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PHOTOMETRY OF TWO SUSPECTED LONG PERIOD CEPHEIDS

Van Genderen and The (1978) show that the G0Ia supergiant HD159378 (=Tr 27-102), a member of the open cluster Trumpler 27, varies in brightness and colour with a period of 70 to 90 days. Since it is situated at the blue edge of the Cepheid strip it may be a very long period cepheid. However, its light curve shows minima of unequal depth similar to that seen in RV Tauri stars.

Eichendorf and Reipurth (1980) suggest that another G0Ia star, V810 Cen, (= HD101947 = HR5411) may be a cepheid with a period of 125 days. They find it lies on the blue edge of the instability strip and near the period-luminosity relation for cepheids. The phase between the light and colour variations and the lack of IR excess in JHKL indicate that it is unlikely to be an RV Tauri, even though it also has unequal minima.

Both stars were usually monitored once or twice each week spent by the authors on the 0.5 (or 1.0 metre) telescopes at Sutherland SAAO. Both stars were observed by the author in the Cape Kron BVRI system using an extended S20 phototube. The observations were transformed to the system of Cousins (1976) using E region standards, and two "local standards" near to HR4511, the adopted values for which are given in Table I. Since the apertures used were in the range, 20" - 33", the faint companion to HD159378 mentioned by van Genderen and The was usually included.

Several observations of HR4511 were also made in the Johnson UBV system using S11 phototubes. These were tied to the standards given in Table I.

The observations are given in Table II (HR4511) and Table III (HD159378).

Table I

Standard	V	B-V	U-B	V-R	V-I
HR 4475	5.140	1.110	1.068	0.558	1.063
HR 4485	5.937	1.022	0.850	0.512	0.986

Table II

Photometry of HR 4511

HJD	V	B-V	U-B	V-R	V-I
-2440000					
3682.30	5.10	0.85	0.41		
3716.25	5.07	0.81		0.46	0.88
3911.57	5.02	0.80		0.46	0.79
3914.54	4.99	0.79		0.46	0.77
3969.41	4.95	0.75		0.42	0.82
3978.50	4.95	0.77		0.42	0.79
3979.43	4.97	0.76		0.44	0.81
4038.32	5.05	0.82		0.46	0.86
4039.27	5.04	0.83		0.46	0.86
4060.29	4.98	0.79		0.44	0.83
4249.59	5.04	0.78		0.42	0.87
4250.59	5.03	0.79		0.42	0.87
4270.58	5.02	0.82		0.44	0.85
4278.62	5.03	0.81	0.42		
4279.61	5.04	0.81	0.42		
4281.53	5.04	0.81	0.42		
4297.45	5.04	0.80		0.45	0.86
4298.57	5.03	0.80		0.44	0.85
4301.53	5.04	0.80		0.45	0.86
4312.46	5.03	0.79	0.41		
4368.39	4.96	0.75	0.40		
4390.22	4.99	0.75	0.40	0.42	0.82
4391.23	5.00	0.76	0.41	0.42	0.82
4392.24	5.00	0.76	0.41	0.43	0.83
4393.23	5.00	0.76	0.40	0.43	0.82
4422.26	5.09	0.81		0.45	0.87
4424.27	5.08	0.81		0.44	0.85

Table III

Photometry of HD 159378

HJD	V	B-V	V-R	V-I
-2440000				
3970.65	8.50	1.97	1.21	2.39
4036.49	8.53	2.04	1.18	2.39
4038.46	8.52	2.06	1.19	2.39
4059.50	8.48	1.93	1.19	2.38
4060.41	8.45	1.89	1.19	2.37
4094.28	8.40	1.90	1.20	2.34
4096.31	8.37	1.91	1.19	2.33
4099.42	8.36	1.88	1.18	2.32
4114.27	8.35	1.88	1.18	2.33
4115.31	8.36	1.88	1.19	2.33
4422.45	8.46	1.91	1.20	2.32
4423.42	8.45	1.91	1.21	2.33

- (a) HD159378 became gradually brighter and bluer between Julian Dates 244 4037 and 2444115. There is insufficient data and too large a time gap to be able to improve on the periods given by van Genderen and The; however the period may exceed 100 days.
- (b) HR4511 appears to have varied irregularly between $V = 4.95$ and 5.08 during the period JD 2443910 - 2444423. There is no evidence for Eichendorf and Reipurth's period of 125 days. The star is bluest at maximum.

Both these stars appear similar to the superluminous supergiants HR5171 and 6392 (Dean 1980) in that they show irregular long period fluctuations. They are thus unlikely to be cepheids.

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