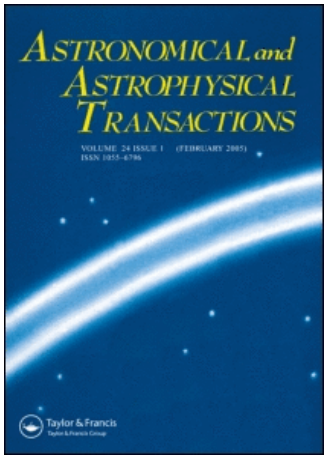

Astronomical & Astrophysical Transactions
The Journal of the Eurasian Astronomical Society
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713453505

Catalogue of reference stars for the 'Lomonosov' astrometric project. II. The results of photoelectric UBV photometry

E. A. Kolotilov [a]; V. G. Metlov [a]
[a] Sternberg Astronomical Institute, Moscow, Russia

Online Publication Date: 01 June 2000
To cite this Article: Kolotilov, E. A. and Metlov, V. G. (2000) 'Catalogue of reference stars for the 'Lomonosov' astrometric project. II. The results of photoelectric UBV photometry', Astronomical & Astrophysical Transactions, 18:6, 793 - 798
To link to this article: DOI: 10.1080/10556790008208173
URL: http://dx.doi.org/10.1080/10556790008208173

Astronomical and Astrophysical Transactions, 2000, Vol. 18, pp. 793–798
Reprints available directly from the publisher
Photocopying permitted by license only

CATALOGUE OF REFERENCE STARS FOR THE 'LOMONOSOV' ASTROMETRIC PROJECT. II. THE RESULTS OF PHOTOELECTRIC UBV PHOTOMETRY

E. A. KOLOTILOV and V. G. METLOV

Sternberg Astronomical Institute,
Universitetskij prospect, 13, Moscow, 119899, Russia

(Received September 21, 1998)

We present the results of photoelectric UBV photometry of 150 reference stars derived during preparatory ground-based work for the 'Lomonosov' space astrometric project.

KEY WORDS Catalogues, stars, UBV photometry

1 INTRODUCTION

The necessary condition for the successful operation of the satellite 'Lomonosov' is the creation of a good system of reference stars. The procedure of their choice was reported earlier in paper I by Voroshilov *et al.* (1992). In the present paper II the results of photoelectric UBV photometry are given.

2 OBSERVATIONS AND DATA REDUCTION

The observations were started in April 1990 with the use of the 60-cm Zeiss reflector of the Sternberg Astronomical Institute located in the Crimean peninsula, and are being continued, with short interruptions, until now. For this programme, containing 250 stars of 7th to 8th V magnitudes, we use the photon counting UBV photometer developed by Lyuty (1971). Here we report the results of UBV measurements of those 150 stars for which two or more flux measures were made during different nights.

In all, the observations were carried out during 57 nights; each night had excellent sky conditions, with stable and very good atmospheric transparency, with

no clouds or inhomogeneous haze up to the horizon. These requirements were dictated by our decision to use only standard star's from the well-known high-precision system of the photoelectric standards determined earlier by Khaliullin *et al.* (1985).

This system, however, contains only 72 standards, therefore the angular distances between those stars and stars of the programme were as a rule quite large. This circumstance made it necessary to determine the atmospheric extinction coefficients using the method of measurements of two standard stars at different zenith distances. The derived UBV values were interpolated for all time moments of observations of programme stars during a given night; each measurement of stellar brightness was thus obtained on the basis of its own atmospheric extinction coefficient.

The above-mentioned system of standards contains R, V, B and W values. We used only V and B values from that system; the U values were taken from the BS catalogue. The neutral filter decreasing light flux by nearly 5 magnitudes, was used in the photometer (except for the 1994 observations), since the programme stars, and especially the standards, were too bright for measurements at the 60-cm reflector. However, during these observations, the U signal being over-attenuated, resulted in a significant increase of errors of the U values obtained. For this reason, since 1994 the observations were conducted without neutral filter; instead, the part of the main mirror was screened (in this case, the non-linearity of the photometer response was of course accounted for, because the signal was still too large).

The observations of the Pleiades stars allowed us to reduce accurately both of our systems (with and without neutral filter) to the standard UBV system.

