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# 51 new γ Doradus stars from the ZTF survey

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**Abstract:** 51 new  $\gamma$  Doradus variables are presented, which were found in the Zwicky Transient Facility Catalog of Periodic Variable Stars. This study confirms that high-amplitude multiperiodic  $\gamma$  Doradus variables with peak-to-peak amplitudes of 0.1 mag (V) and more are not rare objects.

# Introduction

The  $\gamma$  Doradus stars (designation GDOR according to the GCVS) are a relatively recently discovered class of pulsating main-sequence variables that are situated between spectral types A7 and F7 [1, 2] (effective temperature between about 6100 and 7500 K, see e.g. [3]). The GDOR stars are characterized by high-order, low-degree, non-radial gravity mode pulsation.

Although the GCVS and most older studies assumed a maximum peak-to-peak amplitude of 0.1 mag (Johnson *V*) for this type of variable, a recent study [4] has shown that significantly larger amplitudes can be achieved. The unusually high amplitudes of the so-called high-amplitude  $\gamma$  Doradus stars can be explained by the superposition of several base frequencies in interaction with their combination and overtone frequencies. Although the maximum amplitude of the primary frequencies was not found to exceed a peak-to-peak amplitude of 0.1 mag, total light-variability amplitudes of over 0.3 mag (*V*) have been reported [4]. To validate these findings, a search for further high-amplitude GDOR stars was conducted in the Zwicky Transient Facility (ZTF) survey.

### Observations and data analysis

The ZTF is a sky survey that had first light at Palomar Observatory in 2017 and monitors the northern and parts of the southern sky down to a magnitude of  $r \sim 20.6$  mag. The ZTF uses a camera with a 47 square-degree field of view that is mounted on a 48-inch Schmidt telescope and produces high-quality data in two bands (*g* and *r*) that are made publicly available [5, 6, 7].

To discover new GDOR stars, periodic variables extracted from Data Release 2 of the ZTF survey ("Zwicky Transient Facility Catalog of Periodic Variable Stars") [8] were examined in detail. In that work, 781,602 periodic variables down to the limiting magnitude of  $r \sim 20.6$  mag were identified and subdivided into 11 main types (low- and high-amplitude  $\delta$  Scuti, RRab and RRc, Cepheid, EW, EA, RS CVn stars etc.) using an automated classification method. Compared with previously published catalogs, 79.5 % of the entries are new discoveries<sup>1</sup>.

<sup>&</sup>lt;sup>1</sup> <u>http://variables.cn:88/ztf/</u>

Since GDOR stars are a rather uncommon type of variable stars as compared with other variability classes and a corresponding variability type does not exist in [8], it can be assumed that these objects were assigned to other categories, especially to the RS CVn stars, which also exhibit complex light curves and similar main periods without, however, showing multiperiodicity.

GDOR stars show higher surface temperatures than the slightly cooler and more solar-like RS CVn variables, which was exploited for the preselection of GDOR candidates. When available, temperatures from Starhorse [9] or Gaia DR2 [10] were used, and only those objects with temperatures between 5900 and 7600 K were kept as candidates and considered more closely. The light curves of all candidates were inspected visually and promising candidates were analysed with PERIOD04 [11]. Objects which turned out to be multiperiodic with at least two independent frequencies and which were not registered as GDOR stars in the International Variable Star Index of the AAVSO [12] were included in the final sample.

# Results

In total, 51 new GDOR variables were identified, which are presented in Table 1. The analysis of the ZTF data with PERIOD04 indicated that, due to the characteristics and the available number of data points of the ZTF data as downloaded from the NASA/IPAC Infrared Science Archive, generally only two dominant frequencies were found to be significant. Together with the amplitudes and phases as calculated with PERIOD04, these frequencies are listed in Table 2. The maximum amplitude of the individual frequencies does not exceed 0.1 mag (semi-amplitude of 0.05 mag), which agrees with the results described in [4].

The corresponding Fourier spectra of the period analysis in the frequency realm between 0 and 2 cycles per day (c/d) are presented in Figure 1. The light curves folded on the main period (see Table 1) are shown in Figure 2. There is a scattering of brighter data points in the folded light curves around phase 0, which is due to beating effects and indicates the typical multiperiodic behaviour of  $\gamma$  Doradus stars. Therefore, the determination of the peak-to-peak amplitudes of multiperiodic stars is somewhat more complicated as for monoperiodic objects, since besides the scatter due to the measurement uncertainties, the folded light curves are also "broadened" by multiperiodicity. Nevertheless, it was shown in [4] that the peak-to-peak amplitudes estimated in this way from ground-based survey data agrees very well with the peak-to-peak amplitudes determined from high-precision satellite data.

### Summary

51 new  $\gamma$  Doradus stars are presented, which were found in the ZTF survey. The majority of the objects (N = 40) exhibits a peak-to-peak amplitude of at least 0.1 mag (r) and can therefore be regarded as high-amplitude  $\gamma$  Doradus stars. Since the pulsation amplitudes in early-type stars generally increase with decreasing wavelength [4], r band amplitudes represent lower limits for the amplitudes in Johnson V. Therefore, this study confirms that the unusually high amplitudes of some GDOR stars are caused by the superposition of several fundamental frequencies in interaction with their combination and overtone frequencies. Although the maximum amplitude of the fundamental frequencies does not exceed 0.1 mag (V), significantly larger total light-variability amplitudes of up to 0.3 mag (V) can be achieved in this way.

### Acknowledgements

This paper made use of data from VizieR catalogue access tool, and of the interactive sky atlas Aladin, CDS, Strasbourg, France, the NASA/IPAC Infrared Science Archive and of the International Variable Star Index (VSX) database, operated at AAVSO, Cambridge, Massachusetts, USA. The author would like to thank Sebastián Otero (VSX) and the referees of the BAVJ for their support and helpful comments.

Table 1: New GDOR variables. The columns denote: Zwicky Transient Facility ID, RA, DEC (J2000), main period (=1/f1) [d] as calculated with PERIOD04, Max (*r*) [mag], Min (*r*) [mag], T<sub>eff</sub> [K]

