ASTRONOMIE *Série C. Tome XXXIV. 1969*

M 37 galâktik kümesi civarında çok kırmızı bir yıldız
Ein extrem roter Stern in der Nähe des Galaktischen Sternhaufens M 37

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Özet ; M 37 galâktik kümesi civarında bir yıldız sahası incelenirken G - R renk indeksi 7 olan bir kırmızı yıldıza rastlandı. Bu yıldızın bukadar büyük bir renk indeksi göstermesi, belki bir karbonlu yıldız olması ile izah edilebilir.

* * *

Zusammenfassung : Bei der Photometrierung eines Sternfeldes bei M37 wurde ein extrem roter Stern gefunden, dessen Farben-index in G-R 7 ist. Es handelt sich wahrscneinlich um einen Carbon-Stern.

* * *

Bei der Anwendung der Dreifarben-Photometrie in Steınfeldern, findet man in der Regel einige Sterne, deren Farben-indizes nicht in das Zweifarben-Diagramm passen, und deren Lage im ZFD auch nicht durch interstellare Verfärbung erklärt werden kann. Manche von ihnen mögen Doppelsterne sein.

Bei der Photometrierung eines Sternfeldes bei M37 wurde am Rand des Feldes ein extrem roter Stern gefunden (Abb. 1.). Schätzungsweise sind seine Koordinaten

$$AR = 5^h 46^m \qquad l^{II} = 179^\circ$$

$$Dekl. = +30^\circ 36' \qquad b^{II} = +1^\circ.5$$

Die Messungen wurden auf 15 Platten des 48′ — Palomar-Schmidt gemacht, von denen je 5 in den Farbbereichen R, G und U lagen. Aus diesen Platten eıgab sich

$$G = 17.0 \text{ magn.}$$
$$G\text{-}R = 7.0 \text{ magn.}$$
$$U\text{-}G > 4.0 \text{ magn.}$$

Auf den U-Platten ist der Stern unsichtbar. Aus deren Grenzhelligkeit ergibt sich eine untere Grenze für U-G. Eine Veränderlichkeit konnte nicht festgestellt werden.

Bei dem Stern handelt es sich wahrscheinlich um einen Carbon-Stern. Denn bei diesem liegen kraftige C_2 -und CN-Banden im Spektralbereich der G-Helligkeit, deren isophote Wellenlänge bei etwa 4700 A° liegt (siehe P.C. Keenan 1963 und B. Kleman 1955). Im U-Bereich sollte der Stern dann wegen seiner niedrigen Temperatur sehr lichtschwach sein.

