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HD 167 971 - AN Of-TYPE ECLIPSING BINARY*

HD 167 971 (spectral type O8 Ibf) has been reported by Leitherer et al. (1984) and Forbes (1984) to show photometric variations of ∿0.3 magnitudes. In this note we present additional photometry enabling us to determine the period of variations.

We obtained 42 photometric measurements of HD 167 971 during several observing periods between 1984 August and 1985 March. These observations were part of C. Sterken's "Long-Term Photometry of Variables" which is under way at ESO, La Silla. HD 167 971 was observed in the Strömgren-uvby system at the ESO 50-cm telescope and the Bochum 61-cm telescope, respectively. The results are listed in Table I. The photometric uncertainties are less than $0^{m}.03$. As already noted previously, HD 167 971 shows variations in all observed passbands with the colours remaining constant. Notice that the Strömgren-y magnitude is nearly identical with Johnson-V for this spectral type. Throughout this note we assume y = V .

Table I. Photometry of HD 167 971

JD	y	b-y	m_1	c_1
2445902.637	7.39	0.64	-0.19	-0.07
5902.648	7.39	0.62	-0.15	-0.09
5905.627	7.52	0.62	-0.16	-0.08
5909.646	7.37	0.62	-0.18	-0.06
5911.610	7.39	0.62	-0.17	-0.08
5914.754	7.36	0.63	-0.21	-0.05
5918.673	7.60	0.63	-0.19	-0.08
5924.698	7.37	0.63	-0.19	-0.07
5927.676	7.37	0.63	-0.18	-0.08

* Based on observations collected at the European Southern Observatory, La Silla, Chile

Table I (cont.)

JD	y	b-y	m_1	c_1
5930.665	7.45	0.63	-0.18	-0.09
5933.641	7.63	0.64	-0.20	-0.07
5936.611	7.44	0.63	-0.19	-0.07
5939.665	7.36	0.63	-0.19	-0.08
5943.655	7.64	0.63	-0.19	-0.06
5950.578	7.48	0.63	-0.22	-0.08
5950.588	7.49	0.63	-0.22	-0.06
5950.596	7.47	0.62	-0.19	-0.10
5955.554	7.46	0.64	-0.22	-0.09
5966.523	7.43	0.63	-0.21	-0.09
5966.531	7.46	0.62	-0.21	-0.07
5971.554	7.43	0.63	-0.21	-0.08
5974.505	7.36	0.63	-0.22	-0.09
6135.882	7.44	0.62	-0.14	-0.06
6136.856	7.38	0.62	-0.15	-0.05
6137.863	7.58	0.63	-0.15	-0.05
6138.880	7.35	0.63	-0.16	-0.04
6139.871	7.47	0.63	-0.15	-0.04
6140.878	7.41	0.63	-0.16	-0.04
6141.870	7.35	0.63	-0.17	-0.03
6142.870	7.62	0.63	-0.15	-0.04
6144.886	7.45	0.63	-0.15	-0.04
6145.875	7.43	0.63	-0.17	-0.04
6146.863	7.37	0.63	-0.16	-0.06
6149.817	7.49	0.63	-0.13	-0.06
6149.904	7.46	0.63	-0.15	-0.05
6151.809	7.37	0.64	-0.16	-0.05
6152.831	7.63	0.63	-0.15	-0.05
6152.890	7.65	0.63	-0.15	-0.05
6152.894	7.65	0.63	-0.14	-0.05
6152.899	7.65	0.63	-0.14	-0.05
6152.904	7.65	0.63	-0.15	-0.05
6153.818	7.35	0.62	-0.15	-0.04

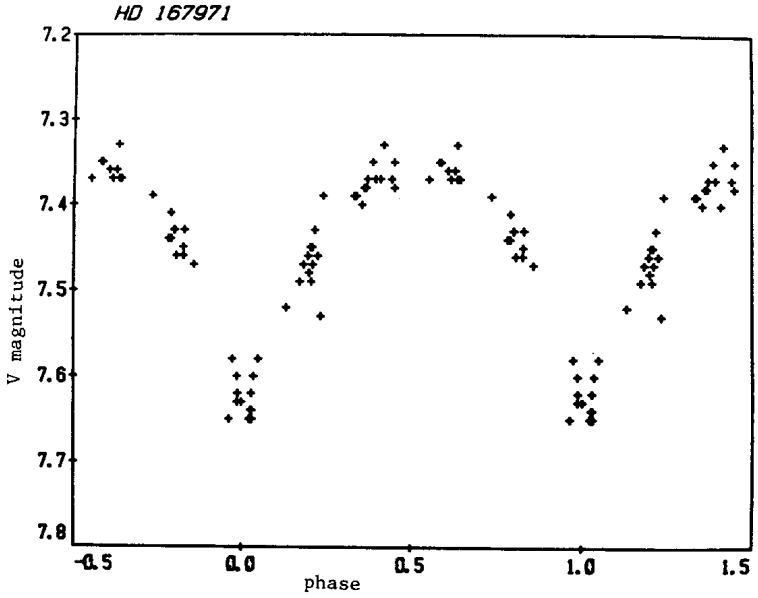

Figure 1. Light curve of HD 167 971

Combining the photometry of Table I and the values published by Leitherer et al. (1984) and Forbes (1984) leads to a total of 62 photometric data points of HD 167 971 over a period of nearly two years. We used these 62 measurements to investigate a possible periodicity of the variations following the method outlined by Stellingwerf (1978). The best-fit solution for the light curve of HD 167 971 is illustrated in Figure 1. HD 167 971 proves to be a short-period eclipsing binary. We derive:

$$\text{Min.} = 2445\,555\overset{d}{.}0 + 1\overset{d}{.}6607 \cdot E$$

A less significant solution for the light curve of HD 167 971 would be twice the above period, namely 3.3212 days. In this case the light curve shows a secondary minimum about $0\overset{m}{.}05$ brighter than the primary minimum. We are not able to distinguish between the two periods with the existing photometry. Further photometry is needed to clarify this question.

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