ID	RA[h m s]	DEC[°´´´] Ma	ain period[d]	Max( <i>r</i> ) [mag]	Min(r) [ma	g] T <sub>eff</sub> [K]
ZTFJ014426.76+542442.9	01 44 26.7624	+54 24 42.984	1.911613	15.66	15.73	6114 (StarHorse)
ZTFJ014702.37+641824.0	01 47 02.3736	+64 18 24.012	1.792779	15.08	15.20	6209 (StarHorse)
ZTFJ014932.59+524827.7	01 49 32.5968	+52 48 27.792	1.346405	15.10	15.22	6313 (StarHorse)
ZTFJ015102.78+523010.5	01 51 02.7864	+52 30 10.548	2.177774	15.07	15.12	6802 (StarHorse)
ZTFJ021058.30+550507.7	02 10 58.3056	+55 05 07.764	0.661817	16.65	16.75	6854 (StarHorse)
ZTFJ060012.56+343731.1	06 00 12.5592	+34 37 31.008	1.843114	16.13	16.28	6822 (StarHorse)
ZTFJ155507.85+321420.0	15 55 07.8528	+32 14 20.040	3.509340	14.65	14.85	6907 (StarHorse)
ZTFJ162707.55+355443.4	16 27 07.5408	+35 54 43.704	1.919566	14.04	14.17	7554 (StarHorse)
ZTFJ163105.57+423354.8	16 31 05.5752	+42 33 54.900	1.632709	15.12	15.30	6851 (StarHorse)
ZTFJ172939.00+234628.0	17 29 39.0048	$+23\ 46\ 27.912$	1.366635	12.46	12.75	6985 (StarHorse)
ZTFJ173808.52+581507.6	17 38 08.5112	+58 15 07.415	1.292392	11.98	12.30	6945 (StarHorse)
ZTFJ180955.37+402203.8	18 09 55.3728	+40 22 03.828	1.612542	16.05	16.25	7128 (Gaia DR2)
ZTFJ181023.93+391109.2	18 10 23.9352	+39 11 09.276	1.452484	14.75	14.86	7068 (StarHorse)
ZTFJ183723.88+501009.8	18 37 23.8896	$+50\ 10\ 09.876$	1.225560	15.70	15.83	6736 (StarHorse)
ZTFJ183948.90+344910.5	18 39 48.9048	+34 49 10.560	2.084865	14.30	14.42	7368 (StarHorse)
ZTFJ184908.32+111206.5	18 49 08.3256	+11 12 06.552	1.092025	13.72	13.85	6574 (StarHorse)
ZTFJ185426.79+364734.2	18 54 26.7936	+36 47 34.260	1.279631	16.38	16.48	7070 (Gaia DR2)
ZTFJ185904.16+444137.5	18 59 04.1616	+44 41 37.572	1.836971	15.95	16.06	7298 (StarHorse)
ZTFJ185951.35+560127.4	18 59 51.3528	+56 01 27.444	2.116811	13.46	13.60	6688 (StarHorse)
ZTFJ191010.15+510713.3	19 10 10.1592	+51 07 13.368	1.293557	13.75	13.88	6387 (StarHorse)
ZTFJ193116.17+371015.5	19 31 16.1712	+37 10 15.564	1.146261	13.79	13.86	6653 (StarHorse)
ZTFJ193420.39+284241.7	19 34 20.4000	$+28\ 42\ 41.760$	1.579581	15.55	15.66	6976 (StarHorse)
ZTFJ193534.45+381819.3	19 35 34.4520	+38 18 19.332	1.681884	14.91	14.98	6659 (StarHorse)
ZTFJ193918.57+113529.7	19 39 18.5736	+11 35 29.724	1.337043	14.33	14.41	6790 (StarHorse)
ZTFJ194455.98+155412.7	19 44 55.9896	+15 54 12.744	1.390417	14.46	14.57	6489 (StarHorse)
ZTFJ194741.64+324125.1	19 47 41.6424	+32 41 25.152	1.278528	15.28	15.37	6828 (StarHorse)
ZTFJ195924.76+320407.9	19 59 24.7680	+32 04 07.968	1.195954	12.86	12.92	6642 (StarHorse)
ZTFJ200140.23+435451.4	20 01 40.2312	+43 54 51.408	1.832853	12.45	12.52	6769 (StarHorse)
ZTFJ201001.90+380233.0	20 10 01.9056	+38 02 33.072	1.469763	15.56	15.66	6380 (StarHorse)
ZTFJ202657.34+305051.6	20 26 57.3480	+30 50 51.648	1.366239	14.59	14.68	6537 (StarHorse)
ZTFJ204350.56+490759.8	20 43 50.5656	+49 07 59.808	1.053723	14.18	14.32	6516 (StarHorse)
ZTFJ205120.92+485141.5	20 51 20.9280	+48 51 41.580	1.174363	15.41	15.55	6444 (StarHorse)
ZTFJ205735.39+161542.8	20 57 35.4024	+16 15 42.912	1.419827	14.46	14.58	6089 (StarHorse)
ZTFJ210253.83+464153.7	21 02 53.8344	+46 41 53.772	2.413572	15.37	15.48	5935 (StarHorse)
ZTFJ211107.32+465831.6	21 11 07.3296	+46 58 31.656	2.075451	15.87	15.98	6010 (StarHorse)
ZTFJ212404.82+610011.3	21 24 04.8240	+61 00 11.304	1.712848	13.79	13.93	6948 (StarHorse)
ZTFJ214026.31+450719.2	21 40 26.3112	+45 07 19.236	1.846739	14.22	14.28	6746 (StarHorse)
ZTFJ214419.56+453023.0	21 44 19.5696	+45 30 23.040	1.266531	14.36	14.46	6648 (StarHorse)
ZTFJ214753.40+245319.3	21 47 53.4048	+24 53 19.356	1.431123	14.70	14.85	6746 (StarHorse)
ZTFJ215720.49+444637.3	21 57 20.4912	+44 46 37.380	1.050543	12.85	12.96	7078 (StarHorse)
ZTFJ220139.53+491542.9	22 01 39.5352	+49 15 42.984	1.284076	13.88	14.00	6328 (StarHorse)
ZTFJ220914.20+550900.3	22 09 14.2056	+55 09 00.396	1.108898	15.32	15.45	6825 (StarHorse)
ZTFJ221425.10+523342.5	22 14 25.1016	+52 33 42.552	1.110983	15.05	15.14	6583 (StarHorse)
ZTFJ221451.07+483018.0	22 14 51.0744	+48 30 18.072	1.923106	13.75	13.87	6542 (StarHorse)
ZTFJ221856.92+491231.7	22 18 56.9280	+49 12 31.752	1.025581	16.06	16.16	6374 (StarHorse)
ZTFJ222146.71+543308.8	22 21 46.7160	+54 33 08.892	1.275157	13.96	14.06	6589 (StarHorse)
ZTFJ224121.27+581726.1	22 41 21.2784	+58 17 26.196	1.325111	15.96	16.12	6491 (StarHorse)
ZTFJ231732.13+533811.4	23 17 32.1336	+53 38 11.436	1.297428	16.86	16.96	6249 (StarHorse)
ZTFJ232622.50+531923.1	23 26 22.5048	+53 19 23.124	1.123398	13.62	13.73	6463 (StarHorse)
ZTFJ233555.89+562902.9	23 35 55.8984	+56 29 02.940	2.343558	15.65	15.75	6901 (StarHorse)
ZTFJ234946.61+520256.8	23 49 46.6200	+52 02 56.868	2.120042	16.06	16.17	7510 (StarHorse)

Table 2: Results of the data analysis with Period04. The columns denote: Zwicky Transient Facility ID, frequency1 [c/d], semi-amplitude1 [mag], phase1 [0...1], frequency2 [c/d], semi-amplitude2 [mag] and phase2 [0...1]