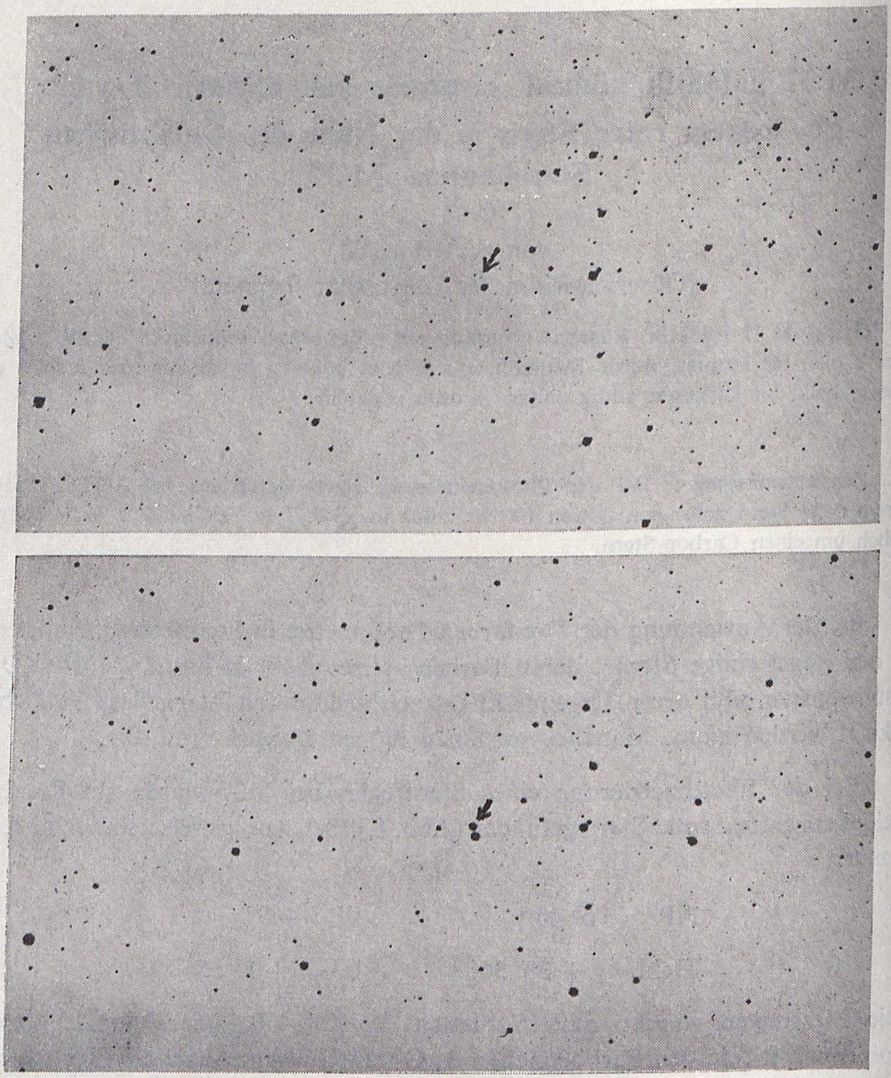

Abb. 1. Aufnahmen von Areal mit dem sogenannten Stern (oben in R, unten in G).

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CHIMIE PHYSIQUE *Série C. Tome XXXIV. 1969*

Pamukkaledeki travertin teşekkülü teorisi

A theory of travertine formations at Pamukkale

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Özet: Su membalarından daha düşük bir referans noktası alınarak tepelerin yükselme hızı için bir denklem bulunmuştur. Travertin teşekkülü içinlüzumlu olan zaman ve mesafe faktörleri hesaplanmıştır. Zamanın kâfi gelmediği hallerde eğimli yamaçlardakiufak tepeciklerden istifâde edilmiştir.

* * *

Summary : An equation is developed for the rate growth of the height of the hillside from a point of reference lower down the hill than the source of the water. The conditions of time and distance necessary for travertine formations are calculated. If the time is insufficient only a hump is made on the sloping hillside.

* * *

In three previous communications we have investigated the composition of the water (I), the percentage of CO_2 in the aiı in Tuıkey (2), and the travertine foımations at Pamukkale (3),. It is clear from the illustrations in the third paper that two alternatives exist. The first is that the hillside is coveıed with white deposits showing only stıiations due to flow which give a hollow ringing sound when stamped upon. The second is that a pool is formed the edges of which grow up vertically and so contain the petıifying water in what become large basins (traveıtine formations). This paper gives a theory of foımation of the basins which shows the special conditions which are necessary.

Theory of formation of basins on hillsides

When the speed of flow is great (i.e some meteıs per second) the wateı runs down channels, or over flat surfaces depositing only $CaCO_3$ but does not foım basins. The first essential is that the water shall form a pool over the edges of which there is a slow seepage. The flowing film of water is thin, and so can loose CO_2 rapidly the deposit commencing on the lips of the edge of the pool. These lips then grow upwards more rapidly than they grow sideways. There is also a self controlling mechanism which keeps the top edge of any one basin at a uniform height. For if one portion grows upward faster than another the supply of water flowing over the lip is immediately reduced, and so the rate of growth is deminished till the rest of the basin edge has grown to this height, when its own rate of growth is resumed.

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ASTRONOMIE *Série C. Tome XXXIV. 1969*

NGC 7245 ve NGC 7226 nın üç renk fotometresi

Theree-colour photometry of NGC 7245 and NGC 7226

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Özet : Daha önce RGU üç renk fotometre sistemi ile incelenen NGC 7245 ve NGC 7226 kümeleri şimdi de UBV sistemi ile incelenmiş ve "Çakıştırma Metodu" ile hesaplanan uzaklıklar bundan önce bulunan değerlerle karşılaştırılmıştır.

Summary : Three-Colour photometry of the clusters NGC 7245 and NGC 7226 have been studied in UBV system and their distances determined with the "Fitting Method" have been compared with those found in RGU system.

