

# Light Elements and Other Photometric Parameters for Twenty Two Variable Stars

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#	Name	Other	Coord (J2000)	Type	Max	Min	System	Period	Epoch (JD)	type	Sp	Comment	L.Curve	Find.Chart	Data
1		2MASS J00023844+6724095	00 02 38.464 +67 24 09.53	EA	12.97	13.78	zr	66.5790	2459077.949	min		<a href="#">Comm. 1</a>	<a href="#">lc_01.png</a>	<a href="#">ch_01.png</a>	<a href="#">V01.txt</a>
2		DR3 510001738346242688	01 36 47.906 +61 26 06.51	EA	17.07	17.32	zr	2.13797	2459204.746	min		<a href="#">Comm. 2</a>	<a href="#">lc_02.png</a>	<a href="#">ch_02.png</a>	<a href="#">V02.txt</a>
3		2MASS J09534278-4543166	09 53 42.782 -45 43 16.56	DSCTC	13.80	13.83	g	0.0550867	2460709.743	max		<a href="#">Comm. 3</a>	<a href="#">lc_03.png</a>	<a href="#">ch_03.png</a>	<a href="#">V03.txt</a>
4		DR3 4256460513326345216	18 33 20.923 -04 58 28.23	EA	16.51	17.18	zr	1.31320	2460481.827	min		<a href="#">Comm. 4</a>	<a href="#">lc_04.png</a>	<a href="#">ch_04.png</a>	<a href="#">V04.txt</a>
5		HS 1286 = FASTT 1286	18 53 03.712 -00 40 46.36	EB	15.46	16.33	g	1.25157	2458684.788	min		<a href="#">Comm. 5</a>	<a href="#">lc_05.png</a>	<a href="#">ch_05.png</a>	<a href="#">V05.txt</a>
6		2MASS J21494762+5903068	21 49 47.636 +59 03 06.81	EA	16.98	17.60	zr	4.99071	2459726.907	min		<a href="#">Comm. 6</a>	<a href="#">lc_06.png</a>	<a href="#">ch_06.png</a>	<a href="#">V06.txt</a>
7		2MASS J21495706+5859170	21 49 57.069 +58 59 17.12	EA	15.65	15.94:	zr	16.5839	2460226.873	min		<a href="#">Comm. 7</a>	<a href="#">lc_07.png</a>	<a href="#">ch_07.png</a>	<a href="#">V07.txt</a>
8		2MASS J21503341+5849595	21 50 33.410 +58 49 59.42	EA	17.36	17.81	zr	7.63768	2460223.737	min		<a href="#">Comm. 8</a>	<a href="#">lc_08.png</a>	<a href="#">ch_08.png</a>	<a href="#">V08.txt</a>
9		2MASS J21510036+5906509	21 51 00.365 +59 06 50.95	EA	15.45	15.85	zr	25.9586	2460230.716	min		<a href="#">Comm. 9</a>	<a href="#">lc_09.png</a>	<a href="#">ch_09.png</a>	<a href="#">V09.txt</a>
10		2MASS J21515214+5850243	21 51 52.135 +58 50 24.35	EA	16.35	16.87	zr	3.00686	2460516.913	min		<a href="#">Comm. 10</a>	<a href="#">lc_10.png</a>	<a href="#">ch_10.png</a>	<a href="#">V10.txt</a>
11		2MASS J21533095+5912299	21 53 30.947 +59 12 29.85	EA	15.84	16.36	zr	41.6852	2460285.005	min		<a href="#">Comm. 11</a>	<a href="#">lc_11.png</a>	<a href="#">ch_11.png</a>	<a href="#">V11.txt</a>
12		USNO-B1.0 1609-0151253	22 19 47.521 +70 57 55.27	EA	18.75	19.44	zr	8.13252	2460520.858	min		<a href="#">Comm. 12</a>	<a href="#">lc_12.png</a>	<a href="#">ch_12.png</a>	<a href="#">V12.txt</a>
13		DR3 2002843928463878528	22 53 35.288 +54 41 56.14	EA	14.60	15.42	zr	2.78739	2460099.893	min		<a href="#">Comm. 13</a>	<a href="#">lc_13.png</a>	<a href="#">ch_13.png</a>	<a href="#">V13.txt</a>
14		2MASS J22544408+5337353	22 54 44.083 +53 37 35.35	EA	16.01	16.43	zr	3.36163	2460222.714	min		<a href="#">Comm. 14</a>	<a href="#">lc_14.png</a>	<a href="#">ch_14.png</a>	<a href="#">V14.txt</a>
15		2MASS J22551856+5413496	22 55 18.570 +54 13 49.59	EA+DSCTC	12.87	13.28	zg	9.55233	2460556.837	min		<a href="#">Comm. 15</a>	<a href="#">lc_15.png</a>	<a href="#">ch_15.png</a>	<a href="#">V15.txt</a>
16		2MASS J22560506+5308282	22 56 05.072 +53 08 28.19	EA	12.57	12.68	g	3.54244	2460599.883	min		<a href="#">Comm. 16</a>	<a href="#">lc_16.png</a>	<a href="#">ch_16.png</a>	<a href="#">V16.txt</a>
17		2MASS J22563076+5256094	22 56 30.764 +52 56 09.42	EA	15.84	16.28	zg	8.56149	2460547.934	min		<a href="#">Comm. 17</a>	<a href="#">lc_17.png</a>	<a href="#">ch_17.png</a>	<a href="#">V17.txt</a>
18		DR3 2012879063707896960	23 50 09.305 +62 03 28.56	EA	18.17	18.63	zr	0.986187	2459851.827	min		<a href="#">Comm. 18</a>	<a href="#">lc_18.png</a>	<a href="#">ch_18.png</a>	<a href="#">V18.txt</a>
19		USNO-B1.0 1526-0458817	23 56 19.539 +62 36 04.48	EA	16.81	17.35	zr	5.19421	2460511.806	min		<a href="#">Comm. 19</a>	<a href="#">lc_19.png</a>	<a href="#">ch_19.png</a>	<a href="#">V19.txt</a>
20		USNO-B1.0 1528-0467698	23 57 05.403 +62 49 53.16	EA	17.30	17.88	zr	9.15020	2460239.823	min		<a href="#">Comm. 20</a>	<a href="#">lc_20.png</a>	<a href="#">ch_20.png</a>	<a href="#">V20.txt</a>
21		USNO-B1.0 1526-0460762	23 58 41.426 +62 37 14.70	EA	16.29	16.48	zr	3.03116	2460560.878	min		<a href="#">Comm. 21</a>	<a href="#">lc_21.png</a>	<a href="#">ch_21.png</a>	<a href="#">V21.txt</a>
22		USNO-B1.0 1526-0460830	23 58 46.976 +62 36 51.32	EA	16.43	16.78	zr	228.29	2460268.850	min		<a href="#">Comm. 22</a>	<a href="#">lc_22.png</a>	<a href="#">ch_22.png</a>	<a href="#">V22.txt</a>