ZTF014426.76-54244.9     0.53118     0.012     0.382     0.403216     0.011     0.271       ZTF014932.59-5248/27.7     0.742719     0.029     0.071     0.43554     0.014     0.931       ZTF014932.59-5248/27.7     0.742719     0.029     0.071     0.43554     0.014     0.976       ZTF010502.78-53007.6     5.15092     0.020     0.158     0.53123     0.012     0.876       ZTF19106201.556307.85-321420     0.244954     0.033     0.924     0.594726     0.036     0.799       ZTF1715305.53543.4     0.5120501     0.014     0.693     0.214     0.354       ZTF1712939.00.234628.0     0.731724     0.041     0.222     0.64060     0.018     0.024     0.325       ZTF118035.37+402203.8     0.630139     0.051     0.277     0.721434     0.022     0.320       ZTF118032.378501005.0     0.81554     0.019     0.625     0.789901     0.014     0.338       ZTF118042.679.364734.2     0.73475     0.028     0.89033     0.013     0.535       ZTF118042.679.345410.5	ID	f1[c/d]	amp1[mag]	phase1	f2[c/d]	amp2[mag]	phase2
21710149702.37+641824.0     0.557793     0.021     0.537     1.271806     0.014     0.331       217101510278-523010.5     0.439184     0.018     0.019     0.485544     0.014     0.376       271710510278-523010.5     0.459184     0.019     0.489542     0.001     0.578       271710500728-5321420.0     0.284954     0.033     0.924     0.591739     0.019     0.352       271711550753545434     0.52091     0.041     0.622     0.647068     0.021     0.354       271711729300234628.0     0.731724     0.047     0.526     0.889777     0.024     0.352       2717113005537+423354.8     0.62139     0.031     0.277     0.721434     0.022     0.532       27171130052391-3911092     0.688476     0.015     0.86603     0.013     0.553       2717114304832-1112065     0.479647     0.026     0.274     0.76213     0.014     0.384       2717114304832-1112065     0.915730     0.026     0.274     0.76813     0.014     0.384       2717114394832-141206     0.91570	ZTFJ014426.76+542442.9	0.523118	0.012	0.382	0.403216	0.011	0.271
ZTF014092.59-524827     0.74279     0.029     0.071     0.435544     0.014     0.976       ZTF10101683.05-53007.7     1.51092     0.020     0.158     0.53123     0.012     0.958       ZTF10201683.05-53007.7     1.51092     0.020     0.158     0.521500     0.014     0.039       ZTF1162017.55.335543.4     0.52951     0.041     0.022     0.647088     0.021     0.354       ZTF1162010.57.423535.8     0.612479     0.020     0.532     0.517739     0.019     0.802       ZTF117308.521581507.6     0.733759     0.030     0.884     0.459066     0.018     0.040       ZTF118103.57440220.8     0.62013     0.051     0.277     0.721434     0.022     0.330       ZTF118005.3744020.8     0.6213     0.019     0.625     0.798901     0.014     0.389       ZTF1180304.59.411130.5     0.81754     0.026     0.893     1.043149     0.009     9.845       ZTF118041.6441375     0.541374     0.026     0.897     0.868499     0.018     0.983       ZTF1183042.59112	ZTFJ014702.37+641824.0	0.557793	0.021	0.537	1.271866	0.014	0.331
ZTFD1015102.78.452010.5     0.459144     0.018     0.019     0.489262     0.007     0.876       ZTFD02012.56.434731.1     0.543260     0.027     0.376     0.521500     0.014     0.693       ZTFD16012.56.434731.1     0.520951     0.041     0.022     0.647088     0.021     0.356       ZTFD16310.57.44.2335.4     0.520951     0.041     0.022     0.647088     0.021     0.356       ZTFD1716310.57.44.2335.4     0.520951     0.041     0.022     0.647088     0.021     0.356       ZTFD172939.00-234628.0     0.7173759     0.030     0.884     0.459006     0.018     0.040       ZTFD180953.74-00238     0.051     0.277     0.721434     0.022     0.320       ZTFD180953.74-00238     0.619     0.625     0.798901     0.014     0.533       ZTFD184908.324-11120.65     0.915730     0.026     0.274     0.786213     0.013     0.058       ZTFD18901.6444137.5     0.020     0.897     0.864999     0.018     0.983       ZTFD19101.61.517113.0     0.771479     0.010	ZTFJ014932.59+524827.7	0.742719	0.029	0.071	0.435544	0.014	0.976
ZTFJ0201058.30+550077     1.51092     0.027     0.376     0.521500     0.014     0.698       ZTFJ050012.56+343731.1     0.542560     0.027     0.376     0.521500     0.014     0.693       ZTFJ150570.58+3521420.0     0.524951     0.041     0.022     0.54726     0.036     0.709       ZTFJ16370.55+3554143.4     0.521951     0.041     0.022     0.517739     0.019     0.352       ZTFJ173900.5234628.0     0.73759     0.030     0.884     0.459006     0.018     0.040       ZTFJ189305.37+40220.8     0.62119     0.625     0.798901     0.014     0.389       ZTFJ18948.93-349110.92     0.67470     0.026     0.274     0.786213     0.013     0.635       ZTFJ18948.93-349110.92     0.915730     0.026     0.274     0.786213     0.018     0.983       ZTFJ18948.93-11426.5     0.915730     0.026     0.274     0.786213     0.018     0.983       ZTFJ18590.16.44137.5     0.54374     0.026     0.289     1.591900     0.012     0.973       ZTFJ18590.15.560127.4	ZTFJ015102.78+523010.5	0.459184	0.018	0.019	0.489262	0.007	0.876
ZTF000012.56-34371.1     0.524500     0.027     0.376     0.521500     0.014     0.003       ZTF115207.85-32142.0     0.284954     0.033     0.924     0.594726     0.036     0.709       ZTF116205.53-5341.3     0.612479     0.020     0.532     0.517739     0.019     0.802       ZTF1172939.00-234628.0     0.731724     0.047     0.526     0.889777     0.024     0.356       ZTF11780853-52-581507.6     0.773759     0.030     0.884     0.45906     0.018     0.040       ZTF118025.93-51402.0     0.678476     0.026     0.79901     0.014     0.389       ZTF118025.93-57+402203.8     0.620139     0.015     0.3606033     0.013     0.553       ZTF1181025.93-51401.2     0.479647     0.026     0.294     0.78048490     0.018     0.988       ZTF1185426.75794474     0.028     0.949     1.591900     0.012     0.973       ZTF1185904.16+44137.5     0.77402     0.021     0.311     0.068433     0.013     0.616       ZTF19193106.17+371015.5     0.872401     0.019 <td>ZTFJ021058.30+550507.7</td> <td>1.510992</td> <td>0.020</td> <td>0.158</td> <td>0.503123</td> <td>0.012</td> <td>0.958</td>	ZTFJ021058.30+550507.7	1.510992	0.020	0.158	0.503123	0.012	0.958
ZTFJ15597.85-32.420.0     0.284954     0.033     0.924     0.594726     0.036     0.709       ZTFJ161016574-422354.8     0.612479     0.020     0.522     0.647088     0.021     0.354       ZTFJ171506574-422354.8     0.0731724     0.047     0.526     0.889777     0.024     0.356       ZTFJ173806.52-48157.6     0.773759     0.030     0.884     0.45906     0.018     0.040       ZTFJ180953.74-02203.8     0.620139     0.051     0.2777     0.72144     0.022     0.320       ZTFJ181933.88-50109.8     0.81954     0.019     0.625     0.798901     0.014     0.339       ZTFJ18393.88-50109.8     0.81954     0.026     0.274     0.786213     0.013     0.058       ZTFJ184908.32+11120.6     0.915730     0.026     0.274     0.786213     0.013     0.983       ZTFJ18908.16:44137.5     0.544374     0.028     0.949     1.65133     0.011     0.028       ZTFJ19316.17-37101.5     0.872401     0.019     0.121     0.331     0.616433     0.013     0.616  <	ZTFJ060012.56+343731.1	0.542560	0.027	0.376	0.521500	0.014	0.693
