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MV LYRAE – SINCE PARENAGO TO THE PRESENT TIME

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The photometry of the novalike variable UMV Lyrae carried out in the years 1951–1996 is performed in the light curve. The evidence of two steady brightness levels lasting about 10 or more years is shown. The peculiarities of the low brightness state which begin in 1995 are described in more detail.

KEY WORDS Cataclysmic Variables, Novalike Star

1 INTRODUCTION

This unique variable was discovered by Parenago in the year 1946. Of the 15 of measurements brightness obtained in Moscow he suggested this star to be an irregular variable. Later his suggestion was confirmed. The next observations were made by Greenstein (1954) and Walker (1954). They showed that MV Lyrae is the very blue star with emission line He II 4686 and detected the fast brightness variations with amplitudes which reached $0^m.5$ with a time-scale of 5 min.

Wenzel (1980, 1983) showed from the 1100 photographic plates from the years 1934–1983 that mostly the MV Lyr brightness is close to 12^m, but occasionally it fades to 16^m. Also brightness variations with typical times from minutes to months were observed. Romano and Rosino (1980) pointed out that a new brightness decreasing up to 18^m happened in September, 1979.

Robinson *et al.*, 1981 (hereafter – RBCCN) were the first who performed the high speed photometry of MV Lyrae in both the high and low brightness state. They claimed, that minimum light is caused by the substantial reduction, and at least once by the cessation of mass transfer from the late-type star to the white dwarf in the system. Despite the very quiet behavior, during one night MV Lyrae showed large amplitude rapid flickering.

Andronov and Shugarov (1982, 1983) (hereafter – ASh) also showed the change between "active" – high and "inactive" – low brightness states in MV Lyrae behavior, and investigated in detail the of decrease of brightness in 1979.

ASh studied MV Lyrae in the low state and in more detail with respect to the high state, one year later than RBCCN, but with a worse time resolution (20 min) on the photographic plates. In contrast to the behavior described by RBCCN, ASh showed that MV Lyrae exhibited brightness variations with an amplitude up to 1^m and a time-scale of about three hours every five nights of observations.

Note, that this was the most prolonged low state observed so far and lasted 10 years.

The X-ray flux from MV Lyrae detected only in a high state in 1979 before the brightness declined and was not in 1980, during minimum light (Mereghetti and Garilli, 1987).

Several authors – Furhmann (1985), Gotz (1987), Andronov (1988), Wenzel (1989), Fuhrmann and Wenzel (1990), Rosino *et al.* (1993) pointed, that there were flashes up to 15^m with a typical time of a few days superposed on a mean brightness of $17–18^m$ at that low state. They noted, that the high state never showed flashes like these, but demonstrated stable flickering with a variable amplitude which reached $0^m.3–0^m.5$.

Kraicheva and Genkov observed the return of MV Lyrae from the low to the high state in 1988–1991 and pointed out that the ascending branch lasted 1–1.5 years and was considerably longer than the decrease of brightness (approximately one month).

Many of authors observed MV Lyrae in the last high state which lasted six years from 1989–1995: At the beginning of the high state – in 1989 (Andronov *et al.*, 1992), in 1990 (Borisov, 1992), and in 1993 (Skillman *et al.*, 1995). All of them noted the similar behavior of the system as in the previous high state.

The spectral observations, undertaken by many authors, showed the evidence of the orbital period close to 3.2 hours, but the optical light variations did not coincide exactly with spectral variations. However, Andronov and Shugarov (1983) and Andronov *et al.* (1992) detected the light variability in both the high and the low state with a time-scale of 2–3 hours. Only Borisov (1992) and later Skillman *et al.* (1995) confidently showed the evidence in a high state of the photometric period several minutes longer than the showed orbital one.

Marsakova and Shugarov (1995) detected the beginning of the fading of the last brightness of MV Lyrae in April 1995 up to $14–15^m$. In summer it reached 18^m and until now (March 1996) in the low state.

We have carried out photometric observations of MV Lyrae from 1979 to 1996 in Crimea and Moscow and on negative archives of the Moscow Collection since 1951. In this paper we describe the global behavior of MV Lyrae during 45 years and examine the last low state in more detail.

In total we measured near 3000 data in B, and 300 data in both the U and V system.

2 OBSERVATIONS

The photometric observations of MV Lyrae have been cariied out:

(1) On the photographic plates of SAI, obtained in the system, close to B at 0.4, 0.5, 1.25 meter telescopes of the Crimean Laboratory of SAI and 0.7 meter reflector in Moscow from 1951–1996.

(2) Using the TV-complex with 0.5 meter meniscus telescope of the Crimean Astrophysical Observatory, equiphed with a blue – sensitive peak – up the tube superisocon (Abramenko *et al.*, 1988). Observations were made in unfiltered light during 18 nights at the last low brightness state between summer and autumn of 1995. Data were reduced to the B system and are given in the Table 1.

(3) Using the UBV electrophotometer of V. M. Lyuty and I. M. Volkov at 0.6 and 1.25 meter reflectors in Crimea, at the 0.6 meter telescope of Simeiz Station of Crimean Astrophysical Observatory and the 0.7 meter reflector in Moscow. The fulh of these data were acquired from 1989–1995 while MV Lyrae was in the high brightness state. The comparison stars were given from the paper of Andronov and Shugarov (1982).

Table 1.

