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TIMES OF LIGHT MAXIMUM OF VZ CANCRI: 1994 SEASON[1]

In a recent paper Arellano Ferro et al. (1994) studied the period variations of the δ Scuti star VZ Cnc and demonstrated that the period has not been steadily increasing as previously believed. The $O-C$ residuals for the last 50 years, before and after being corrected from the beat period effects, show a structure that admits several interpretations: a slopping straight line which implies that the period needs to be revised, two abrupt period changes and, a sinusoidal variation. These authors have speculated that a sinusoidal variation might be produced by light-time effects in a binary system.

Whether the sinusoidal appearance of the $O-C$ residuals will persist in the future, other abrupt period changes will occur, or simply a period revision is needed, will be learned from the systematic obtention of times of maximum light in the years to come.

During March and April 1994 we obtained differential photometry of VZ Cnc through the V filter using the stars BD+10°1818 and BD+10°1816 as comparison and check stars respectively. The observations were obtained with an Optec SSP-5A photoelectric photometer attached to the 0.57m telescope of the La Luz Observatory of the University of Guanajuato.

We report nine observed times of maximum light and the corresponding $O-C$ values in Table 1. We have calculated the $O-C$ residuals using the ephemeris:

$$T_{max} = \text{HJD2431550.71} + 0.17836376\text{E},$$

and then

$$(O-C) = T_{max}(obs) - T_{max}.$$

Since only one more seasons will add very little to the understanding of the period variations of VZ Cnc already discussed by Arellano Ferro et al. (1994), we shall not carry our present discussion any further. However, we emphasize that yearly measurements of times of maximum light of VZ Cnc will contribute substantially to the understanding of the periodic nature of this star. In order to study overall drifts of the light curve and not only the moments of maximum brightness, future observers are encouraged to publish their full sets of observations. In Table 2 we report the V magnitude differences VZ Cnc – BD+10°1818 for our 1994 season.

[1]Based on observations obtained at the La Luz Observatory of the University of Guanajuato, México.

Table 1. Times of light maximum of VZ Cnc in 1994.

HJD (244 9400.+)	$O-C$ (days)	HJD (244 9400.+)	$O-C$ (days)
17.767	+0.0024	28.638	−0.0068
18.651	−0.0054	33.637	−0.0014
19.733	+0.0064	40.600	+0.0049
20.615	−0.0034	41.661	−0.0043
20.790	−0.0071:		

Table 2. Differential V photometry VZ Cnc − BD+10°1818 in 1994.

HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.
12.6332	1.058	12.8012	1.134	15.7878	0.859	17.6886	1.385	17.8095	1.190
12.6458	1.209	12.8049	1.186	15.7913	0.926	17.6911	1.400	17.8129	1.214
12.6428	1.179	12.8083	1.183	15.7947	0.939	17.6931	1.404	17.8168	1.230
12.6534	1.231	12.8123	1.178	15.7966	0.934	17.6955	1.405	17.8208	1.237
12.6501	1.214	12.8160	1.193	15.7988	0.936	17.6977	1.412	17.8236	1.242
12.6593	1.275	12.8201	1.222	15.8012	0.958	17.7003	1.416	17.8279	1.264
12.6565	1.258	12.8245	1.253	15.8038	0.966	17.7038	1.416	17.8309	1.287
12.6677	1.310	12.8287	1.273	15.8063	1.003	17.7060	1.418	17.8333	1.299
12.6632	1.291	12.8322	1.288	15.8089	0.947	17.7088	1.433		
12.6739	1.322	12.8346	1.298			17.7110	1.450	18.6124	1.378
12.6711	1.314	12.8392	1.316	17.6003	0.913	17.7134	1.449	18.6192	1.366
12.6802	1.375	12.8424	1.325	17.6032	0.925	17.7172	1.448	18.6253	1.271
12.6768	1.364			17.6065	0.934	17.7199	1.442	18.6287	1.209
12.6856	1.378	15.7095	1.349	17.6105	0.958	17.7234	1.431	18.6343	1.104
12.6831	1.374	15.7128	1.340	17.6133	0.991	17.7285	1.376	18.6380	1.053
12.6922	1.377	15.7162	1.350	17.6162	1.006	17.7319	1.346	18.6415	1.011
12.6888	1.373	15.7194	1.383	17.6197	1.011	17.7352	1.300	18.6458	0.948
12.6986	1.405	15.7233	1.390	17.6222	1.028	17.7385	1.247	18.6533	0.952
12.6956	1.398	15.7258	1.376	17.6260	1.060	17.7429	1.171	18.6566	0.952
12.7024	1.413	15.7289	1.353	17.6292	1.087	17.7452	1.120	18.6602	0.988
12.7003	1.409	15.7321	1.349	17.6330	1.117	17.7482	1.028	18.6638	1.020
12.7078	1.412	15.7363	1.374	17.6367	1.147	17.7509	0.967	18.6726	1.078
12.7052	1.414	15.7388	1.369	17.6402	1.163	17.7535	0.873	18.6756	1.103
12.7131	1.415	15.7415	1.363	17.6438	1.186	17.7555	0.803	18.7229	1.269
12.7108	1.405	15.7444	1.371	17.6475	1.212	17.7579	0.782	18.7290	1.301
12.7188	1.421	15.7471	1.366	17.6505	1.234	17.7601	0.760	18.7324	1.304
12.7158	1.421	15.7495	1.370	17.6533	1.254	17.7640	0.771	18.7354	1.297
12.7245	1.432	15.7518	1.368	17.6558	1.260	17.7668	0.771	18.7397	1.303
12.7219	1.443	15.7543	1.353	17.6588	1.275	17.7693	0.794	18.7504	1.315
12.7299	1.381	15.7563	1.351	17.6623	1.307	17.7720	0.821	18.7527	1.316
12.7270	1.422	15.7594	1.364	17.6648	1.322	17.7747	0.850	18.7558	1.317
12.7304	1.394	15.7621	1.362	17.6668	1.327	17.7790	0.900	18.7579	1.320
12.7330	1.393	15.7647	1.321	17.6691	1.329	17.7819	0.941	18.7606	1.325
12.7362	1.358	15.7671	1.264	17.6720	1.333	17.7848	0.974	18.7632	1.332
12.7394	1.298	15.7699	1.228	17.6748	1.340	17.7879	1.004	18.7655	1.338
12.7838	0.899	15.7722	1.221	17.6770	1.349	17.7913	1.036	18.7677	1.341
12.7879	0.957	15.7754	1.157	17.6793	1.353	17.7947	1.063	18.7715	1.350
12.7911	1.004	15.7775	1.095	17.6816	1.364	17.7992	1.111	18.7741	1.364
12.7947	1.057	15.7797	1.047	17.6839	1.379	17.8026	1.145	18.7779	1.380
12.7973	1.085	15.7833	0.903	17.6863	1.380	17.8063	1.172	18.7811	1.378