ZTFJ162707.55-355443.4     0.502951     0.041     0.022     0.647088     0.021     0.354       ZTFJ161280.07.7423354.8     0.612479     0.020     0.532     0.517739     0.019     0.802       ZTFJ173808.52+581507.6     0.731724     0.047     0.526     0.889777     0.024     0.336       ZTFJ180955.37+40220.8     0.620199     0.051     0.277     0.721434     0.022     0.114     0.339       ZTFJ187323.84-50100.8     0.815954     0.019     0.625     0.798001     0.014     0.389       ZTFJ18348.90-344910.5     0.479647     0.026     0.897     0.86499     0.018     0.983       ZTFJ183904.16+444137.5     0.544374     0.028     0.949     1.591900     0.012     0.973       ZTFJ19316.17+371015.5     0.872401     0.019     0.102     1.66433     0.013     0.616       ZTFJ19316.17+371015.5     0.872401     0.019     0.102     1.664433     0.011     0.028       ZTFJ193116.17+371015.5     0.872401     0.019     0.102     1.664433     0.011     0.266 <td>ZTFJ155507.85+321420.0</td> <td>0.284954</td> <td>0.033</td> <td>0.924</td> <td>0.594726</td> <td>0.036</td> <td>0.709</td>	ZTFJ155507.85+321420.0	0.284954	0.033	0.924	0.594726	0.036	0.709
TEFI 163105 57-423354.8     0.612479     0.020     0.532     0.517739     0.019     0.802       ZTFJ 172839.00+234628.0     0.731724     0.047     0.526     0.889777     0.024     0.356       ZTFJ 18055.37+402203.8     0.620139     0.051     0.277     0.721434     0.022     0.320       ZTFJ 18025.37+402203.8     0.6818954     0.019     0.625     0.798901     0.014     0.389       ZTFJ 183348.90+344910.5     0.4179647     0.026     0.274     0.786213     0.013     0.058       ZTFJ 184908.32+111206.5     0.915730     0.026     0.274     0.786213     0.012     0.973       ZTFJ 18406.16444137.5     0.544374     0.021     0.311     0.63389     0.019     0.413       ZTFJ 19161.16444137.5     0.544374     0.021     0.331     0.91833     0.011     0.028       ZTFJ 19161.16444137.5     0.87401     0.012     0.031     0.616     2771       ZTFJ 19161.550017.4     0.472409     0.021     0.331     0.91833     0.011     0.64633     0.013     0.616 <td>ZTFJ162707.55+355443.4</td> <td>0.520951</td> <td>0.041</td> <td>0.022</td> <td>0.647088</td> <td>0.021</td> <td>0.354</td>	ZTFJ162707.55+355443.4	0.520951	0.041	0.022	0.647088	0.021	0.354
ZTFI 172930.00-234628.0     0.731724     0.047     0.526     0.889777     0.024     0.356       ZTFJ 173808.521-581507.6     0.773759     0.030     0.884     0.459006     0.018     0.040       ZTFJ 181023.931-391109.2     0.688476     0.028     0.015     0.806033     0.013     0.553       ZTFJ 181723.84-50109.8     0.815954     0.019     0.625     0.798901     0.014     0.389       ZTFJ 18493.4211120.5     0.479647     0.026     0.274     0.786213     0.013     0.688       ZTFJ 189504.161-444137.5     0.544374     0.028     0.949     1.591900     0.012     0.973       ZTFJ 189504.161-444137.5     0.544374     0.022     0.331     0.663389     0.011     0.028       ZTFJ 193116.17-371015.5     0.872401     0.019     0.102     1.066433     0.011     0.028       ZTFJ 1931420.39+ 284241.7     0.633079     0.026     0.051     1.608482     0.014     0.6628       ZTFJ 19316.47+32125.1     0.747919     0.025     0.921     0.720905     0.016     0.741	ZTFJ163105.57+423354.8	0.612479	0.020	0.532	0.517739	0.019	0.802
ZTF1173808.52-581507.6     0.773759     0.030     0.884     0.459006     0.018     0.040       ZTF118055.37-402203.8     0.620139     0.051     0.277     0.721434     0.022     0.0230       ZTF1183723.38-501009.8     0.8815954     0.019     0.625     0.798901     0.014     0.389       ZTF1183948.30-344910.5     0.479647     0.026     0.893     1.043194     0.009     0.846       ZTF1185904.16-444137.5     0.544374     0.028     0.949     1.591900     0.012     0.973       ZTF1185904.16-444137.5     0.544374     0.022     0.311     0.63358     0.019     0.413       ZTF191816.17-471015.5     0.872401     0.021     0.311     0.63333     0.011     0.028       ZTF191916.17-510713.3     0.773062     0.021     0.331     0.06433     0.013     0.616       ZTF19316.554     0.872401     0.012     0.051     1.608482     0.014     0.628       ZTF193514.54512.7     0.719209     0.029     0.491     0.53507     0.014     0.789       ZTF193918.57+	ZTFJ172939.00+234628.0	0.731724	0.047	0.526	0.889777	0.024	0.356
ZTFI180955.37+402203.8     0.620139     0.051     0.277     0.721434     0.022     0.320       ZTFI181023.93+391109.2     0.6848476     0.028     0.015     0.806033     0.013     0.553       ZTFI183288.900-344910.5     0.479647     0.026     0.893     1.043194     0.009     0.846       ZTFI183948.90-344910.5     0.479647     0.026     0.274     0.786213     0.013     0.058       ZTFI185904.16+444137.5     0.544374     0.020     0.897     0.868499     0.019     0.413       ZTFI185904.16+444137.5     0.544374     0.021     0.311     0.633589     0.019     0.413       ZTFI193016.17+471015.5     0.872401     0.019     0.102     1.664333     0.011     0.628       ZTFI193018.47+13250.7     0.747019     0.025     0.921     0.720905     0.016     0.741       ZTFI193918.57+113520.7     0.747019     0.025     0.921     0.720905     0.016     0.741       ZTFI19471.64+32412.7     0.712090     0.029     0.499     1.653507     0.014     0.789	ZTFJ173808.52+581507.6	0.773759	0.030	0.884	0.459006	0.018	0.040
ZTFJ181023.93+391109.2     0.688476     0.028     0.015     0.806033     0.013     0.553       ZTFJ183723.88+501009.8     0.815954     0.019     0.625     0.798901     0.014     0.389       ZTFJ183948.90+344910.5     0.479647     0.026     0.893     1.043194     0.009     0.846       ZTFJ184904.32+11120.5     0.915730     0.022     0.897     0.868499     0.018     0.983       ZTFJ185904.16+444137.5     0.544374     0.028     0.949     1.591900     0.012     0.973       ZTFJ19010.15+510713.3     0.773062     0.021     0.311     0.66333     0.011     0.028       ZTFJ193116.17+371015.5     0.872401     0.019     0.102     1.066433     0.014     0.628       ZTFJ19318.57+113529.7     0.747919     0.022     0.921     0.7106     0.740       ZTFJ193918.57+113529.7     0.747919     0.022     0.110     1.366983     0.010     0.163       ZTFJ194401.23+4125.1     0.782149     0.022     0.110     1.366983     0.010     0.163       ZTFJ1947041.04+324125.1<	ZTFJ180955.37+402203.8	0.620139	0.051	0.277	0.721434	0.022	0.320
ZTFJ183723.88+501009.8     0.815954     0.019     0.625     0.798901     0.014     0.389       ZTFJ183948.90-344910.5     0.915730     0.026     0.893     1.043194     0.009     0.846       ZTFJ18426.79+364734.2     0.781475     0.026     0.274     0.786213     0.013     0.058       ZTFJ185264.79+364734.2     0.781475     0.021     0.311     0.633589     0.011     0.028       ZTFJ185904.16+444137.5     0.544374     0.021     0.311     0.633589     0.011     0.028       ZTFJ191010.15+510713.3     0.773662     0.021     0.331     0.961833     0.011     0.028       ZTFJ19342.03+284241.7     0.633079     0.026     0.051     1.608482     0.014     0.628       ZTFJ19354.45+381819.3     0.594571     0.016     0.256     1.444464     0.009     0.270       ZTFJ19342.03+284241.7     0.71299     0.022     0.921     0.720905     0.016     0.741       ZTFJ19445598+155412.7     0.719209     0.022     0.110     1.366983     0.010     0.163 <td< td=""><td>ZTFJ181023.93+391109.2</td><td>0.688476</td><td>0.028</td><td>0.015</td><td>0.806033</td><td>0.013</td><td>0.553</td></td<>	ZTFJ181023.93+391109.2	0.688476	0.028	0.015	0.806033	0.013	0.553