JD hel 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*
31.302	17.77	31.328	17.60	31.351	17.85	31.377	17.88	31.409	17.80
31.303	17.70	31.329	17.72	31.352	17.87	31.378	17.96	31.410	17.65
31.304	17.84	31.330	17.73	31.353	17.81	31.380	17.80	31.411	17.70
31.305	17.86	31.331	17.80	31.355	17.91	31.381	17.93	31.412	17.80
31.306	17.83	31.332	17.76	31.356	17.90	31.383	17.90	31.413	17.82
31.307	17.75	31.333	17.80	31.357	17.86	31.384	17.94	31.415	17.72
31.308	17.78	31.334	17.82	31.358	17.81	31.386	17.87	31.416	17.77
31.309	17.70	31.335	17.93	31.359	17.84	31.387	18.00	31.417	17.70
31.310	17.72	31.337	17.85	31.360	17.85	31.389	18.03	31.418	17.85
31.312	17.95	31.338	17.78	31.361	17.80	31.391	17.90	31.419	17.83
31.313	17.80	31.340	17.73	31.362	17.77	31.394	17.93	31.420	17.72
31.315	17.77	31.341	17.82	31.363	17.78	31.396	17.85	31.421	17.80
31.316	17.76	31.342	17.74	31.364	17.88	31.397	17.80	31.423	17.81
31.317	17.72	31.343	17.77	31.366	17.91	31.399	17.75	31.424	17.78
31.319	17.65	31.344	17.75	31.367	17.88	31.400	17.83	31.425	17.86
31.320	17.81	31.345	17.78	31.368	17.86	31.401	17.70	31.426	17.75
31.321	17.75	31.346	17.75	31.369	17.74	31.402	17.75	31.427	17.70
31.322	17.82	31.347	17.80	31.370	17.80	31.403	17.77	31.428	17.70
31.323	17.74	31.348	17.81	31.371	17.80	31.404	17.85	31.429	17.63
31.324	17.67	31.349	17.85	31.373	17.95	31.405	17.80	31.430	17.75
31.326	17.83	31.350	17.83	31.374	18.02	31.406	17.90	31.431	17.77
31.327	17.86	31.351	17.81	31.376	18.05	31.408	17.77	31.433	17.79

Table 1. Continued

JD hel 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*
31.434	17.68	53.428	17.74	58.359	17.77	58.417	17.80	59.277	17.66
31.435	17.71	53.431	17.68	58.360	17.84	58.419	17.84	59.278	17.65
31.436	17.77	58.287	17.75	58.361	17.76	58.420	17.78	59.279	17.43
31.437	17.80	58.288	17.77	58.362	17.72	58.421	17.73	59.280	17.26
31.439	17.81	58.289	17.80	58.363	17.67	58.422	17.74	59.282	17.06
31.440	17.76	58.290	17.87	58.364	17.79	58.424	17.69	59.283	17.01
31.441	17.77	58.297	17.75	58.366	17.74	58.425	17.75	59.284	16.97
31.442	17.70	58.299	17.73	58.367	17.76	58.426	17.77	59.285	17.28
31.444	17.78	58.307	17.80	58.368	17.68	58.427	17.80	59.285	17.25
31.445	17.82	58.308	17.83	58.369	17.60	58.428	17.80	59.286	17.30
31.446	17.70	58.309	17.77	58.371	17.75	58.429	17.72	59.287	17.13
31.447	17.75	58.311	17.85	58.372	17.67	58.430	17.70	59.289	17.32
31.449	17.68	58.312	17.82	58.373	17.69	58.431	17.75	59.289	17.58
31.450	17.75	58.313	17.80	58.374	17.75	58.432	17.77	59.290	17.64
31.451	17.69	58.315	17.88	58.375	17.74	58.433	17.70	59.292	17.00
31.345	17.60	58.316	17.85	58.376	17.70	58.435	17.80	59.292	16.83
31.453	17.65	58.317	17.92	58.378	17.69	58.436	17.82	59.293	16.70
31.455	17.75	58.318	17.87	58.379	17.73	58.437	17.73	59.294	16.83
31.456	17.68	58.319	17.95	58.380	17.75	58.438	17.65	59.295	16.85
31.458	17.70	58.321	17.85	58.381	17.85	58.440	17.74	59.296	16.71
31.459	17.80	58.322	17.90	58.382	17.88	58.441	17.77	59.298	16.90
31.460	17.74	58.326	18.05	58.383	17.76	58.442	17.80	59.299	16.77
31.461	17.68	58.328	17.80	58.384	17.80	58.443	17.76	59.300	16.91
31.462	17.75	58.329	17.88	58.385	17.83	59.247	17.05	59.301	17.00
31.462	17.78	58.330	17.86	58.386	17.78	59.247	17.00	59.302	17.27
31.463	17.77	58.332	17.75	58.387	17.85	59.248	17.03	59.303	17.33
31.464	17.72	58.333	18.00	58.389	17.84	59.248	17.00	59.304	17.20
31.465	17.68	58.334	18.06	58.390	17.80	59.250	17.15	59.305	17.22
31.466	17.71	58.335	17.90	58.391	17.77	59.250	17 40	59.306	17.45
31.467	17.77	58.335	18.08	58.392	17.85	59.252	17.80	59.307	17.38
31.468	17.62	58.336	17.93	58.394	17.76	59.253	17.77	59.308	17.42
31.469	17.70	58.337	18.15	58.395	17.73	59.254	17.85	59.309	17.60
31.470	17.65	58.338	18.08	58.396	17.82	59.255	17.70	59.310	17.42
31.471	17.77	58.340	18.00	58.397	17.88	59.256	17.80	59.311	17.00
31.473	17.75	58.341	17.90	58.398	17.80	59.257	17.90	59.312	16.90
31.474	17.70	58.342	17.80	58.399	17.77	59.258	17.80	59.314	16.83
31.475	17.75	58.343	17.80	58.400	17.85	59.259	17.82	59.315	16.78
31.476	17.13	58.344	17.83	58.401	17.83	59.261	17.70	59.317	16.70
31.477	17.18	58.345	17.70	58.403	17.78	59.262	17.63	59.318	17.03
31.478	17.20	58.346	17.68	58.404	17.76	59.264	17.22	59.319	16.77
31.479	17.21	58.347	17.80	58.405	17.83	59.265	17.00	59.321	16.85
31.480	17.47	58.348	17.77	58.407	17.80	59.266	17.10	59.322	16.92
31.480	17.5	58.349	17.73	58.408	17.71	59.268	17.40	59.323	17.15
31.481	17.28	58.351	17.68	58.410	17.66	59.269	17.53	59.325	17.18
31.482	17.36	58.352	17.70	58.411	17.72	59.271	17.16	59.326	17.23
31.483	17.41	58.353	17.75	58.412	17.76	59.272	17.33	59.328	17.35
31.484	17.45	58.354	17.77	58.413	17.85	59.273	17.38	59.329	17.47
31.485	17.4	58.355	17.73	58.414	17.78	59.274	17.49	59.330	17.56
53.424	17.80	58.356	17.63	58.415	17.77	59.275	17.68	59.331	17.65
53.426	17.83	58.358	17.75	58.416	17.69	59.276	17.72	59.332	17.51