Table 2. Continued

HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.
18.7847	1.370	19.7291	0.922	20.6741	1.246	28.6040	1.370	33.6344	0.857
18.7868	1.371	19.7316	0.903	20.6765	1.255	28.6065	1.350	33.6379	0.881
18.7924	1.379	19.7337	0.906	20.6786	1.269	28.6092	1.329	33.6398	0.898
18.7952	1.359	19.7367	0.908	20.6841	1.302	28.6116	1.312	33.6428	0.925
18.7974	1.353	19.7410	0.913	20.6877	1.325	28.6136	1.286	33.6460	0.950
18.8009	1.341	19.7462	0.932	20.6901	1.318	28.6163	1.251	33.6504	0.991
18.8030	1.321	19.7511	0.966	20.6920	1.314	28.6187	1.198	33.6531	1.012
18.8060	1.297	19.7542	0.980	20.6947	1.330	28.6210	1.152		
18.8099	1.274	19.7590	1.015	20.6976	1.337	28.6242	1.079	40.6563	1.053
		19.7623	1.042	20.6999	1.340	28.6281	0.986	40.6589	1.086
19.5966	1.175	19.7694	1.086	20.7026	1.352	28.6342	0.915	40.6636	1.120
19.5990	1.173	19.7764	1.128	20.7050	1.362	28.6374	0.883	40.6698	1.170
19.6023	1.176	19.7791	1.151	20.7073	1.361	28.6456	0.921	40.6824	1.251
19.6047	1.179	19.7816	1.168	20.7098	1.358	28.6480	0.929	40.6854	1.274
19.6073	1.190	19.7850	1.178	20.7131	1.372	28.6551	1.005	40.5981	0.797
19.6102	1.202	19.7885	1.202	20.7166	1.381	28.6572	1.027	40.6005	0.791
19.6120	1.205	19.7909	1.225	20.7249	1.361	28.6606	1.054	40.6037	0.814
19.6140	1.211	19.7937	1.238	20.7223	1.368	28.6645	1.085	40.6066	0.828
19.6230	1.252	19.7967	1.251	20.7309	1.380	28.6679	1.116	40.6098	0.847
19.6299	1.276	19.7998	1.277	20.7278	1.377	28.6708	1.146	40.6121	0.871
19.6439	1.335	19.8036	1.297	20.7401	1.400	28.6739	1.173	40.6156	0.929
19.6460	1.345	19.8063	1.310	20.7362	1.405	28.6768	1.188	40.6178	0.957
19.6485	1.349	19.8106	1.335	20.7473	1.388	28.6798	1.192	40.6236	1.013
19.6507	1.349	19.8129	1.330	20.7440	1.395	28.6822	1.205	40.6261	1.033
19.6534	1.380	19.8157	1.311	20.7542	1.365	28.6853	1.225	40.6284	1.050
19.6565	1.411	19.8183	1.323	20.7508	1.376	28.6879	1.239	40.6305	1.068
19.6590	1.398			20.7615	1.331	28.6906	1.249	40.6342	1.112
19.6625	1.378	20.6065	0.911	20.7585	1.382	28.6934	1.249	40.6366	1.141
19.6651	1.399	20.6082	0.856	20.7685	1.217	28.6963	1.250	40.6417	1.173
19.6675	1.420	20.6106	0.813	20.7652	1.272	28.6989	1.255	40.6444	1.182
19.6701	1.413	20.6126	0.769	20.7733	1.142	28.7018	1.260	40.6472	1.194
19.6720	1.413	20.6152	0.765	20.7707	1.193	28.7049	1.260	40.6553	1.256
19.6761	1.413	20.6178	0.765	20.7783	1.033	28.7077	1.261	40.6526	1.247
19.6803	1.415	20.6207	0.783	20.7759	1.081	28.7106	1.274	40.6643	1.297
19.6832	1.422	20.6236	0.804	20.7833	0.964	28.7128	1.287	40.6624	1.285
19.6881	1.422	20.6261	0.837	20.7809	0.972	28.7158	1.271	40.6718	1.325
19.6918	1.396	20.6279	0.858	20.7888	0.852	28.7201	1.256	40.6682	1.321
19.6958	1.363	20.6306	0.879	20.7864	0.855	28.7243	1.293	40.6798	1.362
19.6986	1.344	20.6328	0.900	20.7943	0.946	28.7273	1.325	40.6770	1.354
19.7011	1.329	20.6358	0.931	20.7918	0.928	28.7304	1.338	40.6877	1.370
19.7043	1.282	20.6378	0.953	20.7996	0.965	28.7344	1.329	40.6835	1.362
19.7064	1.247	20.6411	0.993	20.7975	0.938	28.7380	1.324	40.6945	1.381
19.7088	1.212	20.6449	1.034	20.8046	1.010			40.6910	1.374
19.7112	1.183	20.6500	1.083	20.8026	0.997	33.6163	1.140	40.7006	1.400
19.7133	1.151	20.6536	1.118	20.8098	1.059	33.6189	1.081	40.6981	1.392
19.7161	1.105	20.6566	1.144	20.8074	1.029	33.6217	1.004	40.7077	1.412
19.7188	1.057	20.6601	1.174	20.8157	1.099	33.6233	0.962	40.7036	1.407
19.7211	1.020	20.6653	1.211			33.6264	0.929	40.7310	1.384
19.7241	0.973	20.6684	1.219	28.5987	1.392	33.6291	0.893	40.7419	1.310
19.7264	0.940	20.6715	1.230	28.6013	1.386	33.6322	0.872	40.7387	1.363