ZTFJ183948.90+344910.5     0.479647     0.026     0.893     1.043194     0.009     0.846       ZTFJ184908.32+111206.5     0.915730     0.026     0.274     0.786213     0.013     0.058       ZTFJ185901.16+441375     0.544374     0.028     0.497     0.868499     0.012     0.973       ZTFJ185901.16+441375     0.472409     0.021     0.311     0.633589     0.019     0.413       ZTFJ1919101.15+510713.3     0.773062     0.021     0.331     0.961833     0.011     0.028       ZTFJ19320.39+284241.7     0.633079     0.026     0.051     1.606432     0.014     0.628       ZTFJ19340.39+28421.7     0.73209     0.026     0.511     1.606433     0.014     0.789       ZTFJ19340.37+115329.7     0.747919     0.025     0.921     0.720905     0.016     0.741       ZTFJ19340.4453412.5     0.78194     0.022     0.110     1.366983     0.010     0.143       ZTFJ200140.23+435451.4     0.545598     0.018     0.786     0.315617     0.013     0.786       ZTFJ2	ZTFJ183723.88+501009.8	0.815954	0.019	0.625	0.798901	0.014	0.389
ZTFJ184908.32+111206.5     0.915730     0.026     0.274     0.786213     0.013     0.058       ZTFJ185206.79+364734.2     0.781475     0.020     0.897     0.868499     0.018     0.983       ZTFJ185901.46+444137.5     0.544374     0.028     0.949     1.591900     0.012     0.973       ZTFJ18591.35+50127.4     0.472409     0.021     0.311     0.635389     0.019     0.413       ZTFJ193116.17+371015.5     0.872401     0.019     0.102     1.066433     0.013     0.616       ZTFJ193145.7+13529.7     0.747919     0.025     0.4144464     0.628     2       ZTFJ193534.45+381819.3     0.594571     0.016     0.7210     2.71719358     0.014     0.789       ZTFJ194741.64+324125.1     0.719209     0.022     0.110     1.366983     0.010     0.143       ZTFJ190414.64+324125.1     0.78149     0.022     0.110     1.366983     0.010     0.143       ZTFJ20010.92+465144     0.545598     0.018     0.786     0.315617     0.010     0.143       ZTFJ20010.90+380233.0 <td>ZTFJ183948.90+344910.5</td> <td>0.479647</td> <td>0.026</td> <td>0.893</td> <td>1.043194</td> <td>0.009</td> <td>0.846</td>	ZTFJ183948.90+344910.5	0.479647	0.026	0.893	1.043194	0.009	0.846
ZTFJ185426.79+364734.2     0.781475     0.020     0.897     0.868499     0.018     0.983       ZTFJ185904.16+444137.5     0.544374     0.028     0.949     1.591900     0.012     0.973       ZTFJ185901.15+16071.33     0.671200     0.021     0.311     0.633589     0.019     0.413       ZTFJ193116.17+371015.5     0.872401     0.019     0.102     1.066433     0.013     0.616       ZTFJ193334.45+381819.3     0.594571     0.016     0.256     1.44444     0.009     0.270       ZTFJ193534.45+381819.3     0.594571     0.016     0.256     1.44444     0.009     0.270       ZTFJ193529.7     0.747919     0.022     0.110     1.366983     0.010     0.166       ZTFJ19524.76+320407.9     0.836153     0.017     0.353     0.712541     0.010     0.143       ZTFJ200140.23+435451.4     0.545598     0.018     0.786     0.31617     0.013     0.786       ZTFJ200140.23+435451.4     0.454324     0.026     0.120     1.505441     0.010     0.143       ZTFJ120	ZTFJ184908.32+111206.5	0.915730	0.026	0.274	0.786213	0.013	0.058
ZTF1185904.16+444137.5     0.544374     0.028     0.949     1.591900     0.012     0.973       ZTF1185951.35+560127.4     0.472409     0.021     0.311     0.633589     0.019     0.413       ZTF1193116.17+371015.5     0.872401     0.019     0.102     1.066433     0.013     0.616       ZTF1193420.39+284241.7     0.633079     0.026     0.051     1.608482     0.014     0.628       ZTF1193534.45+381819.3     0.594571     0.016     0.256     1.444464     0.009     0.270       ZTF1193918.57+11329.7     0.747919     0.022     0.921     0.720005     0.016     0.741       ZTF1193914.67+32010.9     0.836153     0.017     0.353     0.71241     0.010     0.143       ZTF1200140.23+435451.4     0.545598     0.018     0.786     0.315617     0.013     0.786       ZTF12020140.23+435451.4     0.545598     0.018     0.786     0.315617     0.013     0.786       ZTF1201001.90+38023.0     0.680382     0.026     0.110     0.828275     0.010     0.464	ZTFJ185426.79+364734.2	0.781475	0.020	0.897	0.868499	0.018	0.983
ZTFJ185951.35+560127.4     0.472409     0.021     0.311     0.633589     0.019     0.413       ZTFJ191010.15+510713.3     0.773062     0.021     0.331     0.961833     0.011     0.028       ZTFJ193116.17+371015.5     0.872401     0.019     0.102     1.066433     0.013     0.616       ZTFJ193534.45+381819.3     0.594571     0.016     0.256     1.444464     0.009     0.270       ZTFJ1939318.57+113529.7     0.747919     0.025     0.921     0.720005     0.016     0.741       ZTFJ193934.57+113529.7     0.747919     0.022     0.110     1.366983     0.010     0.106       ZTFJ193924.76+320407.9     0.836153     0.017     0.353     0.712541     0.010     0.143       ZTFJ200140.23+435451.4     0.545598     0.0120     1.505441     0.014     0.319       ZTFJ200140.23+435451.4     0.545598     0.0120     1.505441     0.014     0.319       ZTFJ200140.23+45451.4     0.851526     0.038     0.127     0.753702     0.017     0.973       ZTFJ2053.53+61632.8	ZTFJ185904.16+444137.5	0.544374	0.028	0.949	1.591900	0.012	0.973
ZTFJ191010.15+510713.3     0.773062     0.021     0.331     0.961833     0.011     0.028       ZTFJ193116.17+371015.5     0.872401     0.019     0.102     1.066433     0.013     0.616       ZTFJ193304.57+31819.3     0.594571     0.016     0.256     1.444464     0.009     0.270       ZTFJ193918.57+113529.7     0.747919     0.022     0.921     0.720005     0.016     0.741       ZTFJ194455.98+155412.7     0.719209     0.029     0.499     1.653507     0.014     0.789       ZTFJ194741.64+32412.51     0.782149     0.022     0.110     1.366983     0.010     0.106       ZTFJ200140.23+435451.4     0.545598     0.018     0.786     0.315617     0.013     0.786       ZTFJ200140.23+435451.4     0.545598     0.018     0.786     0.110     0.828275     0.010     0.464       ZTFJ202657.34+305051.6     0.731937     0.026     0.110     0.82875     0.010     0.48275       ZTFJ205120.92+485141.5     0.851526     0.038     0.127     0.753702     0.017     0.973	ZTFJ185951.35+560127.4	0.472409	0.021	0.311	0.633589	0.019	0.413
ZTFJ193116.17+371015.5     0.872401     0.019     0.102     1.066433     0.013     0.616       ZTFJ193420.39+284241.7     0.633079     0.026     0.051     1.608482     0.014     0.628       ZTFJ193534.45-331819.3     0.594571     0.016     0.256     1.444464     0.009     0.270       ZTFJ193918.57+113529.7     0.719209     0.029     0.499     1.653507     0.016     0.741       ZTFJ194451.98+155412.7     0.719209     0.022     0.110     1.366983     0.010     0.106       ZTFJ195924.76+320407.9     0.836153     0.017     0.353     0.712541     0.010     0.143       ZTFJ200140.23+435451.4     0.545598     0.018     0.786     0.315617     0.013     0.786       ZTFJ20101.90-380233.0     0.680382     0.026     0.120     1.505441     0.014     0.319       ZTFJ204550.56+490759.8     0.949016     0.023     0.160     0.171758     0.017     0.973       ZTFJ204350.56+490759.8     0.949016     0.023     0.160     0.171758     0.019     0.377	ZTFJ191010.15+510713.3	0.773062	0.021	0.331	0.961833	0.011	0.028
ZTFJ193420.39+284241.7     0.633079     0.026     0.051     1.608482     0.014     0.628       ZTFJ193534.45+381819.3     0.594571     0.016     0.256     1.444464     0.009     0.270       ZTFJ193918.57+113529.7     0.747919     0.025     0.921     0.720905     0.016     0.741       ZTFJ194455.98+155412.7     0.719209     0.029     0.499     1.653507     0.014     0.789       ZTFJ195924.76+320407.9     0.836153     0.017     0.353     0.712541     0.010     0.143       ZTFJ200140.23+435451.4     0.545598     0.018     0.786     0.315617     0.013     0.786       ZTFJ201001.90+380233.0     0.680382     0.026     0.120     1.505441     0.014     0.319       ZTFJ20257.34+305051.6     0.731937     0.026     0.110     0.828275     0.010     0.464       ZTFJ20253.53+46154.8     0.704311     0.029     0.738     1.791958     0.009     0.377       ZTFJ210253.83+464153.7     0.414324     0.019     0.574     0.541090     0.013     0.816	ZTFJ193116.17+371015.5	0.872401	0.019	0.102	1.066433	0.013	0.616