Table 1. Continued

JD hel 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*
59.333	17.18	59.373	16.66	61.266	17.70	61.326	17.80	61.384	17.76
59.334	17.30	59.374	16.63	61.267	17.72	61.328	17.80	61.385	17.77
59.335	17.22	59.375	16.70	61.268	17.80	61.329	17.81	61.386	17.80
59.336	17.40	59.375	16.60	61.269	17.81	61.330	17.75	61.387	17.77
59.337	17.18	59.376	16.20	61.270	17.77	61.332	17.83	61.388	17.85
59.338	17.21	59.377	16.41	61.271	17.76	61.333	17.87	61.389	17.79
59.339	17.50	59.377	16.45	61.272	17.75	61.335	17.82	61.390	17.82
59.341	17.15	59.378	16.38	61.273	17.70	61.336	17.78	61.392	17.78
59.343	17.00	59.378	16.50	61.274	17.77	61.337	17.75	61.393	17.73
59.344	17.12	59.379	16.42	61.275	17.82	61.338	17.70	61.394	17.76
59.344	16.90	59.380	16.30	61.276	17.74	61.339	17.67	61.396	17.77
59.346	16.73	59.380	16.73	61.278	17.77	61.340	17.85	61.397	17.80
59.347	16.70	59.381	16.79	61.279	17.75	61.342	17.87	61.398	17.74
59.348	16.72	59.382	16.90	61.281	17.80	61.343	17.80	61.399	17.78
59.349	16.75	59.382	17.08	61.283	17.80	61.344	17.78	61.400	17.75
59.350	16.63	59.383	17.25	61.284	17.83	61.345	17.80	61.401	17.72
59.351	16.60	59.384	17.23	61.285	17.85	61.346	17.82	61.402	17.77
59.352	16.56	59.385	17.19	61.287	17.93	61.349	17.73	61.403	17.69
59.353	16.50	59.386	17.03	61.288	17.97	61.349	17.74	61.404	17.72
59.353	16.27	59.387	16.97	61.290	18.02	61.351	17.77	61.405	17.75
59.354	16.21	59.388	17.00	61.291	17.83	61.352	17.75	61.407	17.71
59.355	16.85	59.389	16.96	61.292	17.75	61.353	17.76	61.408	17.69
59.355	16.77	59.390	16.88	61.294	17.83	61.355	17.69	61.408	17.77
59.355	16.79	59.392	17.10	61.295	17.70	61.356	17.65	61.409	17.72
59.356	16.65	59.393	16.84	61.296	17.77	61.357	17.75	61.410	17.76
59.356	16.70	59.394	16.90	61.298	17.80	61.358	17.77	61.411	17.75
59.357	16.92	59.395	16.67	61.299	17.75	61.359	17.80	61.412	17.66
59.357	16.70	59.396	16.52	61.301	17.73	61.360	17.75	61.413	17.78
59.357	16.88	59.396	16.70	61.302	17.86	61.361	17.80	61.415	17.74
59.358	16.74	59.397	16.67	61.303	17.90	61.362	17.72	61.417	17.75
59.358	16.63	59.398	16.65	61.304	17.80	61.362	17.77	61.418	17.71
59.359	16.55	59.398	16.72	61.305	17.75	61.363	17.81	61.419	17.77
59.360	16.67	59.399	16.61	61.307	17.77	61.364	17.77	61.420	17.72
59.360	16.55	59.400	16.73	61.308	17.84	61.364	17.80	61.421	17.76
59.361	16.52	59.401	16.85	61.309	17.70	61.365	17.80	61.423	17.68
59.362	16.40	59.402	16.88	61.310	17.76	61.367	17.71	61.424	17.72
59.362	16.37	59.402	16.94	61.311	17.78	61.368	17.87	61.425	17.80
59.363	16.50	59.403	16.80	61.312	17.85	61.369	17.65	61.426	17.78
59.364	16.56	59.403	16.98	61.313	17.75	61.370	17.71	61.428	17.68
59.364	16.70	61.254	17.87	61.314	17.80	61.371	17.75	61.428	17.74
59.365	16.68	61.255	17.78	61.315	17.88	61.372	17.68	61.430	17.83
59.366	16.70	61.256	17.72	61.316	17.77	61.373	17.77	61.431	17.73
59.367	16.66	61.257	17.70	61.317	17.74	61.374	17.74	61.432	17.75
59.367	16.38	61.258	17.73	61.318	17.85	61.376	17.78	61.433	17.77
59.368	16.53	61.259	17.77	61.319	17.76	61.377	17.71	61.434	17.74
59.370	16.70	61.260	17.80	61.320	17.78	61.378	17.77	61.435	17.78
59.371	16.73	61.261	17.82	61.321	17.83	61.380	17.75	61.436	17.81
59.371	16.65	61.262	17.78	61.322	17.84	61.381	17.72	61.437	17.83
59.372	16.35	61.264	17.86	61.324	17.92	61.382	17.81	61.438	17.76
59.373	16.50	61.265	17.82	61.325	17.90	61.383	17.84	61.440	17.74