## Comments:

1. = GSC 04026-00677.  $zg = 14.27-15.30$ ,  $D = 0.015$  P. Twice longer period is possible. Combined photometry in ZTF r-band and R-band near minimum published by Popov and Zubareva (2022) was used for period determination. Magnitudes in R-band were adjusted by -0.3 mag. The variability of EA type was discovered by Popov and Zubareva (2022), but only one minimum was detected.

2. = USNO-A2.0 1500-01640775.  $MinII = 17.22$  zr,  $D = 0.06$  P. The object is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and incorrect  $P = 2.10795$  d.

3. = GSC 08181-02326.  $M-m = 0.48$  P.  $V = 13.64-13.68$ . Additional period  $P = 0.092813$  d is clearly present at the power spectrum. This mode is probably nonradial. The variability was discovered by Csizmadia et al. (2016) as DSCT type with  $P \sim 0.1$  d.

4. = USNO-A2.0 0825-12358286.  $MinII = 16.72$  zr,  $D = 0.08$  P.  $zg = 17.73-18.50$ ,  $MinII = 17.89$  zg. The object is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and erroneous  $P = 0.78236$  d.

5. = USNO-A2.0 0825-13350978.  $MinII = 15.92$  g. The variability was reported by Henden and Stone (1998) without any type or period. The star is included in the ASAS-SN Variable Stars Database (Jayasinghe et al., 2018) with the type VAR but no period.

