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NEW VARIABLE STARS FOUND IN GALACTIC CLUSTERS

The purpose of this note is to report the variability detected photoelectrically in fourteen stars located in the region of the following eight galactic clusters: Cr 132, Cr 140, Cr 228,Cr 240, Cr 367, NGC 3324, NGC 3590 and HOGG 10. All these clusters are being studied by the writer using wide-band (UBV) and narrow-band (Hβ) photometry. Observations of numerous stars in the region of all these clusters have been carried out during various observing runs in 1973-1975, using the 60-inch telescope of the Bosque Alegre Station of the Cordoba Observatory (Argentina) and the 24-inch Lowell and 36-inch telescopes of Cerro Tololo Inter-American Observatory (Chile). The observations were reduced using standard stars from the E-regions (1) and mean extinction coefficients. The external and internal mean errors of a single observation are about $0^m.01$ in all the cases. Among the new variables detected there are ten having V amplitudes greater than $0^m.10$ while the other four stars have ΔV variations in the interval $0^m.07 \leq V \leq 0^m.10$. Nine of the variable stars are undoubtedly cluster members, the remaining five being non-member field stars.

The individual UBV observations of the variable stars detected in the fields of galactic clusters are listed in Table I whose columns give in succession: (1) HD/CD number or author's number, (2) indication if the star is a member (m) or non-member (n-m) of the cluster, (3) source of reference for the two former columns,(4) spectral type taken from the literature (2,3,4) or when given in parenthesis as estimated from the intrinsic UBV colours, (5) heliocentric Julian Date, and (6-8) magnitude and colours in the UBV standard system. A finding chart for the two variable stars in Cr 228 is shown in Fig.1.

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Table I

Individual UBV Observations of the New Variables

Star	Membership	Ref.	Sp.type	HJD 2440000+	V	B-V	U-B
			Collinder 132				
HD 56161	n-m	5	G5 IV	2427.572	6.88	0.76	0.32
				2428.595	6.94	0.78	0.36
				2431.603	7.18	0.64	0.36
				2432.621	6.89	0.74	0.39
			Collinder 140				
HD 58535*	m	5	gK 2	1686.588	5.32	1.08	0.92
				1686.699	5.31	1.09	0.91
				1686.821	5.32	1.08	0.91
				1688.591	5.40	1.07	0.89
				1688.721	5.41	1.05	0.91
				1688.826	5.43	1.06	0.93
				1691.564	5.34	1.08	0.89
				1691.671	5.34	1.07	0.88
				1691.798	5.34	1.07	0.87
				1699.601	5.37	1.08	0.88
				1699.725	5.37	1.08	0.89
				1699.842	5.39	1.06	0.89
				1769.621	5.34	1.06	0.88
				1769.701	5.35	1.07	0.88
				1770.703	5.35	1.08	0.89
				2448.709	5.34	1.09	0.89
				2449.601	5.39	1.06	0.88
				2455.729	5.36	1.07	0.89
CD -31°4410	n-m	5	-	2448.729	9.44	1.00	0.68
				2449.643	9.51	0.92	0.72
				2455.743	9.48	0.94	0.70
CD -31°4409	m	5	(A7)	2448.688	10.26	0.19	0.16
				2449.676	10.22	0.22	0.19
				2455.779	10.29	0.24	0.18
				2456.762	10.26	0.22	0.17
			NGC 3324				
28	m	6	(B2.5 V)	2449.794	12.14	0.24	-0.46
				2450.800	12.34	0.22	-0.47
				2451.818	12.27	0.25	-0.44
				2452.818	12.21	0.24	-0.49
31	m	6	(B3 V)	2449.776	12.33	0.23	-0.43
				2450.781	12.33	0.23	-0.42
				2451.803	12.39	0.24	-0.41
				2452.800	12.40	0.24	-0.42
			Collinder 228				
12*	m	5	(BO)	1769.768	10.32	0.11	-0.73
				1770.831	10.33	0.08	-0.76
				2448.811	10.24	0.09	-0.76
36	n-m	5	-	1769.731	11.35	0.54	-0.02
				1770.801	11.43	0.54	0.03
				2448.796	11.28	0.58	0.06

Table I (continued)

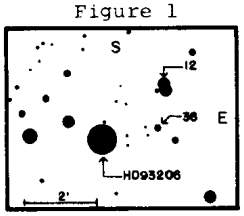
Star	Membership	Ref.	Sp.type	HJD 2440000+	V	B-V	U-B
			Hogg 10				
7	m	7	(B2.5 V)	2449.701	12.15	0.23	-0.52
				2450.711	12.30	0.25	-0.49
				2452.710	12.25	0.28	-0.47
13	m	7	(B6 V)	2449.720	13.22	0.32	-0.24
				2450.723	13.01	0.36	-0.20
				2452.733	13.11	0.34	-0.20
			Collinder 240				
HD 97151	n-m	7	B2 Ve	2458.700	7.59	-0.05	-0.83
				2459.728	7.70	-0.09	-0.80
				2460.725	7.65	-0.10	-0.80
				2462.731	7.64	-0.09	-0.82
HD 97013*	m	7	09.5 III	2458.709	8.77	0.20	-0.53
				2459.716	9.02	0.25	-0.50
				2460.733	8.84	0.24	-0.48
				2462.739	8.88	0.24	-0.47
			NGC 3590				
22	n-m	7	-	2449.743	13.31	0.63	0.43
				2450.739	13.46	0.56	0.39
				2458.730	13.38	0.60	0.40
				2462.759	13.39	0.60	0.40
			Collinder 367				
CD -24°13962	m	5	07.5nn	1897.635	7.34	0.12	-0.85
				1898.643	7.32	0.15	-0.86
				1899.659	7.29	0.14	-0.89
				1900.663	7.38	0.11	-0.87
				1920.703	7.45	0.11	-0.85
				1921.691	7.36	0.13	-0.86

HD 58535: IDS double star (ρ=1".9, Δm=5.5). Measures refer to A component.

Star 12 (Cr 228): This star was also considered to be a cluster member by Feinstein et al.(8).

HD 97013 : From a recent study by Clariá (7) it is suggested that the stars in the region of Cr 240 (=NGC 3572a) form an OB association rather than a cluster.

Figure 1



Finding chart for variables in Cr 228.

References:

1) Cousins, A.W.J. 1972, M.N.R.A.S. Southern Africa,31, 127
2) Jaschek, C., Conde, H., and de Sierra, A.C. 1964, Catalogue of Stellar Spectra Classified in the MK System,La Plata Publ. Ser. Astr. 28, Part 2.
3) Kennedy, P.M. and Buscombe, W. 1974, MK Spectral Classification published since Jaschek's La Plata Catalogue,Evanston
4) Stephenson, C.B. and Sanduleak, N. 1971, Publ. Warner and Swasey Obs. 1, No.1
5) Clariá, J.J. (to be published)
6) Clariá, J.J. 1976, Astron. & Ap.Suppl. (in press)
7) Clariá, J.J. 1976, Astron. J. 81, 155
8) Feinstein, A., Marraco, H.G., and Forte, J.C. 1976, Astron. & Ap. Suppl. (in press)