

1 Mon: The 'lost' 1979 - 1985 data

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Abstract

Extensive photoelectric measurements of the δ Scuti variable 1 Mon were obtained from 1979 to 1985 at Odessa Astronomical Observatory. These data are presented and analyzed. The star shows an almost equidistant frequency triplet with a number of combinations of these three frequencies. The frequencies and amplitudes are in agreement with those found in previous years.

Introduction

The δ Scuti variable 1 Mon is of special interest because of its low projected rotational speed of 19 km/s and peak-to-peak amplitude of just under 0.3 mag. This puts the star in the intermediate region between the slowly rotating HADS (high-amplitude Delta Scuti stars) and the ocean of more rapidly rotating Delta Scuti stars with small amplitudes and mostly nonradial pulsation. The examination of these intermediate stars (e.g., 1 Mon and 44 Tau) is one of the present priorities of the Delta Scuti Network.

1 Mon is special for another reason: the star shows an almost equidistantly spaced frequency triplet. However, this triplet is composed of modes with different quantum numbers, ℓ (Balona & Stobie 1980, Balona et al. 2001). Consequently, rotational splitting of a nonradial mode as a cause for equidistance seems to be ruled out.

The variability of 1 Mon was discovered by Cousins (1963). Several subsequent short studies confirmed the variability using a single frequency with variable amplitude. Millis (1973) showed the existence of two frequencies of pulsation. It was the extensive study by Shobbrook & Stobie (1974) which revealed the existence of three frequencies as well as interactions between them.

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To examine the nature of the frequency triplet, lengthy studies are needed: for the 1970/71 and 1971/72 observing seasons (Millis data listed in his paper), for 1972/73 (Shobbrook & Stobie data available from the IAU Archives of Unpublished Observations of Variable Stars), for 1976/77 and 1977/78 (Balona & Stobie 1980, data on microfiche in the journal,² while the less extensive photometric data for the year 2000 are not publicly available.

During the 1978/79, 1982/83 and 1984/85 observing seasons, additional measurements of 1 Mon were obtained at the Astronomical Observatory of the Odessa State University. These were announced with very few details (Romanov & Fedotov 1979, Fedotov & Galdyr 1991). It is the purpose of the present paper to provide a brief multiperiod analysis and to make these important data available.

The observations were obtained with the photon-counting photometer and the V filter of the 20-cm refractor at the observational site "Mayaki" of the Astronomical Observatory of the Odessa State University. HR 2039 and HR 2198 were used as comparison stars. All measurements were transformed to the standard UBV system using annual transformation coefficients. Most measurements were carried out during the 1984/85 season, while some are also available from 1979 and 1982/83.

The analysis of the Odessa measurements showed that a few measurements needed to be rejected since they appear to be of very low precision or erroneous. This includes the complete night of 244 5307, for which a very large timing error of the two-hour run is suspected. Altogether, 799 measurements were used.

Analysis and pulsation behavior of 1 Mon

The photometric data presented here were analyzed for periodicities with the PERIOD04 package (Lenz & Breger 2005), which uses Fourier as well as least-squares algorithms. Data from other longer studies mentioned previously were included to provide a comparison. The previously known three main frequencies as well as a number of combination frequencies were detected. The results for the Odessa data are shown in Table 1. Note that due to zero-point uncertainties (see below) the amplitude for the mode at 0.1291 cd^{-1} needs to be treated with caution and has been put in brackets. The 13-frequency solution fits the observations with a standard deviation of $\pm 0.024 \text{ mag}$. However, these deviations are not caused by poor frequency solutions, but mainly by systematic zero-point offsets between measurements taken in different nights. Consequently, we have made an additional solution allowing for nightly zero-point corrections. Such a

²Since microfiche data may be difficult to read without special equipment, an electronic version of the data can be obtained from the first author of the present paper.

Table 1: Frequencies and amplitudes of 1 Mon from the Odessa data.