Table 1. Continued

JD hel 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*
61.444	17.77	75.226	17.84	80.246	17.68	81.354	17.65	86.338	17.78
61.446	17.70	75.227	17.78	80.247	17.76	81.357	17.63	86.339	17.83
63.342	17.95	75.228	17.74	80.248	17.85	81.359	17.67	86.340	17.81
63.343	17.77	75.229	17.77	80.249	17.86	81.361	17.75	86.342	17.85
63.344	17.83	75.230	17.92	80.250	17.80	81.363	17.77	86.343	17.83
63.345	17.70	75.231	17.82	80.251	17.77	81.365	17.81	86.344	17.70
63.346	17.78	75.232	17.77	80.252	17.76	81.367	17.78	86.345	17.77
63.347	17.75	75.234	17.83	80.253	17.75	81.369	17.64	86.346	17.85
63.348	17.68	75.235	17.70	80.254	17.74	81.371	17.75	86.347	17.78
63.349	17.71	75.236	17.87	80.255	17.83	81.373	17.78	86.348	17.84
63.351	17.78	75.237	17.81	80.256	17.70	81.375	17.83	86.349	17.90
63.368	17.72	75.238	17.75	80.257	17.74	81.378	17.77	86.350	17.88
63.369	17.67	75.240	17.80	80.259	17.97	81.381	17.86	86.351	17.76
63.370	17.79	75.241	17.76	80.261	17.90	81.382	17.80	86.352	17.93
63.371	17.86	75.242	17.80	80.262	17.75	86.295	17.87	86.354	17.96
63.372	17.80	75.243	17.82	80.263	17.77	86.296	17.95	86.355	17.80
63.373	17.82	75.244	17.86	80.264	17.72	86.298	17.93	86.356	17.75
63.374	17.83	75.245	17.78	80.265	17.60	86.299	17.88	86.357	17.67
63.375	17.90	75.246	17.77	80.266	17.57	86.300	17.95	86.358	17.77
63.376	17.75	75.247	17.83	80.267	17.69	86.301	17.80	86.359	17.80
63.378	17.69	75.248	17.70	80.268	17.71	86.302	17.84	86.361	17.85
63.380	17.98	75.249	17.90	80.270	17.66	86.304	17.92	86.362	17.90
63.381	17.83	75.250	17.70	80.271	17.74	86.305	17.80	86.363	17.78
63.383	17.77	75.251	17.77	80.272	17.77	86.307	17.89	86.365	17.96
63.385	17.80	75.252	17.75	80.273	17.75	86.308	17.97	86.366	17.78
63.386	17.76	75.254	17.77	80.274	17.78	86.309	17.93	86.368	17.82
63.387	17.74	75.255	17.81	80.275	17.70	86.310	18.00	86.369	17.73
63.390	17.77	75.256	17.75	80.276	17.72	86.311	17.96	86.370	17.76
63.391	17.71	75.257	17.77	80.277	17.74	86.312	18.02	86.371	17.81
63.392	17.81	75.258	17.74	80.278	17.90	86.314	17.85	88.246	17.65
63.393	17.72	75.259	17.76	80.279	17.80	86.315	17.93	88.248	17.67
63.394	17.76	75.260	17.91	80.280	17.81	86.316	17.73	88.249	17.53
63.396	17.73	75.261	17.83	81.314	17.62	86.317	17.77	88.250	17.66
63.397	17.81	75.262	17.78	81.316	17.35	86.318	17.70	88.251	17.57
63.399	17.75	75.264	17.75	81.320	17.47	86.319	17.85	88.252	17.70
63.403	17.77	75.265	17.76	81.322	17.50	86.320	17.88	88.253	17.71
63.404	17.80	75.267	17.73	81.324	17.40	86.322	17.67	88.254	17.63
63.405	17.81	75.268	17.70	81.327	17.30	86.323	17.00	88.255	17.69
63.406	17.83	80.234	17.68	81.329	17.42	86.325	17.80	88.257	17.73
63.407	17.86	80.235	17.75	81.334	17.75	86.326	17.65	88.258	17.80
63.408	17.90	80.236	17.84	81.336	17.79	86.327	17.73	88.259	17.77
63.409	17.86	80.237	17.71	81.338	17.82	86.329	17.77	88.261	17.74
63.410	17.82	80.238	17.68	81.340	17.65	86.330	17.75	88.262	17.76
63.412	17.88	80.239	17.66	81.342	17.68	86.332	17.68	88.263	17.70
63.413	17.85	80.240	17.68	81.344	17.73	86.333	17.77	88.264	17.75
63.415	17.70	80.241	17.65	81.346	17.68	86.334	17.74	88.264	17.78
63.416	17.73	80.242	17.76	81.348	17.74	86.335	17.83	88.265	17.72
75.224	17.75	80.243	17.73	81.350	17.81	86.336	17.76	88.266	17.69
75.225	17.80	80.244	17.72	81.352	17.83	86.337	17.80	88.267	17.65