6. = USNO-A2.0 1425-12389311.  $MinII = 17.29$  zr,  $D = 0.07$  P. Eccentric orbit:  $MinII-MinI = 0.286$  P.  $zg = 17.47-18.14$ ,  $MinII = 17.76$  zg. The variable is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and erroneous  $P = 0.270836$  d. The star was also independently discovered by Khamrakulov et al. (2023) with the type EA and twice longer  $P = 9.975$  d.

7. = USNO-A2.0 1425-12392639.  $MinII = 15.81$  zr,  $D = 0.02$  P. Eccentric orbit:  $MinII-MinI = 0.156$  P.  $zg = 16.52-16.77$ ,  $MinII = 16.65$  zg. The variability was discovered by Khamrakulov et al. (2023) with uncertain type EA:, because only one minimum was observed.

8. = USNO-A2.0 1425-12405340.  $MinII = 17.79$  zr,  $D = 0.03$  P.  $zg = 18.49-19.01$ ,  $MinII = 18.94$  zg. The variability was discovered by Khamrakulov et al. (2023) with the type EA and twice shorter  $P = 3.833$  d.

9. = USNO-A2.0 1425-12415313.  $MinII = 15.81$  zr,  $D = 0.05$  P. Eccentric orbit:  $MinII-MinI = 0.470$  P.  $zg = 16.89-17.28$ ,  $MinII = 17.27$  zg. The variability was discovered by Khamrakulov et al. (2023) with uncertain type EA:, because only one minimum was observed.

10. = USNO-A2.0 1425-12434698.  $MinII = 16.58$  zr,  $D = 0.05$  P. Apsidal motion,  $P = 3.00671$  d for  $MinII$ .  $zg = 16.88-17.46$ ,  $MinII = 17.11$  zg. The object is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and erroneous  $P = 4.47253$  d. Was also independently discovered by Khamrakulov et al. (2023) with the type EA and twice longer  $P = 6.012$  d.

11. = USNO-A2.0 1425-12472259.  $MinII = 16.34$  zr,  $D = 0.015$  P. Eccentric orbit:  $MinII-MinI = 0.283$  P.  $zg = 17.46 - 17.98$ ,  $MinII = 17.96$  zg. The object is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and erroneous  $P = 11.8937$  d. Was also independently discovered by Khamrakulov et al. (2023) with uncertain type EA:, because only one minimum was observed.

12. = USNO-A2.0 1575-05047588.  $MinII = 19.09$  zr,  $D = 0.02$  P. Eccentric orbit:  $MinII-MinI = 0.518$  P.  $zg = 19.73 - 20.38$ ,  $MinII = 19.98$  zg. The variability was reported by Liakos and Nanouris (2014) with the type EA without period and magnitude range; only one  $MinI$  was observed.

13. = USNO-A2.0 1425-14245136.  $MinII = 15.03$  zr,  $D = 0.05$  P.  $zg = 15.36 - 16.33$ ,  $MinII = 15.81$  zg. The variable is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and erroneous  $P = 1.31903$  d.

14. = USNO-A2.0 1425-14276566.  $MinII = 16.35$  zr,  $D = 0.05$  P.  $zg = 16.65-17.08$ ,  $MinII = 16.97$  zg. The object is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and incorrect  $P = 3.40397$  d. Was also independently discovered by Lapukhin et al. (2022) with the type EA and erroneous  $P = 1.3475$  d.

15. = GSC 03985-00207. EA type light elements are given in the table, photometric parameters are  $zg = 12.89-13.28$ ,  $MinII = 13.14$  zg,  $D = 0.04$  P. Eccentric orbit:  $MinII-MinI = 0.627$  P. DSCTC type light elements:  $HJD Max = 2460194.789 + 0.0836790 \times E$ ,  $zg = 12.87-12.91$ . The object is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and erroneous  $P = 47.76$  d. Variability was independently discovered by Lapukhin et al. (2022) with the type DSCT and incorrect  $P = 0.0844756$  d.