3 RESULTS

Table 1 presents the final results of measurement of 150 reference stars reduced to the standard UBV system. It gives for each star: HD number of the star, equatorial coordinates (for 1950.0 equinox), mean values V, $B-V$ and $U-B$, together with their uncertainties (determined on the basis of dispersion of measures), and also a number of individual measurements for each star.

From the internal agreement of the results one can conclude that the majority of stars appear to be stationary at a level of 0.01 mag in the B and V bands. Only some stars (e.g., HD 18579, 163750, 179874, 203401) might be suspected as variables with amplitudes from about 0.01 to 0.02 mag (in the V band).

One should note that in the present work we did not attempt to make a comparison of our results with publications of other authors, in particular for a confirmation of stationarity or for the search for variability of stellar fluxes. This will be the subject of separate investigation.

References

Khaliullin, Kh., Mironov, A. V., and Moshkalyov, V. G. (1985) *Astrophys. and Sp. Sci.* **111**, 291–323.

Lyuty, V. M. (1971) *Soobshchenija GAISH*, No. 172.
Voroshilov, Yu. V., Metlov, V. G, Kolotilov, E. A., and Sheffer, E. K. (1992) *Catalogue of Reference Stars for the Project 'Lomonosov'. I. The choice of stars.* In: V. V. Nesterov, A. M. Cherepashchuk, and E. K. Sheffer (eds.), *Cosmical Astronomical Experiment 'Lomonosov'*, p. 156–191, Moscow State Univ., Moscow.

Table 1. Results of the UBV photometry

HD	*RA*	*DEC*	V	*error*	$B-V$	*error*	$U-B$	*error*	n
334	00 05.5	−07 49	7.848	0.012	0.480	0.008	−0.083	0.026	4
896	00 10.8	08 39	7.688	0.025	0.304	0.011	−0.118	0.060	3
1094	00 12.8	28 19	7.321	0.000	0.438	0.003	−0.094	0.011	2
1352	00 15.3	16 03	7.206	0.006	0.464	0.008	−0.123	0.014	6
1832	00 20.4	22 06	7.576	0.011	0.636	0.022	0.005	0.018	3
6573	01 04.0	−10 02	7.610	0.010	0.092	0.011	0.029	0.003	2
6664	01 05.2	38 59	7.799	0.002	0.584	0.003	−0.071	0.012	3
7193	01 09.7	12 01	6.898	0.014	0.468	0.005	−0.162	0.014	5
7805	01 15.2	00 53	8.122	0.014	0.314	0.010	−0.009	0.022	4
8274	01 19.7	21 50	7.221	0.034	0.567	0.005	−0.051	0.018	2
11088	01 46.4	01 55	7.393	0.006	0.218	0.006	0.005	0.018	7
11170	01 47.3	06 59	7.430	0.005	0.585	0.005	0.041	0.018	4