Table 1. Continued

JD hel 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*	*JD hel* 2449900+	*mag* ~ *B*
88.268	17.68	88.324	17.81	*08.228	17.80	*09.237	17.95	*09.345	17.90
88.269	17.73	88.325	17.90	*08.229	17.98	*09.240	17.92	*09.347	17.80
88.270	17.70	88.326	17.94	*08.230	18.05	*09.242	17.99	*09.349	17.85
88.272	17.76	88.327	17.87	*08.231	17.93	*09.244	18.01	*09.351	17.85
88.273	17.72	88.327	17.92	*08.233	17.87	*09.246	17.90	*14.227	17.90
88.274	17.68	88.328	17.75	*08.235	17.75	*09.248	17.70	*14.229	17.85
88.275	17.61	88.329	17.80	*08.237	17.84	*09.250	17.71	*14.231	17.90
88.276	17.74	88.331	17.77	*08.239	17.86	*09.252	17.75	*14.249	17.80
88.277	17.66	88.332	17.84	*08.241	17.78	*09.254	17.78	*14.251	17.82
88.278	17.68	88.333	17.70	*08.243	17.81	*09.256	17.84	*14.253	17.83
88.279	17.83	88.334	17.74	*08.245	17.78	*09.258	17.83	*14.256	17.85
88.281	17.77	88.335	17.77	*08.247	17.84	*09.261	17.77	*14.258	17.87
88.282	17.82	88.336	17.83	*08.249	17.82	*09.263	17.78	*14.260	17.95
88.283	17.74	88.337	17.73	*08.250	17.78	*09.265	17.74	*14.263	17.97
88.284	17.77	88.350	17.85	*08.252	17.72	*09.267	17.80	*14.265	17.87
88.286	17.77	88.351	17.77	*08.254	17.80	*09.269	17.82	*14.267	17.81
88.287	17.75	88.352	17.83	*08.256	17.82	*09.271	17.83	*14.269	17.89
88.288	17.77	88.353	17.85	*08.258	17.77	*09.274	17.85	*14.271	18.00
88.289	17.74	88.354	17.80	*08.260	17.75	*09.276	17.72	*14.273	17.85
88.290	17.80	88.355	17.81	*08.263	17.84	*09.278	17.80	*14.275	17.88
88.291	17.66	88.357	17.77	*08.267	17.81	*09.280	17.83	*14.277	17.85
88.292	17.70	88.358	17.75	*08.269	17.85	*09.282	17.87	*14.279	17.82
88.293	17.77	88.359	17.82	*08.271	17.87	*09.285	17.93	*14.281	17.77
88.294	17.84	88.360	17.90	*08.273	17.84	*09.287	17.96	*14.283	17.83
88.295	17.86	88.361	17.86	*08.275	17.89	*09.289	17.81	*14.285	17.85
88.296	17.80	88.362	17.90	*08.277	17.80	*09.292	17.89	*14.288	17.80
88.298	17.73	88.363	17.95	*08.278	17.77	*09.294	17.87	*14.290	17.85
88.299	17.68	88.365	17.93	*08.281	17.75	*09.296	17.85	*14.292	17.86
88.299	17.83	88.366	17.85	*08.283	17.76	*09.298	17.97	*14.294	17.92
88.300	17.85	88.367	17.80	*08.285	17.82	*09.300	17.77	*14.296	17.96
88.302	17.76	88.368	17.95	*08.287	17.83	*09.302	17.75	*14.298	18.00
88.303	17.87	88.369	17.88	*08.289	17.85	*09.304	17.79	*15.169	17.85
88.304	17.76	88.370	17.79	*08.291	17.75	*09.307	17.76	*15.172	17.75
88.305	17.75	88.371	17.77	*08.293	17.77	*09.309	17.77	*15.174	17.80
88.307	17.77	88.373	17.92	*08.296	17.74	*09.311	17.81	*15.176	17.70
88.308	17.70	88.374	17.97	*08.299	17.85	*09.316	17.85	*15.178	17.68
88.309	17.80	88.375	17.81	*09.210	17.80	*09.318	17.77	*15.181	17.71
88.310	17.77	*07.217	17.82	*09.212	17.85	*09.320	17.84	*15.183	17.70
88.311	17.73	*07.219	17.78	*09.213	17.79	*09.322	17.81	*15.185	17.77
88.312	17.83	*07.221	17.87	*09.215	17.86	*09.324	17.86	*15.188	17.82
88.313	17.77	*07.223	17.85	*09.217	17.85	*09.326	17.89	*15.189	17.73
88.314	17.73	*07.225	17.92	*09.219	17.87	*09.328	17.87	*15.192	17.87
88.316	17.76	*07.227	17.95	*09.222	17.93	*09.331	17.96	*15.194	17.95
88.317	17.78	*07.229	17.72	*09.224	17.98	*09.333	17.98	*15.196	17.74
88.318	17.75	*07.232	17.75	*09.226	17.94	*09.335	17.90	*15.199	17.70
88.319	17.77	*08.224	17.83	*09.228	17.87	*09.337	17.95	*15.199	17.74
88.320	17.74	*08.225	17.87	*09.231	17.93	*09.339	18.00	*15.201	17.77
88.321	17.80	*08.226	17.82	*09.233	17.96	*09.341	17.89	*45.242	17.80
88.323	17.75	*08.227	17.90	*09.235	17.90	*09.343	17.92		

