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BD-7^o1108 , A NEW DELTA SCUTI VARIABLE

The star BD-7^o1108 : in the Orion OB1 association was measured in the Geneva photometric system as part of a photometric program for all stars belonging to the Curchod and Hauck (1979) catalogue of Am stars. This 10th mag. star appeared to vary significantly within one observation requiring 12 minutes of integration time. Consequently, we have observed this star frequently during 14 nights in late 1984 at the Swiss station at La Silla Observatory, Chile. Between JD 2445738. and JD 2446043. we have gathered 128 measurements showing a standard deviation of 0.066 mag. In the subsequent analysis an early observation obtained on JD 2445347. is also included.

We have used a Fourier method (Deeming, 1975) and a phase dispersion minimization technique (Stellingwerf, 1978) to determine the frequency of 12.7087 ± 0.0003 c/d, with a corresponding period of 0.078686 ± 0.000002 days. The error in frequency represents $(1/10T)$ c/d, T being the time base of the data. The phase diagram of all but two observations is presented (Figure 1). Those two observations deviate by more than 0.04 mag from the fitted light curve, shown as a continuous curve in Figure 1. The fit includes the first harmonic of 12.7087 c/d in order to reduce the residual scatter to 0.010 mag in the V-filter and 0.009 mag. in the Geneva [B-V] colour index. Such a residual scatter is representative of the noise level expected in the observations of a 10th mag. star in the system as indicated by Figure 8 in the Third Catalogue of Stars measured in the Geneva Observatory Photometric System (Rufener, 1981). The observed full amplitudes are 0.18 mag. in V and 0.26 mag. in B. Colour variations are in antiphase with the light variations (Figure 2).

DATA BD-7^o1108 MAG V .0786864

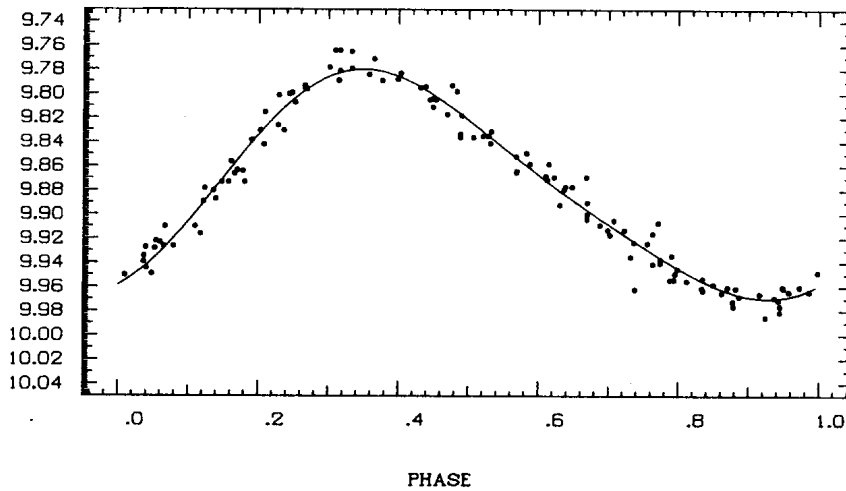


Figure 1: Phase diagram of the 127 V-magnitudes.

The fit represents: $f(t) = 9^m.878 + 0^m.092 \cos(2\pi \cdot 12.7087(t-t_0)+0.70)$
 $+ 0^m.013 \cos(2\pi \cdot 25.4174(t-t_0)+0.40)$
 with t_0 equal to JD 2445347.0.

DATA BD-7^o1108 B - V .0786864

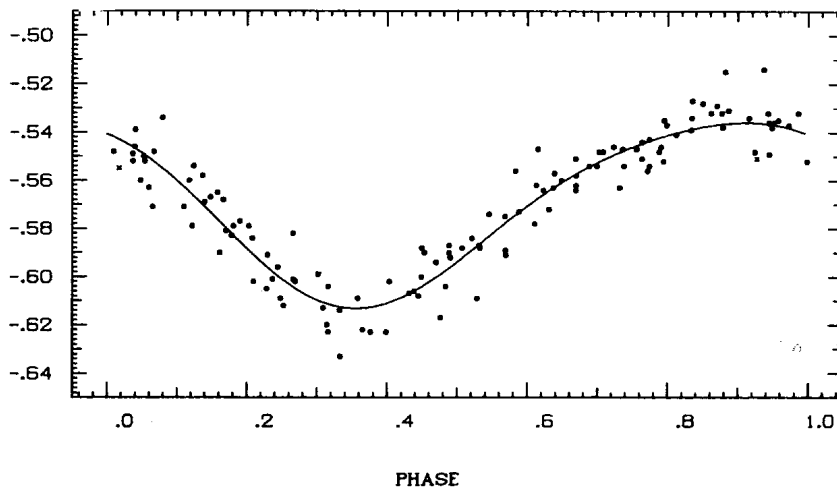


Figure 2: Phase diagram of the 129 [B-V] Geneva colours. The crosses represent the two observations not plotted in Figure 1.

The fit here is: $f(t) = -0^m.570 + 0^m.038 \cos(2\pi \cdot 12.7087(t-t_0)+0.80)$
 $+ 0^m.005 \cos(2\pi \cdot 25.4174(t-t_0)-0.95)$

In conclusion, we report the Delta Scuti type variability of BD-7^o1108 with a period of 1^h 53^{min} and a V-amplitude of 0.18 mag. The photometric parameters $d=1.193$ and $B2-V1 = 0.120$ locate this star inside the instability strip of the observational HR-diagram for A and F type stars in the Geneva system.

Smith(1972) classified this star as metallic lined with SP(K) = A6, SP(H) = A9 and SP(ML) = F2. From the photometric point of view we cannot confirm the metallicity character as both, the Δm_2 -parameter (= -0.027) and the m-parameter (= -0.042) have values resembling those of the normal A stars. Hauck (1978) derived a mean $\overline{\Delta m_2} = -0.009$ for normal A stars versus $\overline{\Delta m_2} = +0.013$ for classical Am stars, while Nicolet and Cramer (1983) found that Am stars tend to have $0.035 < m < 0.120$. The metallicity character of BD-7^o1108 has already been questioned by Hesser, Mc Clintock and Henry (1977).

A more detailed study of the observations of BD-7.1108 is presently being undertaken. The individual observations will be published at a later stage.

We gratefully acknowledge Dr. Ir. M. Burnet for observing some fine light curves of BD-7^o1108 at La Silla, Dr. G. Burki for kindly putting his computer programs at our disposal and Prof. F. Rufener to have pointed out the variable character of BD-7^o1108 and to have provided for observing facilities with the instruments of the Observatoire de Genève.

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References :

- Curchod, A. and Hauck, B.: 1979, Astron. Astrophys. Suppl. Ser. 38, 449.
- Deeming, T.J.: 1975, Astrophys. Space Sci. 36, 137.
- Hauck, B.: 1978, Astron. Astrophys. 69, 285.
- Hesser, J.E., Mc Clintock, W. and Henry, R.C.: 1977, Astrophys.J. 213, 100.
- Nicolet, B. and Cramer, N.: 1983, Astron. Astrophys. 117, 248.
- Rufener, F.: 1981, Astron. Astrophys. Suppl. Ser. 45, 207.
- Smith, M.A.: 1972, Astrophys. J. 175, 765.
- Stellingwerf, R.F.: 1978, Astrophys. J. 224, 953.