Frequency cd^{-1}	Name	V amplitude (mag)	
		Zero-point none	adjustments applied
Main modes			
7.346153	f_1	0.101	0.099
7.475269	f_2	0.065	0.065
7.217116	f_3	0.020	0.018
Other frequencies			
6.717240	f_4	0.002	0.004
14.821422	$f_1 + f_2$	0.017	0.018
14.692306	$2f_1$	0.013	0.012
14.950538	$2f_2$	0.004	0.006
14.563268	$f_1 + f_3$	0.007	0.007
22.167575	$2f_1 + f_2$	0.004	0.003
22.296691	$2f_2 + f_1$	0.003	0.003
7.604385	$2f_2 - f_1$	0.006	0.005
22.038459	$3f_1$	0.001	0.002
0.129116	$f_2 - f_1$	(0.010)	-
Residuals of fit		± 0.024	± 0.014

procedure makes the search for low frequencies impossible and we have therefore omitted the f_1 - f_2 peak at 0.1291 cd^{-1} . Nevertheless, the residuals are now highly improved to $\pm 0.014 \text{ mag}$.

We detect no amplitude variability between the three observing seasons. Since 75% of the available measurements belong to a single season (1984/85), the test can only exclude large-scale amplitude variability.

Good agreement of the sizes of the amplitudes to within a few millimag is also found when we compare the present results with those published by Shobbrook & Stobie (1974) as well as Balona & Stobie (1980). This result confirms the lack of large amplitude variability in this time period. However, note that Balona et al. (2001) report a decreased amplitude of 0.012 mag for f_3 in the year 2000.

The Odessa data

The Odessa measurements of 1 Mon used in this paper are listed in Table 2.

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Table 2: Odessa measurements of 1 Mon (V filter).

HJD 2440000+	V mag	HJD 2440000+	V mag	HJD 2440000+	V mag	HJD 2440000+	V mag
3904.3241	6.215	3931.3529	6.132	5264.5493	5.994	5353.1916	6.032
3904.3336	6.265	3932.2649	6.024	5264.5560	6.048	5353.1990	6.088
3904.3387	6.250	3932.2669	6.025	5264.5626	6.078	5353.2060	6.157
3904.3396	6.240	3932.2713	6.029	5264.5701	6.097	5353.2138	6.176
3904.3467	6.240	3932.2785	6.040	5264.5769	6.121	5353.2227	6.207
3904.3483	6.246	3932.2794	6.053	5272.4602	6.033	5353.2301	6.230
3904.3526	6.224	3932.2860	6.064	5272.4689	6.026	5353.2366	6.253
3904.3535	6.208	3932.2868	6.051	5272.4786	6.083	5353.2435	6.250
3904.3596	6.188	3932.2912	6.073	5272.4878	6.100	5353.2504	6.257
3904.3606	6.186	3932.2923	6.057	5272.4968	6.170	5353.2577	6.272
3904.3696	6.138	3932.2975	6.082	5272.5064	6.210	5353.2650	6.247
3904.3706	6.138	3932.3019	6.069	5272.5147	6.170	5353.2730	6.210
3904.3756	6.084	3932.3930	6.096	5272.5234	6.165	5353.2811	6.171
3904.3805	6.074	3932.3098	6.106	5272.5314	6.118	5353.2984	6.103
3904.3817	6.035	3932.3150	6.116	5272.5399	6.082	5353.2977	6.047