16. = GSC 03985-01182.  $MinII = 12.67$  g,  $D = 0.03$  P.  $V = 12.22-12.32$ ,  $MinII = 12.31$  V. Variability was discovered by Lapukhin et al. (2022) with the type EA and erroneous  $P = 6.55$  d.

17. = USNO-A2.0 1425-14324096.  $MinII = 16.24$  zg,  $D = 0.05$  P. Eccentric orbit:  $MinII-MinI = 0.664$  P.  $zr = 15.20-15.61$ ,  $MinII = 15.59$  zr. The object is included in the Gaia DR3 catalogue

of variable stars (Gaia Collaboration, 2022) with the type E and erroneous  $P = 5.018$  d. Variability was independently discovered by Lapukhin et al. (2022) with the type EA and  $P = 1.5789$ : d or twice longer.

18. = USNO-A2.0 1500-10078285.  $\text{MinII} = 18.54$  zr,  $D = 0.12$  P.  $\text{zg} = 19.31\text{--}19.80$ ,  $\text{MinII} = 19.70$  zg. The object is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and 1.5 times longer  $P = 1.47929$  d. Variability was independently discovered by Gaysin et al. (2023) with the type EA and 1.5 times shorter  $P = 0.6577$  d.

19. = USNO-A2.0 1500-10194107.  $\text{MinII} = 17.18$  zr,  $D = 0.06$  P. Eccentric orbit:  $\text{MinII} - \text{MinI} = 0.306$  P.  $\text{zg} = 17.46\text{--}18.07$ ,  $\text{MinII} = 17.82$  zg. The object is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and  $P = 5.1942$  d. Variability was independently discovered by Burkhonov et al. (2022) with the type EA and incorrect  $P = 5.183$  d.

20. = USNO-A2.0 1500-10209643.  $\text{MinII} = 17.78$  zr,  $D = 0.02$  P. Eccentric orbit:  $\text{MinII} - \text{MinI} = 0.368$  P.  $\text{zg} = 18.09\text{--}18.63$ ,  $\text{MinII} = 18.63$  zg. The object is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and erroneous  $P = 1.02323$  d. Variability was independently discovered by Burkhonov et al. (2022) with the type EA but only one minimum was detected.

21. = USNO-A2.0 1500-10242922.  $\text{MinII} = 16.46$  zr,  $D = 0.06$  P.  $\text{zg} = 16.83\text{--}17.03$ ,  $\text{MinII} = 17.01$  zg. The variable is included in the Gaia DR3 catalogue of variable stars (Gaia Collaboration, 2022) with the type E and erroneous  $P = 0.65337$  d. Variability was independently discovered by Burkhonov et al. (2022) with the type EA and a twice shorter  $P = 1.5154$  d.

22. = USNO-A2.0 1500-10244847.  $\text{MinII} = 16.70$  zr,  $D = 0.005$  P. Eccentric orbit:  $\text{MinII} - \text{MinI} = 0.480$  P. Combined photometry in ZTF r-band, ZTF g-band (near minimum) and R-band from Burkhonov et al. (2022) was used for period determination. Magnitudes in R-band were adjusted by +0.25 mag, in zg-band - by -0.79 mag. Variability was discovered by Burkhonov et al. (2022) with the type EA but only one minimum was detected.

### Remarks:

While working on compiling of the next Name-List for Version 5.1 of the [General Catalogue of Variable Stars](#) (GSVS, Samus et al. 2017), I determined types, light elements and improved coordinates for new variable stars, discovered and published by other authors to transfer them to the GCVS. The study of the presented 22 variables was made using the publicly available electronic archives of CCD observations of the [Sky Patrol All-Sky Automated Survey for Supernovae \(ASAS-SN\) project](#) (Shappee et al., 2014; Kochanek et al., 2017) and the Zwicky Transient Facility (ZTF) photometric data (Bellm et al., 2019; Masci et al., 2019) via the [SNAD ZTF viewer](#) (Malanchev et al., 2023). To find periods, I applied the WinEfk software provided by Dr. V.P. Goranskij and the [online light curve analysis tool](#) developed by Dr. K.V. Sokolovsky. The coordinates of the stars were drawn from the Gaia DR3 catalogue (Gaia Collaboration, 2023).

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