Note. The symbol "*" denotes "JD 2450000+".

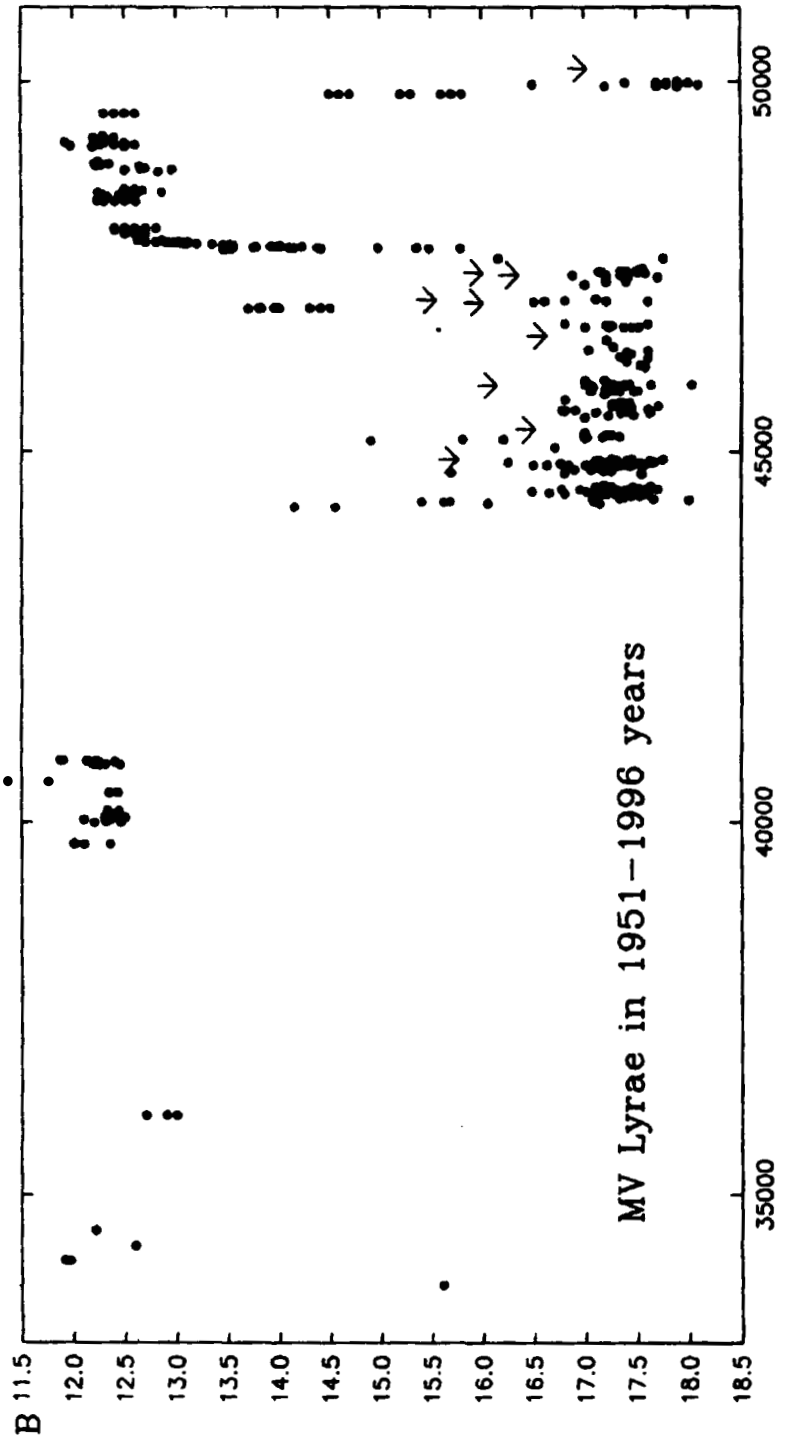

Figure 1 The light curve of MV Lyrae from 1951–1996. Arrows correspond to the upper limit of brightness measurements. Two steady brightness levels are clearly visible.