ZTFJ193534.45+381819.3     0.594571     0.016     0.256     1.444464     0.009     0.270       ZTFJ193918.57+113529.7     0.747919     0.025     0.921     0.720905     0.016     0.741       ZTFJ194455.98+155412.7     0.719209     0.029     0.499     1.653507     0.014     0.789       ZTFJ194741.64+324125.1     0.782149     0.022     0.110     1.366983     0.010     0.143       ZTFJ200140.23+435451.4     0.545598     0.018     0.786     0.315617     0.013     0.786       ZTFJ200101.90+380233.0     0.680382     0.026     0.120     1.505441     0.014     0.319       ZTFJ202657.34+305051.6     0.731937     0.026     0.120     1.505441     0.014     0.319       ZTFJ202532.92+485141.5     0.851526     0.038     0.127     0.753702     0.017     0.973       ZTFJ20535.39+161542.8     0.704311     0.029     0.738     1.791958     0.009     0.377       ZTFJ210253.83+464153.7     0.414324     0.019     0.574     0.541090     0.013     0.816	ZTFJ193420.39+284241.7	0.633079	0.026	0.051	1.608482	0.014	0.628
ZTFJ193918.57+113529.7     0.747919     0.025     0.921     0.720905     0.016     0.741       ZTFJ194455.98+155412.7     0.719209     0.029     0.499     1.653507     0.014     0.789       ZTFJ194741.64+324125.1     0.782149     0.022     0.110     1.366983     0.010     0.143       ZTFJ200140.23+435451.4     0.545598     0.018     0.786     0.315617     0.013     0.786       ZTFJ201001.90-380233.0     0.680382     0.026     0.120     1.505441     0.014     0.319       ZTFJ202657.34+305051.6     0.731937     0.026     0.110     0.828275     0.010     0.464       ZTFJ204350.56+490759.8     0.949016     0.023     0.160     0.171758     0.015     0.389       ZTFJ205120.92+485141.5     0.851526     0.038     0.127     0.753702     0.017     0.973       ZTFJ210253.83+464153.7     0.414324     0.019     0.587     0.541090     0.013     0.816       ZTFJ21404.82+610011.3     0.583823     0.031     0.554     0.554055     0.017     0.407	ZTFJ193534.45+381819.3	0.594571	0.016	0.256	1.444464	0.009	0.270
ZTFJ194455.98+155412.7     0.719209     0.029     0.499     1.653507     0.014     0.789       ZTFJ194741.64+324125.1     0.782149     0.022     0.110     1.366983     0.010     0.106       ZTFJ195924.76+320407.9     0.836153     0.017     0.353     0.712541     0.010     0.143       ZTFJ200140.23+435451.4     0.545598     0.018     0.786     0.315617     0.013     0.786       ZTFJ20101.90+380233.0     0.680382     0.026     0.120     1.505441     0.014     0.319       ZTFJ204350.56+490759.8     0.949016     0.023     0.160     0.171758     0.015     0.389       ZTFJ205120.92+485141.5     0.851526     0.038     0.127     0.753702     0.017     0.973       ZTFJ205735.39+161542.8     0.704311     0.029     0.788     1.791958     0.009     0.377       ZTFJ212404.82+610011.3     0.583823     0.031     0.554     0.541090     0.018     0.206       ZTFJ214026.31+450719.2     0.541495     0.019     0.799     0.715386     0.009     0.218	ZTFJ193918.57+113529.7	0.747919	0.025	0.921	0.720905	0.016	0.741
ZTFJ194741.64+324125.10.7821490.0220.1101.3669830.0100.106ZTFJ195924.76+320407.90.8361530.0170.3530.7125410.0100.143ZTFJ200140.23+435451.40.5455980.0180.7860.3156170.0130.786ZTFJ201001.90+380233.00.6803820.0260.1201.5054410.0140.319ZTFJ204350.56+490759.80.9490160.0230.1600.1717580.0150.389ZTFJ205120.92+485141.50.8515260.0380.1270.7537020.0170.973ZTFJ20573.39+161542.80.7043110.0290.7381.7919580.0090.377ZTFJ210523.83+464153.70.4143240.0190.5870.5410900.0130.816ZTFJ212404.82+610011.30.5838230.0310.5540.5540550.0170.407ZTFJ214026.31+450719.20.5144950.0190.7990.7153860.0090.218ZTFJ2141245.340+245319.30.6987520.0340.0680.5444480.0160.093ZTFJ214753.40+245319.30.6987520.0340.1050.9171630.0190.709ZTFJ22014.20+55090.30.9010770.0250.0431.4003760.0150.795ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ221451.07+483018.00.5199920.0260.5041.120	ZTFJ194455.98+155412.7	0.719209	0.029	0.499	1.653507	0.014	0.789
ZTFJ195924.76+320407.9     0.836153     0.017     0.353     0.712541     0.010     0.143       ZTFJ200140.23+435451.4     0.545598     0.018     0.786     0.315617     0.013     0.786       ZTFJ201001.90+380233.0     0.680382     0.026     0.120     1.505441     0.014     0.319       ZTFJ204350.56+490759.8     0.949016     0.023     0.160     0.171758     0.015     0.389       ZTFJ205120.92+485141.5     0.851526     0.038     0.127     0.753702     0.017     0.973       ZTFJ205735.39+161542.8     0.704311     0.029     0.738     1.791958     0.009     0.377       ZTFJ2105738.39+461153.7     0.414324     0.019     0.587     0.541090     0.013     0.816       ZTFJ21107.32+465831.6     0.481823     0.024     0.927     0.417492     0.018     0.206       ZTFJ21404.82+610011.3     0.583823     0.031     0.554     0.541055     0.017     0.407       ZTFJ21449.56+453023.0     0.789558     0.028     0.390     0.879810     0.016     0.236	ZTFJ194741.64+324125.1	0.782149	0.022	0.110	1.366983	0.010	0.106
ZTFJ200140.23+435451.4     0.545598     0.018     0.786     0.315617     0.013     0.786       ZTFJ201001.90+380233.0     0.680382     0.026     0.120     1.505441     0.014     0.319       ZTFJ202657.34+305051.6     0.731937     0.026     0.110     0.828275     0.010     0.464       ZTFJ204350.56+490759.8     0.949016     0.023     0.160     0.171758     0.017     0.973       ZTFJ205120.92+485141.5     0.851526     0.038     0.127     0.753702     0.017     0.973       ZTFJ205735.39+161542.8     0.704311     0.029     0.738     1.791958     0.009     0.377       ZTFJ210253.83+464153.7     0.414324     0.019     0.587     0.541090     0.013     0.816       ZTFJ21404.82+610011.3     0.583823     0.031     0.554     0.554055     0.017     0.407       ZTFJ21404.82+610011.3     0.583823     0.028     0.390     0.879810     0.016     0.236       ZTFJ21440.826445302.0     0.789558     0.028     0.390     0.879810     0.016     0.236	ZTFJ195924.76+320407.9	0.836153	0.017	0.353	0.712541	0.010	0.143
ZTFJ201001.90+380233.0     0.680382     0.026     0.120     1.505441     0.014     0.319       ZTFJ202657.34+305051.6     0.731937     0.026     0.110     0.828275     0.010     0.464       ZTFJ204350.56+490759.8     0.949016     0.023     0.160     0.171758     0.017     0.973       ZTFJ205120.92+485141.5     0.851526     0.038     0.127     0.753702     0.017     0.973       ZTFJ205735.39+161542.8     0.704311     0.029     0.738     1.791958     0.009     0.377       ZTFJ2105735.39+161542.8     0.704311     0.029     0.738     1.791958     0.009     0.377       ZTFJ21404.82+610011.3     0.583823     0.024     0.927     0.417492     0.018     0.206       ZTFJ214026.31+450719.2     0.541495     0.019     0.799     0.715386     0.009     0.218       ZTFJ214753.40+245319.3     0.698752     0.034     0.068     0.544448     0.016     0.236       ZTFJ22013.9.354491542.9     0.778770     0.034     0.105     0.917163     0.019     0.799	ZTFJ200140.23+435451.4	0.545598	0.018	0.786	0.315617	0.013	0.786
