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SEVEN-COLOUR-PHOTOMETRY OF THE SILICON VARIABLE HD 37808 [†])

Very recently Renson and Manfroid (1981) published uvby light-curves of HD 37808 based on a period of 1.099 days determined from a sample of 33 measurements which were obtained in Nov. 1977. I have also obtained 10 measurements on 10 consecutive nights in Feb. 1973 at the ESO 1m-telescope using standard uvby and in addition H-beta-wide and the filters g_1 and g_2 introduced by Maitzen (1976) for measuring the strength of the absorption feature around 5200 Å. The first impression of this series of measurements was a variation with a period of about 10 days. As such a period would be extraordinarily long for a Silicon star the associated period close to one day seemed more plausible.

Unfortunately the time gap to the observations of Renson and Manfroid is too large and hence the refining of the period 1.099 days is not yet possible until other measurements become available. Fig.1 shows in the upper part the lightcurves reduced with the period 1.099 days and JD 2441728.18 as zero-point for the phases. Differential magnitudes were obtained using HD 37635 as comparison star which was also one of Renson and Manfroid's comparison stars. In the lower part of Fig. 1 the run with wavelength of the maxima and minima of the lightcurves is displayed. One easily recognizes the depressions at g_2 (5240Å) and at v (4100Å) which are typical for Ap stars.

The curve of the minima shows smaller depressions than that of the maxima. This is well explained by lower absorption both in the ultraviolet and in the visual depression regions. The former results in a smaller backwarming effect. Both effects modulate the depth of the depression features.

In general, we learn from the lower part of Fig.1 that the slope of the Paschen continuum of HD 37808 is very similar (albeit a

[†]) Based on observations collected at the European Southern Observatory (ESO), La Silla (Chile).

bit steeper) to the Paschen slope of the comparison star HD 37635.

TABLE I Journal of observations: HD 37808 minus HD 37635.

J. D. \odot	u	v	b	H β w	g_1	g_2	y
2440000+							
1728.564	-0.054	-0.035	-0.039	-0.031	-0.029	-0.005	-0.024
1729.557	71	41	51	44	40	15	36
1730.541	92	48	58	50	37	12	37
1731.538	99	56	65	62	50	22	42
1732.584	105	64	69	62	53	22	45
1733.545	90	56	58	52	48	19	35
1734.530	81	44	57	48	38	09	32
1735.557	74	44	49	44	38	11	31
1736.566	64	34	40	35	31	11	23
1737.557	-0.066	-0.029	-0.036	-0.037	-0.031	-0.002	-0.021

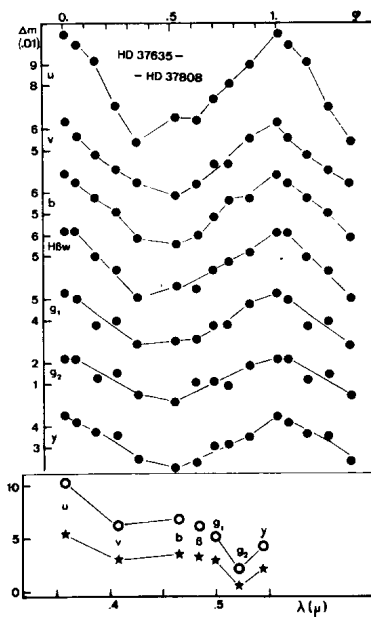


FIG. 1:

Upper part: Lightcurves in the sense HD 37635 minus HD 37808 in uvb β g_1g_2y . Phases were obtained using the elements:

$$\text{Max}(u) = \text{JD } 2441728.18 + 1.099 \text{ E.}$$

Lower part: Maxima (open circles) and minima (stars) of the lightcurves in the upper part versus wavelength.

This is in accordance with similarity in the uvby (see Hauck, Mermilliod, 1980) and UB_V (see Blanco et al., 1970) values of both stars.

As for other Ap-stars there is a discrepancy in spectral types: Cowley (1972) classifies HD 37808 as B9.5 IIIp Si 4200. while Lesh (1968) gives B7V for HD 37635 for which the HD type is B5. From the uvby calibration of B type stars (Crawford, 1978) one gets B5-6V for the Ap star and B6V for the comparison star. Thus the Ap line criteria yield a significantly cooler spectral type than the continuum flux distribution of the Ap star. In addition, the relatively weak hydrogen lines were explained by higher luminosity compensating the later type of the spectral classification.

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