Table 2. Continued

HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.	HJD 2449400.+	ΔV mag.
40.7536	1.062	41.6624	1.029	50.5979	0.863	50.6776	1.325	68.6464	1.208
40.7462	1.239	41.6655	1.043	50.6005	0.875	50.6802	1.340	68.6499	1.218
40.7634	0.828	41.6676	1.053	50.6031	0.886	50.6832	1.380	68.6563	1.247
		41.6719	1.062	50.6060	0.929	50.6855	1.384		
41.5943	1.355	41.6751	1.077	50.6086	0.951	50.6887	1.395	69.6002	1.361
41.5970	1.359	41.6778	1.097	50.6117	0.973	50.6911	1.407	69.6022	1.367
41.6002	1.360	41.6816	1.115	50.6141	0.996	50.6941	1.392	69.6048	1.371
41.6041	1.370	41.6843	1.123	50.6170	0.995	50.6962	1.379	69.6074	1.365
41.6088	1.379	41.6868	1.139	50.6189	1.019	50.6992	1.378	69.6103	1.365
41.6110	1.376	41.6917	1.172	50.6215	1.060	50.7026	1.380	69.6131	1.383
41.6141	1.372	41.6951	1.194	50.6239	1.082	50.7062	1.399	69.6155	1.398
41.6164	1.375	41.6982	1.206	50.6267	1.124	50.7085	1.402	69.6185	1.402
41.6196	1.370	41.7015	1.210	50.6288	1.140	50.7112	1.399	69.6211	1.398
41.6222	1.360	41.7049	1.207	50.6349	1.147	50.7139	1.391	69.6234	1.401
41.6266	1.333	41.7069	1.208	50.6374	1.173	50.7167	1.374	69.6273	1.386
41.6284	1.326	41.7106	1.213	50.6401	1.197	50.7193	1.370	69.6300	1.379
41.6322	1.296	41.7137	1.212	50.6424	1.205			69.6348	1.333
41.6350	1.274	41.7183	1.217	50.6447	1.223	68.6098	0.859	69.6371	1.313
41.6389	1.226	41.7231	1.227	50.6475	1.222	68.6124	0.890	69.6403	1.292
41.6412	1.198	41.7316	1.255	50.6505	1.229	68.6159	0.930	69.6426	1.274
41.6437	1.177	41.7347	1.254	50.6530	1.272	68.6183	0.944	69.6453	1.257
41.6463	1.150	41.7380	1.244	50.6563	1.288	68.6210	0.979	69.6491	1.225
41.6494	1.112	41.7412	1.244	50.6584	1.289	68.6244	1.032	69.6515	1.192
41.6519	1.084	41.7458	1.260	50.6652	1.362	68.6285	1.058	69.6545	1.154
41.6551	1.063	41.7491	1.267	50.6683	1.386	68.6316	1.091	69.6348	1.333
41.6569	1.045			50.6721	1.353	68.6370	1.155		
41.6605	1.033	50.5956	0.844	50.6750	1.335	68.6390	1.173		

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Arellano Ferro, A., Nuñez, N.S. and Avila, J.J., 1994, PASP, in press (July issue)