ZTFJ202657.34+305051.6   0.731937   0.026   0.110   0.828275   0.010   0.464     ZTFJ204350.56+490759.8   0.949016   0.023   0.160   0.171758   0.015   0.389     ZTFJ205120.92+485141.5   0.851526   0.038   0.127   0.753702   0.017   0.973     ZTFJ205735.39+161542.8   0.704311   0.029   0.738   1.791958   0.009   0.377     ZTFJ210253.83+464153.7   0.414324   0.019   0.587   0.541090   0.013   0.816     ZTFJ21404.82+610011.3   0.583823   0.031   0.554   0.54055   0.017   0.407     ZTFJ214026.31+450719.2   0.541495   0.019   0.799   0.715386   0.009   0.218     ZTFJ21449.56+45302.3.0   0.789558   0.028   0.390   0.879810   0.016   0.236     ZTFJ214753.40+245319.3   0.698752   0.034   0.668   0.544448   0.016   0.093     ZTFJ22013.9.53+491542.9   0.778770   0.034   0.105   0.917163   0.019   0.795     ZTFJ221451.07+483018.0   0.519992   0.021   0.986   0.851509 <t< td=""><td>ZTFJ201001.90+380233.0</td><td>0.680382</td><td>0.026</td><td>0.120</td><td>1.505441</td><td>0.014</td><td>0.319</td></t<>	ZTFJ201001.90+380233.0	0.680382	0.026	0.120	1.505441	0.014	0.319
ZTFJ204350.56+490759.8     0.949016     0.023     0.160     0.171758     0.015     0.389       ZTFJ205120.92+485141.5     0.851526     0.038     0.127     0.753702     0.017     0.973       ZTFJ205735.39+161542.8     0.704311     0.029     0.738     1.791958     0.009     0.377       ZTFJ210253.83+464153.7     0.414324     0.019     0.587     0.541090     0.013     0.816       ZTFJ21404.82+610011.3     0.583823     0.031     0.554     0.554055     0.017     0.407       ZTFJ214402.631+450719.2     0.541495     0.019     0.799     0.715386     0.009     0.218       ZTFJ21449.56+453023.0     0.789558     0.028     0.390     0.879810     0.016     0.236       ZTFJ214753.40+245319.3     0.698752     0.034     0.668     0.544448     0.016     0.093       ZTFJ22013.9.53+491542.9     0.778770     0.034     0.105     0.917163     0.019     0.795       ZTFJ22014.20+550900.3     0.901797     0.025     0.043     1.400376     0.015     0.795	ZTFJ202657.34+305051.6	0.731937	0.026	0.110	0.828275	0.010	0.464
ZTFJ205120.92+485141.50.8515260.0380.1270.7537020.0170.973ZTFJ205735.39+161542.80.7043110.0290.7381.7919580.0090.377ZTFJ210253.83+464153.70.4143240.0190.5870.5410900.0130.816ZTFJ211107.32+465831.60.4818230.0240.9270.4174920.0180.206ZTFJ21404.82+610011.30.5838230.0310.5540.5540550.0170.407ZTFJ214026.31+450719.20.5414950.0190.7990.7153860.0090.218ZTFJ214419.56+453023.00.7895580.0280.3900.8798100.0160.236ZTFJ215720.49+444637.30.9518880.0190.7971.1116410.0140.127ZTFJ220139.53+491542.90.7787700.0340.1050.9171630.0190.799ZTFJ21451.07+483018.00.5199920.0210.9860.8515090.0140.010ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ22146.71+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ22146.71+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ22142.1.27+581726.10.7546540.0290.6270.7785780.0240.591ZTFJ233555.89+562902.90.4267020.0240.7240.5052940.0120.150ZTFJ234946.61+520256.80.4716890.0260.0170.55630	ZTFJ204350.56+490759.8	0.949016	0.023	0.160	0.171758	0.015	0.389
ZTFJ205735.39+161542.80.7043110.0290.7381.7919580.0090.377ZTFJ210253.83+464153.70.4143240.0190.5870.5410900.0130.816ZTFJ211107.32+465831.60.4818230.0240.9270.4174920.0180.206ZTFJ21404.82+610011.30.5838230.0310.5540.5540550.0170.407ZTFJ214026.31+450719.20.5414950.0190.7990.7153860.0090.218ZTFJ214419.56+453023.00.7895580.0280.3900.8798100.0160.236ZTFJ215720.49+444637.30.9518880.0190.7971.1116410.0140.127ZTFJ220139.53+491542.90.7787700.0340.1050.9171630.0190.799ZTFJ21451.07+28302.30.9017970.0250.0431.4003760.0150.795ZTFJ22145.10+523342.50.9001040.0210.9860.8515090.0140.010ZTFJ22145.10+523342.50.9001040.0210.9151.5302190.0120.421ZTFJ22145.10+483018.00.519920.0210.9151.5302190.0120.421ZTFJ22146.71+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ22146.71+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ231732.13+533811.40.7707550.0210.4900.9727830.0170.678ZTFJ232622.50+531923.10.8901560.0270.7290.634331	ZTFJ205120.92+485141.5	0.851526	0.038	0.127	0.753702	0.017	0.973
ZTFJ210253.83+464153.70.4143240.0190.5870.5410900.0130.816ZTFJ211107.32+465831.60.4818230.0240.9270.4174920.0180.206ZTFJ212404.82+610011.30.5838230.0310.5540.5540550.0170.407ZTFJ214026.31+450719.20.5414950.0190.7990.7153860.0090.218ZTFJ214419.56+453023.00.7895580.0280.3900.8798100.0160.236ZTFJ215720.49+444637.30.9518880.0190.7971.1116410.0140.127ZTFJ220139.53+491542.90.7787700.0340.1050.9171630.0190.799ZTFJ221425.10+523342.50.9001040.0210.9860.8515090.0140.010ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ221451.07+483018.00.5199920.0260.5041.1201810.0120.116ZTFJ221451.07+483018.00.786540.0290.6270.7785780.0240.591ZTFJ22142.12.7+581726.10.7546540.0290.6270.7785780.0170.678ZTFJ233555.89+562902.90.4267020.0240.7240.5052940.0120.427ZTFJ234946.61+520256.80.4716890.0260.0170.5563020.0150.255	ZTFJ205735.39+161542.8	0.704311	0.029	0.738	1.791958	0.009	0.377
ZTFJ211107.32+465831.60.4818230.0240.9270.4174920.0180.206ZTFJ212404.82+610011.30.5838230.0310.5540.5540550.0170.407ZTFJ214026.31+450719.20.5414950.0190.7990.7153860.0090.218ZTFJ214419.56+453023.00.7895580.0280.3900.8798100.0160.236ZTFJ214753.40+245319.30.6987520.0340.0680.5444480.0160.093ZTFJ215720.49+444637.30.9518880.0190.7971.1116410.0140.127ZTFJ220139.53+491542.90.7787700.0340.1050.9171630.0190.709ZTFJ22145.10+523342.50.9001040.0210.9860.8515090.0140.010ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ221451.07+483018.00.5199920.0260.5041.1201810.0120.116ZTFJ221451.07+483018.00.5199920.0250.8100.1470290.0100.399ZTFJ221451.07+483018.00.5199920.0260.6270.7785780.0240.591ZTFJ221451.121+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ221421.27+581726.10.7546540.0290.6270.7785780.0240.591ZTFJ233555.89+562902.90.4267020.0240.7240.5052940.0120.427ZTFJ234946.61+520256.80.4716890.0260.0170.55	ZTFJ210253.83+464153.7	0.414324	0.019	0.587	0.541090	0.013	0.816
ZTFJ212404.82+610011.30.5838230.0310.5540.5540550.0170.407ZTFJ214026.31+450719.20.5414950.0190.7990.7153860.0090.218ZTFJ214419.56+453023.00.7895580.0280.3900.8798100.0160.236ZTFJ214753.40+245319.30.6987520.0340.0680.5444480.0160.093ZTFJ215720.49+444637.30.9518880.0190.7971.1116410.0140.127ZTFJ220139.53+491542.90.7787700.0340.1050.9171630.0190.709ZTFJ22145.10+523342.50.9001040.0210.9860.8515090.0140.010ZTFJ22145.10+523342.50.9001040.0210.9860.8515090.0120.421ZTFJ22145.10+543308.00.5199920.0260.5041.1201810.0120.116ZTFJ22146.71+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ221421.27+581726.10.7546540.0290.6270.7785780.0240.591ZTFJ233732.13+533811.40.7707550.0210.4900.9727830.0170.678ZTFJ233555.89+562902.90.4267020.0240.7240.5052940.0120.150ZTFJ234946.61+520256.80.4716890.0260.0170.5563020.0150.255	ZTFJ211107.32+465831.6	0.481823	0.024	0.927	0.417492	0.018	0.206
ZTFJ214026.31+450719.20.5414950.0190.7990.7153860.0090.218ZTFJ214419.56+453023.00.7895580.0280.3900.8798100.0160.236ZTFJ214753.40+245319.30.6987520.0340.0680.5444480.0160.093ZTFJ215720.49+444637.30.9518880.0190.7971.1116410.0140.127ZTFJ22039.53+491542.90.7787700.0340.1050.9171630.0190.709ZTFJ220914.20+550900.30.9017970.0250.0431.4003760.0150.795ZTFJ221451.07+523342.50.9001040.0210.9860.8515090.0140.010ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ22146.71+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ224121.27+581726.10.7546540.0290.6270.7785780.0240.591ZTFJ231732.13+533811.40.7707550.0210.4900.9727830.0170.678ZTFJ233555.89+562902.90.4267020.0240.7240.5052940.0120.150ZTFJ234946.61+520256.80.4716890.0260.0170.5563020.0150.255	ZTFJ212404.82+610011.3	0.583823	0.031	0.554	0.554055	0.017	0.407