12453	02 00.2	51 25	7.862	0.004	0.090	0.011	0.071	0.021	2
12831	02 03.5	20 21	7.568	0.017	0.563	0.016	0.048	0.047	3
12889	02 04.0	14 21	8.193	0.013	0.305	0.007	0.176	0.002	2
13162	02 06.4	28 09	7.927	0.009	0.069	0.012	0.086	0.018	2
13857	02 12.9	36 32	7.864	0.012	0.300	0.001	0.047	0.038	2
14094	02 14.9	47 55	7.284	0.010	0.200	0.014	0.119	0.018	2
14338	02 16.4	−07 41	7.656	0.009	0.401	0.003	0.011	0.005	3
14606	02 19.7	43 17	7.684	0.010	0.198	0.009	0.153	0.011	3
15607	02 28.0	−01 54	7.880	0.007	0.304	0.005	0.009	0.018	4
16261	02 33.9	−00 51	7.404	0.009	0.243	0.006	0.054	0.036	4
18031	02 51.1	−07 57	7.209	0.015	0.355	0.019	−0.040	0.003	2
18579	02 57.3	30 56	7.412	0.018	0.407	0.019	−0.048	0.009	4
18881	03 00.3	38 13	7.155	0.007	−0.015	0.008	−0.106	0.006	4
19101	03 02.8	49 04	8.227	0.002	0.352	0.008	−0.049	0.008	2
19343	03 04.9	44 01	8.002	0.015	0.496	0.014	−0.025	0.042	2
19521	03 05.8	07 27	7.014	0.006	0.269	0.007	0.133	0.027	5
20127	03 11.5	−06 51	7.749	0.006	0.407	0.011	−0.091	0.030	3
20772	03 18.2	−00 21	8.155	0.003	0.184	0.000	0.245	0.015	2
21405	03 24.6	02 06	7.429	0.013	0.080	0.013	0.137	0.030	4
21438	03 25.0	08 36	7.801	0.005	0.339	0.009	0.257	0.025	4
26141	04 06.0	17 10	7.646	0.009	0.127	0.001	0.118	0.009	2
28138	04 24.1	19 44	7.449	0.005	0.340	0.007	0.191	0.014	6
36150	05 27.2	−00 51	6.496	0.005	0.248	0.008	0.156	0.058	3
50520	06 53.3	63 06	7.485	0.005	0.195	0.006	0.268	0.020	3
59975	07 30.9	48 18	7.279	0.005	0.103	0.005	0.318	0.007	3
66922	08 03.3	15 29	7.595	0.005	0.446	0.004	−0.062	0.039	2
67087	08 04.5	31 42	8.065	0.026	0.476	0.016	0.050	0.003	2
68903	08 12.2	16 14	7.271	0.006	−0.086	0.004	−0.285	0.008	5
68933	08 12.7	32 20	7.386	0.011	0.478	0.001	0.070	0.011	2
72295	08 29.3	−08 41	7.987	0.005	0.010	0.001	−0.002	0.026	2
74815	08 43.9	08 40	7.068	0.006	−0.003	0.011	−0.042	0.050	3
76884	08 56.6	09 11	7.410	0.020	0.031	0.023	−0.110	0.002	2
77819	09 03.2	53 11	7.574	0.017	0.918	0.014	0.561	0.070	3
78422	09 05.5	−07 36	7.414	0.013	0.318	0.011	0.046	0.048	3
79800	09 14.0	30 35	8.225	0.006	0.036	0.008	0.143	0.020	2
81125	09 21.3	01 38	7.640	0.027	0.275	0.016	0.066	0.001	2
81996	09 27.1	32 16	7.960	0.013	0.590	0.018	0.057	0.018	4
82817	09 32.3	26 25	7.656	0.017	0.025	0.005	0.085	0.013	2
83792	09 38.2	−06 40	7.765	0.006	0.307	0.013	0.115	0.008	4