3904.3877	6.005	3932.3160	6.122	5272.5464	6.059	5353.3043	6.005
3904.3887	5.992	3932.3206	6.153	5272.5541	6.010	5353.3101	5.983
3904.3963	6.011	3932.3217	6.145	5272.5609	6.002	5353.3169	5.970
3904.3975	5.992	3932.3287	6.179	5272.5720	5.971	5353.3232	5.994
3904.4023	5.977	3932.3298	6.209	5272.5817	6.021	5353.3291	6.030
3904.4035	6.017	3932.3352	6.226	5272.5907	6.041	5353.3356	6.060
3904.4087	6.029	3932.3409	6.216	5272.5986	6.081	5353.3435	6.116
3904.4098	6.031	3932.3419	6.223	5282.4932	6.200	5353.3494	6.141
3906.3321	6.168	3935.2467	6.246	5282.5006	6.165	5353.3556	6.168
3906.3332	6.189	3935.2477	6.228	5282.5086	6.125	5353.3617	6.175
3906.3407	6.233	3935.2524	6.251	5282.5166	6.077	5353.3687	6.206
3906.3484	6.268	3935.2580	6.210	5282.5246	6.045	5353.3756	6.243
3906.3495	6.307	3935.2592	6.214	5282.5369	6.027	5353.3813	6.235
3906.3558	6.304	3935.2670	6.185	5282.5450	6.047	5353.3870	6.272
3906.3568	6.299	3935.2681	6.151	5282.5548	6.088	5353.3935	6.266
3906.3634	6.287	3935.2726	6.129	5282.5616	6.098	5353.3995	6.221
3906.3644	6.304	3935.2735	6.113	5282.5717	6.163	6006.5168	6.251
3906.3720	6.295	3935.2779	6.078	5282.5791	6.191	6006.5190	6.234
3906.3729	6.293	3935.2791	6.070	5282.5901	6.237	6006.5212	6.202
3906.3788	6.260	3935.2831	6.052	5282.5969	6.242	6006.5245	6.167
3906.3797	6.249	3935.2843	6.055	5282.6078	6.262	6006.5267	6.164
3906.3847	6.224	3935.2911	6.004	5284.5311	6.244	6006.5288	6.146
3906.3862	6.203	3935.2923	6.005	5284.5384	6.171	6006.5308	6.137
3931.2586	6.232	3935.2998	5.983	5284.5453	6.051	6006.5336	6.130
3931.2598	6.260	3935.3010	5.989	5284.5520	6.008	6006.5357	6.093
3931.2662	6.271	3935.3071	6.020	5284.5586	6.000	6006.5377	6.070
3931.2719	6.240	3935.3082	6.005	5284.5657	6.015	6006.5399	6.062
3931.2803	6.262	3935.3135	6.041	5284.5728	6.044	6006.5421	6.013
3931.2861	6.219	3935.3147	6.057	5284.5807	6.098	6006.5442	6.000
3931.2922	6.138	3935.3198	6.063	5284.5778	6.141	6006.5463	5.985
3931.2973	6.097	3935.3209	6.060	5285.3590	5.989	6006.5489	5.983
3931.3055	6.007	3935.3253	6.106	5285.3663	5.975	6006.5512	5.966
3931.3072	6.013	3935.3300	6.097	5285.3745	6.033	6006.5532	5.955
3931.3130	5.992	3935.3335	6.102	5285.3828	6.097	6006.5553	5.962
3931.3142	6.003	3935.3344	6.152	5285.3905	6.095	6006.5573	5.945
3931.3196	5.989	5264.4980	6.123	5285.4000	6.104	6006.5593	5.950
3931.3270	5.982	5264.5076	6.091	5285.4080	6.146	6006.5614	5.962
3931.3318	5.998	5264.5144	6.062	5285.4163	6.217	6006.5635	5.967
3931.3366	6.033	5264.5220	6.019	5285.4364	6.307	6006.5665	6.000
3931.3452	6.097	5264.5305	6.010	5285.4475	6.284	6006.5686	5.995
3931.3498	6.113	5264.5416	5.985	5353.1845	6.019	6006.5708	6.004