ZTFJ214419.56+453023.00.7895580.0280.3900.8798100.0160.236ZTFJ214753.40+245319.30.6987520.0340.0680.5444480.0160.093ZTFJ215720.49+444637.30.9518880.0190.7971.1116410.0140.127ZTFJ220139.53+491542.90.7787700.0340.1050.9171630.0190.709ZTFJ220914.20+550900.30.9017970.0250.0431.4003760.0150.795ZTFJ221425.10+523342.50.9001040.0210.9860.8515090.0140.010ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ221456.92+491231.70.9750570.0260.5041.1201810.0120.116ZTFJ224121.27+581726.10.7546540.0290.6270.7785780.0240.591ZTFJ231732.13+533811.40.7707550.0210.4900.9727830.0170.678ZTFJ232622.50+531923.10.8901560.0270.7290.6343310.0120.427ZTFJ233555.89+562902.90.4267020.0240.7240.5052940.0120.150ZTFJ234946.61+520256.80.4716890.0260.0170.5563020.0150.255	ZTFJ214026.31+450719.2	0.541495	0.019	0.799	0.715386	0.009	0.218
ZTFJ214753.40+245319.30.6987520.0340.0680.5444480.0160.093ZTFJ215720.49+444637.30.9518880.0190.7971.1116410.0140.127ZTFJ220139.53+491542.90.7787700.0340.1050.9171630.0190.709ZTFJ220914.20+550900.30.9017970.0250.0431.4003760.0150.795ZTFJ221425.10+523342.50.9001040.0210.9860.8515090.0140.010ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ221456.92+491231.70.9750570.0260.5041.1201810.0120.116ZTFJ22146.71+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ221421.27+581726.10.7546540.0290.6270.7785780.0240.591ZTFJ231732.13+533811.40.7707550.0210.4900.9727830.0170.678ZTFJ233555.89+562902.90.4267020.0240.7240.5052940.0120.150ZTFJ234946.61+520256.80.4716890.0260.0170.5563020.0150.255	ZTFJ214419.56+453023.0	0.789558	0.028	0.390	0.879810	0.016	0.236
ZTFJ215720.49+444637.30.9518880.0190.7971.1116410.0140.127ZTFJ220139.53+491542.90.7787700.0340.1050.9171630.0190.709ZTFJ220914.20+550900.30.9017970.0250.0431.4003760.0150.795ZTFJ221425.10+523342.50.9001040.0210.9860.8515090.0140.010ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ221455.92+491231.70.9750570.0260.5041.1201810.0120.116ZTFJ22146.71+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ221421.27+581726.10.7546540.0290.6270.7785780.0240.591ZTFJ231732.13+533811.40.7707550.0210.4900.9727830.0170.678ZTFJ233555.89+562902.90.4267020.0240.7240.5052940.0120.150ZTFJ234946.61+520256.80.4716890.0260.0170.5563020.0150.255	ZTFJ214753.40+245319.3	0.698752	0.034	0.068	0.544448	0.016	0.093
ZTFJ220139.53+491542.90.7787700.0340.1050.9171630.0190.709ZTFJ220914.20+550900.30.9017970.0250.0431.4003760.0150.795ZTFJ221425.10+523342.50.9001040.0210.9860.8515090.0140.010ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ221856.92+491231.70.9750570.0260.5041.1201810.0120.116ZTFJ22146.71+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ221421.27+581726.10.7546540.0290.6270.7785780.0240.591ZTFJ231732.13+533811.40.7707550.0210.4900.9727830.0170.678ZTFJ233555.89+562902.90.4267020.0240.7240.5052940.0120.150ZTFJ234946.61+520256.80.4716890.0260.0170.5563020.0150.255	ZTFJ215720.49+444637.3	0.951888	0.019	0.797	1.111641	0.014	0.127
ZTFJ220914.20+550900.30.9017970.0250.0431.4003760.0150.795ZTFJ221425.10+523342.50.9001040.0210.9860.8515090.0140.010ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ221856.92+491231.70.9750570.0260.5041.1201810.0120.116ZTFJ22146.71+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ224121.27+581726.10.7546540.0290.6270.7785780.0240.591ZTFJ231732.13+533811.40.7707550.0210.4900.9727830.0170.678ZTFJ232622.50+531923.10.8901560.0270.7290.6343310.0120.427ZTFJ233555.89+562902.90.4267020.0240.7240.5052940.0120.150ZTFJ234946.61+520256.80.4716890.0260.0170.5563020.0150.255	ZTFJ220139.53+491542.9	0.778770	0.034	0.105	0.917163	0.019	0.709
ZTFJ221425.10+523342.50.9001040.0210.9860.8515090.0140.010ZTFJ221451.07+483018.00.5199920.0210.9151.5302190.0120.421ZTFJ221856.92+491231.70.9750570.0260.5041.1201810.0120.116ZTFJ22146.71+543308.80.7842170.0250.8100.1470290.0100.399ZTFJ224121.27+581726.10.7546540.0290.6270.7785780.0240.591ZTFJ231732.13+533811.40.7707550.0210.4900.9727830.0170.678ZTFJ232622.50+531923.10.8901560.0270.7290.6343310.0120.427ZTFJ233555.89+562902.90.4267020.0240.7240.5052940.0120.150ZTFJ234946.61+520256.80.4716890.0260.0170.5563020.0150.255	ZTFJ220914.20+550900.3	0.901797	0.025	0.043	1.400376	0.015	0.795
ZTFJ221451.07+483018.0   0.519992   0.021   0.915   1.530219   0.012   0.421     ZTFJ221856.92+491231.7   0.975057   0.026   0.504   1.120181   0.012   0.116     ZTFJ22146.71+543308.8   0.784217   0.025   0.810   0.147029   0.010   0.399     ZTFJ224121.27+581726.1   0.754654   0.029   0.627   0.778578   0.024   0.591     ZTFJ231732.13+533811.4   0.770755   0.021   0.490   0.972783   0.017   0.678     ZTFJ232622.50+531923.1   0.890156   0.027   0.729   0.634331   0.012   0.427     ZTFJ233555.89+562902.9   0.426702   0.024   0.724   0.505294   0.012   0.150     ZTFJ234946.61+520256.8   0.471689   0.026   0.017   0.556302   0.015   0.255	ZTFJ221425.10+523342.5	0.900104	0.021	0.986	0.851509	0.014	0.010
ZTFJ221856.92+491231.7   0.975057   0.026   0.504   1.120181   0.012   0.116     ZTFJ22146.71+543308.8   0.784217   0.025   0.810   0.147029   0.010   0.399     ZTFJ224121.27+581726.1   0.754654   0.029   0.627   0.778578   0.024   0.591     ZTFJ231732.13+533811.4   0.770755   0.021   0.490   0.972783   0.017   0.678     ZTFJ232622.50+531923.1   0.890156   0.027   0.729   0.634331   0.012   0.427     ZTFJ234946.61+520256.8   0.471689   0.026   0.017   0.556302   0.015   0.255	ZTFJ221451.07+483018.0	0.519992	0.021	0.915	1.530219	0.012	0.421
ZTFJ222146.71+543308.8   0.784217   0.025   0.810   0.147029   0.010   0.399     ZTFJ224121.27+581726.1   0.754654   0.029   0.627   0.778578   0.024   0.591     ZTFJ231732.13+533811.4   0.770755   0.021   0.490   0.972783   0.017   0.678     ZTFJ232622.50+531923.1   0.890156   0.027   0.729   0.634331   0.012   0.427     ZTFJ233555.89+562902.9   0.426702   0.024   0.724   0.505294   0.012   0.150     ZTFJ234946.61+520256.8   0.471689   0.026   0.017   0.556302   0.015   0.255	ZTFJ221856.92+491231 7	0.975057	0.026	0.504	1.120181	0.012	0.116
ZTFJ224121.27+581726.1   0.754654   0.029   0.627   0.778578   0.024   0.591     ZTFJ231732.13+533811.4   0.770755   0.021   0.490   0.972783   0.017   0.678     ZTFJ232622.50+531923.1   0.890156   0.027   0.729   0.634331   0.012   0.427     ZTFJ234946.61+520256.8   0.471689   0.026   0.017   0.556302   0.015   0.255	ZTFJ222146.71+543308.8	0.784217	0.025	0.810	0.147029	0.010	0.399
ZTFJ231732.13+533811.4   0.770755   0.021   0.490   0.972783   0.017   0.678     ZTFJ232622.50+531923.1   0.890156   0.027   0.729   0.634331   0.012   0.427     ZTFJ233555.89+562902.9   0.426702   0.024   0.724   0.505294   0.012   0.150     ZTFJ234946.61+520256.8   0.471689   0.026   0.017   0.556302   0.015   0.255	ZTEJ224121.27+581726.1	0.754654	0.029	0.627	0.778578	0.024	0.591
ZTFJ232622.50+531923.1   0.890156   0.027   0.729   0.634331   0.012   0.427     ZTFJ233555.89+562902.9   0.426702   0.024   0.724   0.505294   0.012   0.150     ZTFJ234946.61+520256.8   0.471689   0.026   0.017   0.556302   0.015   0.255	ZTFJ231732.13+533811.4	0.770755	0.021	0.490	0.972783	0.017	0.678
ZTFJ233555.89+562902.9     0.426702     0.024     0.724     0.505294     0.012     0.150       ZTFJ234946.61+520256.8     0.471689     0.026     0.017     0.556302     0.015     0.255	ZTEJ232622.50+531923 1	0.890156	0.027	0.729	0.634331	0.012	0.427
ZTFJ234946.61+520256.8 0.471689 0.026 0.017 0.556302 0.015 0.255	ZTEJ233555 89+562902 9	0.426702	0.024	0 724	0.505294	0.012	0.150
	ZTFJ234946.61+520256.8	0.471689	0.026	0.017	0.556302	0.015	0.255



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Figure 1: Fourier spectra in the frequency range of 0 to 2 c/d, as obtained with PERIOD04.











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Figure 2: Folded light curves of the 51 new GDORs using the periods given in Table 1.

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