Table 1. Continued

HD	*RA*	*DEC*	*V*	*error*	*B − V*	*error*	*U − B*	*error*	*n*
83986	09 39.3	−12 23	7.882	0.010	0.340	0.010	0.049	0.044	2
84515	09 43.3	−01 41	8.087	0.003	0.466	0.012	−0.130	0.021	2
85833	09 52.0	01 11	7.823	0.010	0.514	0.017	−0.030	0.018	4
86460	09 56.4	27 46	7.808	0.007	0.550	0.015	0.025	0.003	2
86680	09 57.8	28 25	8.034	0.007	0.544	0.010	0.158	0.035	3
86777	09 58.5	30 50	7.839	0.009	0.165	0.007	0.157	0.011	5
87178	10 00.9	10 08	7.140	0.007	0.458	0.020	−0.088	0.028	3
87286	10 01.7	28 05	8.243	0.013	0.270	0.013	0.086	0.014	3
87423	10 02.4	08 14	7.317	0.007	0.498	0.005	−0.122	0.041	3
88046	10 07.1	49 45	7.182	0.005	0.403	0.007	−0.091	0.034	2
92371	10 37.6	27 47	7.111	0.002	0.102	0.005	0.163	0.020	2
92558	10 38.7	20 49	8.103	0.008	0.102	0.010	0.120	0.025	5
94280	10 50.3	−06 33	7.188	0.003	0.556	0.001	−0.026	0.001	2
92674	10 39.4	−06 19	7.435	0.010	0.537	0.005	−0.086	0.022	4
97089	11 08.0	−08 45	7.977	0.003	0.517	0.016	−0.127	0.021	3
97891	11 13.1	04 45	8.326	0.006	0.441	0.011	−0.174	0.008	3
99122	11 22.0	16 10	7.573	0.015	0.538	0.012	−0.028	0.045	2
99302	11 23.1	27 01	7.319	0.009	0.253	0.003	−0.012	0.018	4
99518	11 24.5	25 18	7.713	0.003	0.368	0.013	−0.031	0.017	4
101093	11 35.5	−01 19	7.634	0.008	0.561	0.012	−0.098	0.033	3
101209	11 36.3	−07 19	8.336	0.003	0.418	0.016	−0.171	0.028	2
104379	11 58.7	30 58	7.879	0.003	0.510	0.014	0.097	0.052	2
109029	12 29.0	33 17	7.471	0.010	0.405	0.001	−0.093	0.020	2
130396	14 45.2	19 15	7.467	0.007	0.535	0.022	−0.121	0.097	2
130556	14 46.1	21 32	7.928	0.006	0.379	0.008	−0.130	0.090	2
131917	14 53.8	03 37	7.130	0.002	0.387	0.008	0.075	0.011	2
136696	15 19.5	05 46	7.416	0.008	0.510	0.013	0.004	0.014	2
139643	15 36.4	15 35	8.002	0.000	0.419	0.010	−0.190	0.045	2
140320	15 40.2	18 22	7.895	0.024	0.407	0.022	−0.145	0.024	3
140614	15 42.0	03 32	7.327	0.006	0.419	0.006	−0.196	0.017	2
141069	15 44.2	20 04	7.640	0.003	0.703	0.014	0.215	0.160	2
145229	16 07.1	11 42	7.469	0.016	0.602	0.005	−0.046	0.069	3
145549	16 08.9	16 26	8.167	0.025	0.458	0.021	−0.147	0.007	2
145891	16 10.6	12 56	7.038	0.010	0.247	0.014	0.457	0.040	2
146102	16 11.9	02 46	6.987	0.015	0.499	0.007	0.057	0.129	2
147062	16 17.0	05 39	7.552	0.015	0.583	0.029	0.038	0.058	2
147717	16 20.6	17 31	8.373	0.019	0.555	0.038	−0.130	0.110	3
147906	16 22.1	01 16	7.870	0.002	0.426	0.008	−0.122	0.160	2
153015	16 54.1	16 22	7.237	0.011	0.242	0.002	−0.058	0.026	2
153376	16 56.4	15 32	6.908	0.007	0.616	0.011	0.081	0.019	9
154581	17 03.6	07 55	7.511	0.014	0.267	0.011	0.093	0.030	3
154796	17 04.8	12 11	7.475	0.011	0.455	0.008	−0.233	0.018	2
154892	17 05.4	15 16	7.917	0.009	0.476	0.011	−0.072	0.045	4
155193	17 07.3	10 06	7.024	0.011	0.540	0.009	−0.031	0.043	4
160488	17 37.4	13 19	7.539	0.002	0.527	0.002	−0.006	0.013	3
161750	17 44.7	04 27	7.864	0.004	0.442	0.002	−0.008	0.037	3
162772	17 49.8	16 39	7.558	0.007	0.043	0.008	−0.054	0.016	7
163750	17 55.0	12 38	7.454	0.008	0.497	0.010	−0.034	0.019	9
165146	18 02.0	01 14	7.592	0.011	0.416	0.019	−0.011	0.063	2
168481	18 17.0	15 48	6.980	0.004	0.273	0.005	0.253	0.013	11
168782	18 19.0	−03 54	7.996	0.001	0.411	0.009	0.142	0.041	2