Table 2 continued.

6006.5728	6.028	6038.3726	6.167	6039.3526	6.035	6039.4917	6.075
6006.6037	6.183	6038.3751	6.159	6039.3547	6.008	6039.4937	6.061
6006.6058	6.194	6038.3771	6.129	6039.3574	6.013	6039.4973	6.055
6006.6080	6.196	6038.3791	6.149	6039.3597	6.039	6039.4993	6.061
6006.6108	6.213	6038.3811	6.141	6039.3629	6.037	6039.5014	6.058
6006.6128	6.215	6038.3837	6.111	6039.3650	6.025	6039.5034	6.051
6006.6149	6.253	6038.3839	6.102	6039.3768	6.059	6039.5055	6.052
6030.4579	6.244	6038.3885	6.071	6039.3798	6.086	6039.5086	6.071
6030.4601	6.240	6038.3905	6.050	6039.3818	6.090	6039.5106	6.065
6030.4623	6.243	6038.3924	6.040	6039.3840	6.095	6039.5131	6.075
6030.4645	6.230	6038.3943	6.030	6039.3860	6.111	6039.5151	6.076
6030.4677	6.229	6038.3964	6.025	6039.3889	6.122	6039.5184	6.087
6030.4700	6.210	6038.3984	6.005	6039.3909	6.121	6039.5206	6.097
6030.4725	6.211	6038.4010	6.000	6039.3930	6.118	6039.5231	6.114
6030.4757	6.192	6038.4030	6.019	6039.3959	6.161	6039.5252	6.119
6030.4781	6.186	6038.4050	5.983	6039.3980	6.163	6039.5284	6.119
6030.4805	6.159	6038.4070	5.997	6039.4001	6.150	6039.5305	6.137
6030.4840	6.122	6038.4094	5.998	6039.4022	6.156	6039.5326	6.145
6030.4862	6.111	6038.4115	6.005	6039.4053	6.153	6039.5352	6.138
6030.4888	6.086	6038.4141	5.995	6039.4074	6.160	6039.5375	6.138
6030.4910	6.070	6038.4161	6.008	6039.4095	6.185	6039.5404	6.153
6030.4934	6.014	6038.4182	6.027	6039.4116	6.189	6039.5428	6.168
6030.4992	5.992	6038.4204	6.031	6039.4138	6.188	6039.5449	6.159
6030.5015	5.999	6038.4224	6.040	6039.4167	6.176	6039.5477	6.168
6030.5037	5.976	6038.4244	6.067	6039.4188	6.187	6039.5499	6.183
6030.5078	5.978	6038.4268	6.062	6039.4208	6.196	6040.3950	6.174
6030.5109	5.990	6038.4290	6.109	6039.4230	6.193	6040.3975	6.175
6030.5130	5.984	6038.4321	6.097	6039.4252	6.207	6040.3994	6.183
6030.5153	5.988	6038.4343	6.127	6039.4279	6.214	6040.4019	6.187
6030.5181	6.009	6038.4365	6.133	6039.4299	6.219	6040.4052	6.172
6030.5204	6.010	6038.4385	6.126	6039.4320	6.206	6040.4071	6.199
6030.5234	6.022	6038.4407	6.145	6039.4341	6.201	6040.4078	6.180
6030.5256	6.042	6038.4432	6.163	6039.4364	6.212	6040.4094	6.193
6030.5276	6.035	6038.4459	6.165	6039.4386	6.198	6040.4104	6.193
6030.5303	6.057	6038.4479	6.181	6039.4425	6.199	6040.4119	6.186
6030.5326	6.064	6038.4499	6.189	6039.4445	6.190	6040.4130	6.182
6030.5347	6.072	6038.4520	6.192	6039.4465	6.201	6040.4146	6.189
6030.5368	6.074	6038.4541	6.205	6039.4487	6.196	6040.4174	6.177
6030.5397	6.100	6038.4561	6.214	6039.4507	6.186	6040.4185	6.176
6030.5417	6.117	6038.4581	6.201	6039.4528	6.195	6040.4204	6.175
6030.5438	6.114	6038.4603	6.230	6039.4551	6.174	6040.4225	6.170
6030.5471	6.112	6038.4633	6.223	6039.4583	6.175	6040.4235	6.164
6030.5494	6.135	6038.4655	6.233	6039.4605	6.164	6040.4257	6.166
6030.5516	6.131	6038.4676	6.229	6039.4624	6.171	6040.4276	6.171
6030.5548	6.155	6038.4698	6.218	6039.4645	6.151	6040.4295	6.161
6030.5570	6.162	6038.4719	6.225	6039.4677	6.144	6040.4324	6.161
6030.5592	6.180	6038.4740	6.229	6039.4697	6.128	6040.4344	6.149
6030.5641	6.198	6038.4762	6.232	6039.4717	6.112	6040.4362	6.148
6030.5669	6.205	6038.4789	6.237	6039.4737	6.109	6040.4381	6.126
6030.5692	6.212	6038.4810	6.234	6039.4758	6.109	6040.4401	6.139
6030.5714	6.207	6038.4832	6.239	6039.4780	6.098	6040.4420	6.125
6030.5744	6.219	6038.4859	6.228	6039.4811	6.098	6040.4456	6.124
6030.5777	6.222	6038.4880	6.247	6039.4830	6.105	6040.4475	6.115
6030.5800	6.225	6039.3454	6.066	6039.4850	6.077	6040.4494	6.113
6038.3688	6.186	6039.3482	6.061	6039.4871	6.077	6040.4513	6.102
6038.3707	6.191	6039.3504	6.053	6039.4892	6.077	6040.4532	6.109

Table 2 continued.

