flat fields were also obtained for each observational date. The photometric dataset was obtained during the time interval from July 15 to August 06, 2023 (JD 2460141.2300–2460163.3643). During 21 nights almost 2000 frames were taken. All images were processed with master bias, dark, and flat frames using standard IRAF packages. We rejected low-quality images, and the final set contained 1937 frames. The VaST software package (Sokolovsky and Lebedev, 2018) was used to search for variable stars. To derive periods, we used the period search tool by Dr. K.V. Sokolovsky who incorporated it in his VaST package.

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References:

Chen, X., Wang, S., Deng, L., et al., 2020, Astrophys. J. Suppl. Ser., 249, 18

Ehgamberdiev, S., 2018, Nat. Astron., 2, 349
Gaia Collaboration, Vallenari, A., Brown, A. G. A., et al., 2023, Astron. Astrophys., 674, A1
Malanchev, K., Kornilov, M. V., Pruzhinskaya, M. V., et al., 2023, Publ. Astron. Soc. Pac., 135, 1044, id. 024503
Samus, N. N., Kazarovets, E. V., Durlevich, O. V., Kireeva, N. N., Pastukhova, E. N., 2017, Astron. Rep., 61, 80
Skrutskie, M.F., Cutri, R.M., Stiening, R., et al., 2006, Astron. J., 131, 1163
Sokolovsky, K. V., Lebedev, A. A., 2018, Astron. Comput., 22, 28