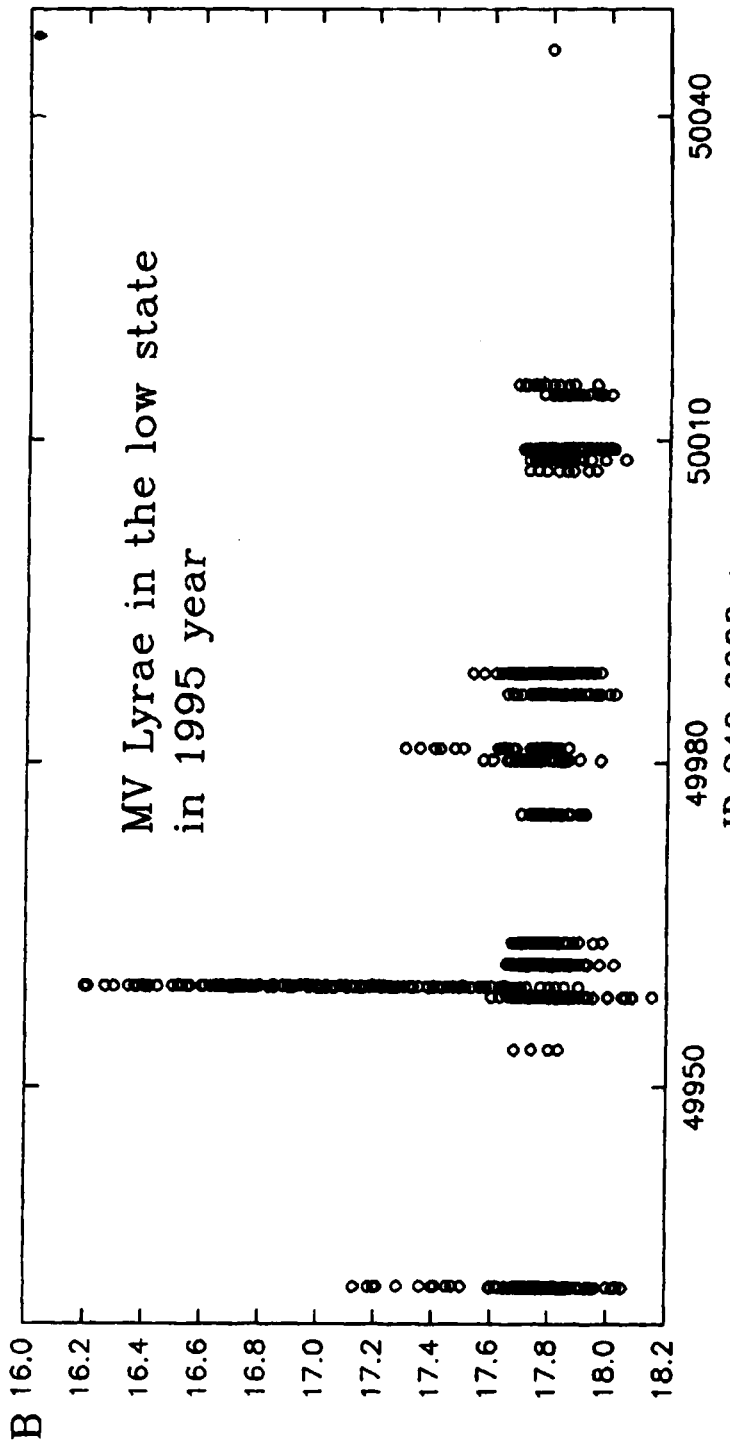

Figure 2 The behaviour of the variable in August–November 1995. MV Lyrae was in the stable deep low state at that time with the exception of one night shown in Figure 3.