Table 1. Continued

HD	*RA*	*DEC*	*V*	*error*	*B − V*	*error*	*U − B*	*error*	*n*
171874	18 34.3	12 57	7.368	0.007	0.465	0.027	−0.011	0.077	2
171888	18 34.6	00 54	6.896	0.001	0.547	0.012	−0.088	0.020	2
173216	18 41.5	08 34	7.139	0.005	0.518	0.007	0.031	0.019	5
173418	18 42.4	15 35	8.269	0.007	0.335	0.017	−0.013	0.008	2
176118	18 56.2	−04 48	7.513	0.026	0.417	0.008	0.063	0.014	2
177983	19 04.1	15 47	7.296	0.009	0.400	0.004	0.173	0.049	2
178404	19 05.8	09 30	7.432	0.001	0.407	0.026	−0.014	0.049	2
179742	19 11.1	04 11	7.685	0.012	0.320	0.020	−0.019	0.015	2
179874	19 11.7	−03 35	8.139	0.008	0.598	0.011	−0.007	0.050	8
181099	19 16.3	16 36	7.476	0.003	0.240	0.004	0.207	0.030	2
181382	19 17.5	11 56	7.646	0.004	0.487	0.005	−0.079	0.014	11
183936	19 29.3	05 40	6.968	0.003	0.431	0.006	−0.082	0.011	10
185785	19 38.3	−01 59	7.539	0.013	0.511	0.008	−0.080	0.038	3
187402	19 47.0	15 00	7.819	0.007	0.377	0.007	−0.109	0.004	2
187406	19 47.2	02 50	7.667	0.005	0.462	0.012	−0.018	0.022	2
190681	20 03.6	−01 52	8.011	0.039	0.478	0.007	0.045	0.029	2
192715	20 13.4	15 10	6.867	0.000	0.256	0.000	0.024	0.020	2
196203	20 33.2	−00 10	7.115	0.006	0.488	0.008	0.086	0.030	11
196218	20 33.2	03 08	7.438	0.004	0.501	0.006	−0.001	0.067	2
196726	20 36.5	08 21	7.543	0.007	0.442	0.009	−0.075	0.019	2
197573	20 41.8	21 13	7.180	0.009	0.136	0.009	0.148	0.021	3
197703	20 42.5	20 18	6.989	0.007	0.241	0.011	0.136	0.030	5
198334	20 47.2	−06 53	7.926	0.017	0.500	0.009	−0.068	0.007	3
198554	20 48.4	12 23	8.215	0.009	0.341	0.010	0.244	0.028	6
198920	20 51.0	02 49	7.538	0.004	0.601	0.006	0.335	0.049	3
199999	20 57.9	19 46	7.292	0.005	0.406	0.007	−0.001	0.020	8
200047	20 58.3	09 48	7.658	0.009	0.034	0.001	0.073	0.016	2
203401	21 19.1	22 41	7.334	0.011	0.219	0.007	0.213	0.019	7
207135	21 44.6	22 43	7.638	0.007	0.309	0.003	0.051	0.055	2
207707	21 48.4	08 09	8.533	0.011	0.603	0.002	0.023	0.049	3
208156	21 51.7	18 10	8.128	0.003	0.487	0.006	−0.152	0.009	2
208668	21 55.2	11 43	7.501	0.007	0.028	0.003	−0.031	0.008	2
209665	22 02.3	25 25	7.208	0.012	0.075	0.008	−0.013	0.007	2
210733	22 10.0	−08 16	7.119	0.006	0.384	0.005	−0.093	0.031	5
211212	22 13.0	01 42	8.139	0.015	0.401	0.002	−0.031	0.019	2
211784	22 16.8	27 25	7.492	0.012	0.244	0.006	0.160	0.016	2
211856	22 17.5	12 12	7.651	0.026	0.376	0.002	0.165	0.015	2
213143	22 26.5	21 08	7.776	0.006	0.382	0.007	0.081	0.003	2
213234	22 27.3	29 44	7.955	0.009	0.191	0.003	0.054	0.028	2
213575	22 30.0	−06 44	6.929	0.005	0.678	0.009	0.060	0.028	5
214435	22 35.4	14 44	7.875	0.005	0.544	0.030	−0.163	0.036	2
215012	22 39.4	22 08	7.457	0.010	0.042	0.005	−0.181	0.017	3
215043	22 39.8	04 55	7.394	0.004	0.207	0.003	0.080	0.017	6
217650	22 59.6	32 25	8.211	0.007	0.445	0.006	−0.129	0.011	10
218331	23 04.6	−07 58	7.394	0.005	0.094	0.003	0.071	0.012	8
218538	23 06.1	28 53	7.495	0.001	0.139	0.016	0.100	0.007	2
219476	23 13.3	31 24	7.610	0.003	0.532	0.004	−0.136	0.009	8
221026	23 26.0	09 09	7.397	0.016	0.490	0.007	0.007	0.055	2