6040.4560	6.092	6114.2769	6.142	6118.2548	6.127	6119.3115	6.020
6040.4584	6.085	6114.2792	6.161	6118.2579	6.131	6119.3141	5.998
6040.4622	6.075	6114.2826	6.150	6118.2598	6.141	6119.3177	6.051
6040.4642	6.069	6114.2838	6.144	6118.2619	6.139	6119.3203	6.071
6040.4654	6.068	6114.2852	6.180	6118.2713	6.171	6119.3234	6.069
6040.4673	6.073	6114.2875	6.188	6118.2738	6.163	6119.3246	6.062
6040.4692	6.066	6115.2948	6.094	6118.2762	6.166	6119.3281	6.108
6040.4714	6.062	6115.2977	6.088	6118.2796	6.158	6119.3314	6.119
6040.4733	6.059	6115.3011	6.061	6118.2819	6.172	6119.3348	6.130
6040.4763	6.059	6115.3033	6.044	6118.2841	6.165	6119.3374	6.112
6040.4783	6.077	6115.3061	6.051	6118.2864	6.182	6119.3402	6.161
6040.4808	6.071	6115.3087	6.025	6118.2885	6.179	6120.2011	6.187
6040.4843	6.066	6115.3118	6.015	6118.2918	6.163	6120.2048	6.174
6040.4863	6.092	6115.3141	6.008	6118.2941	6.162	6120.2078	6.161
6040.4887	6.084	6115.3224	6.001	6118.2970	6.163	6120.2109	6.137
6040.4909	6.092	6115.3246	5.976	6118.2997	6.150	6120.2139	6.103
6040.4930	6.097	6115.3269	5.969	6118.3028	6.134	6120.2167	6.081
6040.4950	6.103	6115.3293	5.999	6118.3060	6.124	6120.2177	6.064
6040.4972	6.100	6115.3317	5.990	6118.3083	6.116	6120.2197	6.069
6040.4998	6.113	6115.3350	6.038	6118.3112	6.103	6120.2204	6.053
6040.5029	6.126	6115.3375	6.061	6118.3135	6.098	6120.2236	6.006
6040.5056	6.130	6115.3399	6.074	6118.3173	6.102	6120.2263	6.006
6040.5082	6.120	6115.3421	6.058	6118.3198	6.084	6120.2285	5.985
6040.5120	6.138	6115.3448	6.093	6118.3221	6.090	6120.2313	5.970
6040.5147	6.147	6115.3475	6.100	6118.3245	6.073	6120.2335	5.958
6040.5180	6.139	6115.3505	6.136	6118.3274	6.073	6120.2363	5.964
6040.5200	6.154	6115.3532	6.152	6118.3310	6.064	6120.2389	5.916
6040.5221	6.170	6115.3560	6.142	6118.3334	6.065	6120.2415	5.929
6114.1979	6.198	6115.3571	6.142	6118.3359	6.043	6120.2437	5.932
6114.2009	6.166	6115.3594	6.187	6118.3381	6.043	6120.2465	5.917
6114.2048	6.158	6115.3619	6.180	6118.3404	6.030	6120.2486	5.925
6114.2071	6.110	6118.1959	6.002	6118.3439	6.033	6120.2508	5.924
6114.2111	6.080	6118.1990	6.010	6118.3449	6.023	6120.2539	5.990
6114.2138	6.058	6118.2022	6.017	6118.3476	6.032	6120.2563	5.966
6114.2161	6.034	6118.2066	6.012	6118.3500	6.030	6120.2572	5.985
6114.2205	5.987	6118.2091	6.019	6118.3525	6.024	6120.2590	5.980
6114.2243	5.964	6118.2114	6.016	6118.3536	6.030	6120.2615	5.998
6114.2268	5.932	6118.2144	6.016	6119.2619	6.153	6120.2643	6.017
6114.2306	5.914	6118.2166	6.037	6119.2648	6.151	6120.2665	6.000
6114.2335	5.925	6118.2195	6.026	6119.2680	6.102	6120.2687	6.029
6114.2364	5.953	6118.2207	6.019	6119.2686	6.113	6120.2714	6.026
6114.2373	5.954	6118.2236	6.040	6119.2711	6.092	6120.2738	6.053
6114.2393	5.951	6118.2259	6.041	6119.2733	6.077	6120.2759	6.078
6114.2436	5.984	6118.2269	6.060	6119.2762	6.052	6120.2793	6.109
6114.2462	5.984	6118.2288	6.063	6119.2787	6.023	6120.2819	6.106
6114.2484	5.992	6118.2317	6.056	6119.2822	5.995	6120.2840	6.143
6114.2520	6.012	6118.2342	6.065	6119.2847	5.985	6120.2861	6.144
6114.2542	6.041	6118.2365	6.079	6119.2871	5.988	6123.2045	5.979
6114.2565	6.043	6118.2374	6.091	6119.2904	5.992	6123.2069	5.972
6114.2579	6.049	6118.2401	6.086	6119.2934	5.987	6123.2095	5.956
6114.2605	6.073	6118.2424	6.094	6119.2957	5.961	6123.2119	5.973
6114.2646	6.086	6118.2435	6.093	6119.2987	5.974	6123.2141	5.965
6114.2656	6.075	6118.2454	6.086	6119.3011	5.982	6123.2164	5.960
6114.2680	6.105	6118.2484	6.101	6119.3035	5.972	6123.2184	5.976
6114.2706	6.127	6118.2504	6.114	6119.3065	6.011	6123.2210	5.965
6114.2745	6.154	6118.2525	6.125	6119.3092	6.001	6123.2233	5.989