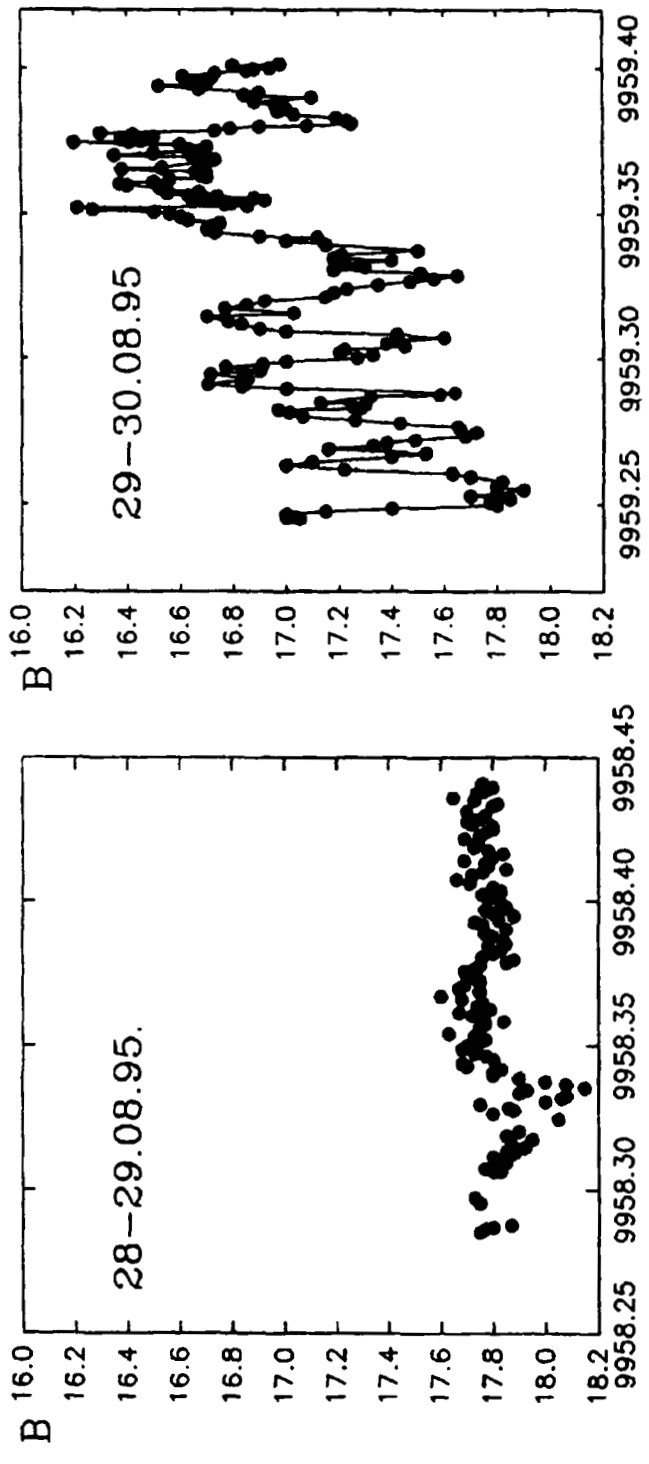

Figure 3 Two light curves demonstrating the ability of MV Lyrae to change its behaviour dramatically from night to night. The relatively quiet behaviour it is seen with small-amplitude brightness modulation and typical time of a 1.5 hour in August 8–29. The next night MV Lyrae demonstrated the high-amplitude (1^m) and fast (25 min) light variations, superposed on the brightness increase from $17^m.8$ to $17^m.0$ during four hours.

3 LIGHT CURVES

The total view of the changes of MV Lyrae brightness over almost half a century is shown in Figure 1. It is clearly seen that the two brightness levels: $12–13^m$ and $17–18^m$ are typical for this variable. Also it is seen that, as was mentioned above in the high state MV Lyrae do not undergoe the brightness variations with an amplitude of more than 0.5 mag, whereas the last prolonged low state demonstrated a row (at least five) of large amplitude flashes with the largest amplitudes even equal to 4^m!

It seems that the low state which started in the summer of 1995 is deeper than the previous one. We undertook the regular observations from August till November and did not detect any long-term flashes during 18 nights of observations. The behavior of the system was quiet with the mean brightness corresponding to $B = 17^m.8$ (see Figure 2). Only three exceptions have been observed: two single $0^m.5$ – amplitude flashes detected in August 1–2 and September 20–21 lasted approximately 30 minites or so, and the sequence of flashes with similar typical times but amplitudes high as one magnitude in August 29–30. In Figure 3 we present examples of two neighbor light curves for 28–29.08.95 and 29–30.08.95 which demonstrate the contrast behavior.

Thus we detected the light variations of MV Lyrae from several minutes to several tens of years. The analysis of this time series in order to study the orbital light variations both in the high and low states as well as other periodicites and short – time QPOs are planned to the performed in separate papers.

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References

Abramenko, A. N., Prokof'eva, V. V., Bondar', N. I. *et al.* (1988) *Izv. Krym. Astrof. Obs.* **78**, 182; (1988) *Bull. Crimean Astrophys. Obs.* **78**, 189.
Andronov, I. L. and Shugarov, S. Yu. (1983) *IBVS*, No. 2418.
Andronov, I. L., Borodina, I. G., Chinarova, L. L. *et al.* (1992) *Soobsh. Spetz. Astrof. Obs.*, No. 69, 135.
Andronov, I. L., Fuhrmann, B., and Wenzel, W. (1988) *Astron. Nachr.* **309**, 39.
Andronov, I. L. and Shugarov, S. Yu. (1982) *Astron. Tsirk.*, No. 1218, 3.
Borisov, G. V. (1992) *Astron. and Astrophys.* **261**, 154.
Furhmann, B. (1985) *IBVS*, No. 2833.
Furhmann, B. and Wenzel, W. (1990) *IBVS*, No. 3513.
Gotz, W. (1987) *IAU Circ.*, No. 4386.
Greenstein, J. L. (1954) *Publ. Astron. Soc. Pac.* **66**, 79.
Kraicheva, Z. and Genkov, V. (1992) *IBVS*, No. 3697.
Marsakova, V. and Shugarov, S. (1995) *IAU Circ.*, No. 6186.
Mereghetti, S. and Garrili, B. (1987) *Astron. J.* **94**, 1616.
Parenago, P. P. (1946) *Perem. Zvezdi* **6**, 26.
Robinson, E. L. (1976) *Ann. Rev. Astron. Astrophys.* **14**, 119.

Robinson, E. L., Barker, E. S., Cochran, A. L., and Nather, R. E. (1981) *Astrophys. J.* **251**, 611.
Romano, G. and Rosino, L. (1980) *IBVS*, No. 1776.
Rosino, L., Romano, G., and Marziani, P. (1993) *Publ. Astron. Soc. Pac.* **105**, 51.
Schneider, D. P., Youhg, P., and Shectman, S. A. (1981) *Astrophys. J.* **245**, 644.
Skillman, D. R., Patterson, J., and Thorstensen, J. R. (1995) *Publ. Astron. Soc. Pac.* **107**, 545.
Walker, M. F. (1954) *Publ. Astron. Soc. Pac.* **66**, 71.
Wenzel, W. and Furhmann, B. (1980) *IBVS*, No. 1810.
Wenzel, W. and Furhmann, B. (1983) *Mitt. Veränderl. Sterne* **9**, H.6, 175.
Wenzel, W. and Furhmann, B. (1989) *IBVS*, No. 3391.