Note on the light-variation of the magnetic star HD 10783

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New photo-electric observations in the red of the magnetic variable star HD 10783 suggest that the light-variation may not be strictly periodic. At present a period of 4.1334 days gives the best fit for the magnetic as well as for the photometric observations.

A first series of photo-electric observations of this magnetic variable was obtained by the author in 1964–1965 in red light (effective wavelength 5960 A). A period of 4.1565 days gives a fairly good representation of these photometric measures and also of the measures of the magnetic field strength (VAN GENDEREN, 1965). However, one photometric normal point of high weight showed a considerable deviation from the mean light-curve.

In the autumn of 1965 the author has made additional photometric observations with the same telescope and the same filter. The results of these measures are presented in table 1. The observations were then combined into normal points, the data of which are given in table 2. The comparison star used is HD 10262 and corrections for differential extinction were applied.

The period which was derived from our first series of observations yields also a good light-curve for the new observations. However, there exists a phase shift of nearly half a period between the light-curves of the two series, which are only about one year apart in time. The period of 4.1565 days represents the measures of the magnetic field strength in a satisfactory manner, as was shown in the author's first paper, although they are spread over several years. As for nearly all periodic magnetic variables there exists a strong correlation between the magnetic and the photometric variations, we have tried to find a period which would bring about such a correlation. The only period which we could find is 4.1334 days, which differs very little from the period of 4.134 days derived by STEINITZ (1964) from Babcock's measures. With the new period the light-curves of the two photometric series coincide and the phase shift has disappeared. Only a few observations of the first series show rather strong deviations from the mean light-curve. The normal point with the largest deviation, however, is of poor weight. Phases computed with the formula

$$\text{phase} = 0.24193\ (\text{J.D.} - 2430000)$$

are given for the normal point in the last column of table 2. The light-curve of all observations of both series is shown in figure 1. We conclude that the period of 4.1334 days gives a satisfactory representation of all available observations, keeping in mind that there may exist for magnetic variables systematic deviations from cycle to cycle.

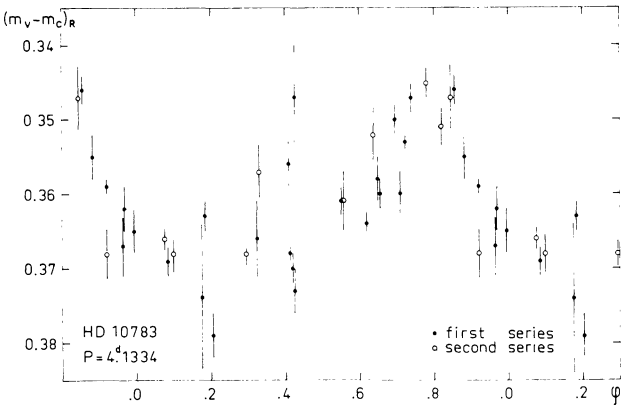

Figure 1. Light-curve of all photometric observations derived with a period of 4.1334 days.

References

A. M. VAN GENDEREN, 1965, *Bull. Astr. Inst. Netherlands* **18** 67
R. STEINITZ, 1964, *Bull. Astr. Inst. Netherlands* **17** 504

TABLE 1

Individual observations

J.D. −2430000	$m_v - m_c$	J.D. −2430000	$m_v - m_c$	J.D. −2430000	$m_v - m_c$	J.D. −2430000	$m_v - m_c$
8984.5727	0.355	9018.4949	0.352	9024.4899	0.377	9026.6600	0.348
8984.5743	0.366	9018.4969	0.353	9024.4911	0.363	9026.6614	0.346
8984.5756	0.360	9018.4988	0.329	9024.4923	0.369	9026.6625	0.350
8984.5767	0.369	9018.5038	0.336	9024.4936	0.376	9026.6639	0.347
8984.5781	0.344	9018.5054	0.352	9024.4944	0.362	9026.6650	0.357
8984.5792	0.333	9018.5074	0.358	9024.4959	0.359		
8984.5804	0.334	9018.5100	0.329	9024.4972	0.374	9052.6047	0.375
8984.5817	0.354					9052.6059	0.368
8984.5829	0.352	9023.5818	0.366	9026.4847	0.336	9052.6069	0.372
8984.5842	0.350	9023.5831	0.364	9026.4859	0.344	9052.6081	0.373
8984.5857	0.344	9023.5846	0.366	9026.4871	0.345	9052.6094	0.360
8984.5868	0.364	9023.5858	0.364	9026.4884	0.359	9052.6105	0.368
		9023.5872	0.369	9026.4895	0.346	9052.6117	0.364
8991.5631	0.352	9023.5884	0.365	9026.4908	0.338	9052.6128	0.358
8991.5647	0.356	9023.5896	0.367	9026.4920	0.343	9052.6141	0.356
8991.5662	0.364	9023.5908	0.378	9026.4933	0.336	9025.6154	0.368
		9023.5922	0.353	9026.4945	0.359	9052.6169	0.385
9010.5366	0.372	9023.5934	0.364	9026.4958	0.349		
9010.5382	0.376	9023.5948	0.362	9026.4971	0.345	9054.4832	0.361
9010.5393	0.369	9023.5960	0.370	9026.4983	0.337	9054.4843	0.356
9010.5405	0.356	9023.5972	0.373	9026.4996	0.343	9054.4855	0.370
9010.5418	0.378	9023.5983	0.373	9026.5008	0.347	9054.4868	0.365
9010.5430	0.366	9023.5996	0.361			9054.4881	0.361
9010.5443	0.350			9026.6498	0.354	9054.4895	0.335
9010.5455	0.370	9024.4813	0.370	9026.6510	0.363	9054.4911	0.343
9010.5466	0.385	9024.4826	0.365	9026.6523	0.351	9054.4923	0.370
9010.5481	0.353	9024.4838	0.361	9026.6536	0.342	9054.4936	0.378
9010.5493	0.375	9024.4851	0.373	9026.6548	0.337	9054.4950	0.378
		9024.4864	0.366	9026.6561	0.368	9054.4965	0.353
9018.4915	0.359	9024.4875	0.371	9026.6573	0.360		
9018.4932	0.359	9024.4887	0.371	9026.6588	0.343		

TABLE 2

Normal points

Date	J.D. −2430000	$m_v - m_c$	m.e.	m.d. obs. ($0^m.001$)	Number of obs.	Phase
11/12 August 1965	8984.58	0.352	± 3.4	± 12	12	.639
18/19 August 1965	8991.56	0.357	3.5	6	3	.328
6/ 7 September 1965	9010.54	0.368	3.3	11	11	.920
14/15 September 1965	9018.50	0.347	4.3	13	9	.846
19/20 September 1965	9023.59	0.366	1.5	6	15	.077
20/21 September 1965	9024.49	0.368	1.5	6	14	.295
22/23 September 1965	9026.49	0.345	2.0	7	14	.779
22/23 September 1965	9026.66	0.351	2.5	9	13	.820
18/19 October 1965	9052.61	0.368	2.5	8	11	.098
20/21 October 1965	9054.49	0.361	4.1	14	11	.553