Table 2 continued.

6123.2254	6.010	6125.2282	6.078	6126.2122	6.045	6126.2918	6.128
6123.2275	5.994	6125.2308	6.102	6126.2144	6.061	6126.2940	6.128
6123.2303	6.029	6125.2347	6.119	6126.2171	6.052	6126.2962	6.127
6123.2323	6.027	6125.2373	6.100	6126.2192	6.023	6132.2021	6.041
6123.2355	6.059	6125.2393	6.071	6126.2219	6.008	6132.2042	6.032
6123.2384	6.060	6125.2424	6.069	6126.2239	6.020	6132.2065	6.037
6123.2406	6.086	6125.2445	6.066	6126.2263	5.995	6132.2088	6.043
6123.2433	6.081	6125.2471	6.068	6126.2303	5.989	6132.2112	6.040
6123.2454	6.098	6125.2492	6.063	6126.2310	5.999	6132.2138	6.064
6123.2474	6.085	6125.2513	6.044	6126.2333	5.985	6132.2161	6.085
6123.2495	6.110	6125.2534	6.039	6126.2354	6.012	6132.2182	6.086
6123.2522	6.131	6125.2562	6.016	6126.2385	6.018	6132.2208	6.084
6123.2543	6.136	6125.2584	6.039	6126.2412	6.012	6132.2227	6.106
6123.2564	6.138	6125.2606	6.017	6126.2432	6.013	6132.2252	6.112
6123.2584	6.146	6125.2634	6.017	6126.2454	5.987	6132.2277	6.107
6123.2611	6.160	6125.2661	6.021	6126.2482	6.000	6132.2301	6.130
6123.2633	6.181	6125.2688	6.033	6126.2503	6.023	6132.2324	6.139
6123.2655	6.173	6125.2709	6.040	6126.2532	6.027	6132.2346	6.140
6123.2684	6.170	6125.2731	6.028	6126.2555	6.044	6132.2369	6.144
6123.2705	6.195	6125.2759	6.028	6126.2577	6.040	6132.2398	6.151
6123.2725	6.190	6125.2783	6.023	6126.2605	6.044	6132.2424	6.151
6123.2746	6.181	6125.2802	6.016	6126.2628	6.061	6132.2448	6.177
6123.2774	6.197	6125.2833	6.042	6126.2648	6.056	6132.2471	6.182
6123.2796	6.198	6125.2852	6.049	6126.2676	6.073	6132.2495	6.179
6123.2824	6.206	6125.2873	6.074	6126.2725	6.080	6132.2519	6.179
6123.2850	6.205	6125.2894	6.066	6126.2747	6.107	6132.2543	6.184
6123.2882	6.203	6125.2915	6.060	6126.2770	6.113	6132.2567	6.189
6123.2903	6.222	6125.2943	6.081	6126.2791	6.121	6132.2595	6.205
6123.2932	6.220	6125.2968	6.087	6126.2820	6.111	6132.2619	6.199
6123.2955	6.234	6125.2995	6.085	6126.2842	6.120	6132.2642	6.180
6125.2230	6.105	6126.2032	6.106	6126.2866	6.121	6132.2670	6.197
6125.2261	6.111	6126.2090	6.061	6126.2888	6.134		