Plates which were taken by W. BECKER with the 122 cm. reflector of the Assiago Observatory in 1963 for NGC 7245 and in 1966 for NGC 7226 were not available for the studing of these clusters until today because of absence of photoelectric UBV - magnitudes. In 1969 the studing of these clusters in RGU system using other available plates taken with the 48″ Palamar Schmidt telescope (1) gave us the opportunity to use BECKER's plates and discuss the results of UBV and RGU systems.

Five plates in U, four plates in B and five plates in V are used for the cluster NGC 7245 and they were measured with Iris - photometer in BASEL. For the other cluster three plates in U, four plates in B and three plates in V are used and were measured with Askania - photometer in Istanbul.

NGC 7245

The coordinates of the cluster are

$$l^{II} = 101\overset{\circ}{.}4 \qquad \text{R.A.} = 22^h\,13^m.4$$
$$b^{II} = -\overset{\circ}{1}.9 \qquad \text{Decl.} = +\overset{\circ}{54}\;05' \qquad (1950)$$

In this cluster 160 stars were measured with a limiting magnitude of $16^m.5$ in V. The data are given in Table I ; remarks in the last column gives : (1) physical members ; (2) non - members and (bl.) blend. Both colour - magnitude diagrams (CMD) (V, B — V) and (V, U — B) are given in Fig. 1. 117 of the stars are considered as physical members for they lie on the main - sequense, 7 stars are also considered as physical members although they do not lie on the main sequence but on a horizontal branch which indicate that they are giants. The rest are field stars. The "Fitting - Method" used in Basel leads to the following results :

$$
\begin{aligned}
(m - M) &= 12^m.20 \\
E(B - V) &= 0\ .41 \\
E(U - B) &= 0\ .31 \\
\text{Absorption (V)} &= 1\ .23 \\
(m - M)_0 &= 10\ .97 \\
\text{Distance} &= 1560\ \text{pc.}
\end{aligned}
$$

NGC 7226

The coordinates of this clustei are

$l^{II} = 101°.4$ R. A. $= 22^h\ 8^m.7$

$b^{II} = -0°.6$ Decl. $= +\ 55°10'$

The stars in NGC 7226 are faint in U therefore less stars were measured with respect to the other cluster (92 stars). The limit magnitude here does not exceed 16^m. The data are given in Table 2. Stars lying on the main - sequence and on the horizontal giant branch in CMD (Fig. 2) have been considered as physical members (68 stars) while the rest seem to be field stars (24 stars). The "Fitting-Method" used in Basel leads to the following results :

$$
\begin{aligned}
(m - M) &= 13.^m60 \\
E(B - V) &= 0\ .55 \\
E(U - B) &= 0\ .39 \\
\text{Absorption (V)} &= 1.\ 65 \\
(m - M)_0 &= 11\ .95 \\
\text{Distance} &= 2450\ \text{pc.}
\end{aligned}
$$

Conclusion : If we compare the distances found in two systems it is seen that UBV system gives a distance 370 pc. nearer with respect to RGU system for NGC 7245 and 210 pc. farther for NGC 7226. Both differences are due partly to different limit magnitudes of the two systems and partly to the absence of photoelectric UBV - magnitudes in the present work. Also it is of interest to compare the colour indices in the two systems : the differences between the E(B — V) of this work and those transfered from E(G — R) (2) of previous work are only $0^m.08$ for NGC 7245 and $0^m.06$ for NGC 7226. But scattering is more prominent here.

Finally,I wish to express my gratitude to Prof. Dr. W. BECKER who suggested that I examine this work and gave to me all the necessary material.

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Table 1

Star (*)	V	(B - V)	(U - B)	Rem-arks	Star (*)	V	(B - V)	(U - B)	Rem-arks	Star (*)	V	(B- V)	(U - B)	Rem-arks
1	—	—	—		76	14.67	0.87	0.37	1	150	15.49	0.75	0.44	1
2	15.09	0.84	0.31	1	76a	16.39	0.81	0.42	1	151	15.40	0.72	0.32	1
3	14.62	1.10	0.26	2,bl	77	14.16	0.51	0.30	1,bl.	152	13.62	0.74	0.31	1
4	—	—	—		78	—	—	—	bl.	153	13.88	0.99	—0.04	2, bl.
5	15.11	1.18	0.50	2	79	—	—	—	bl.	154	13.27	0.51	0.34	1
6	14.48	0.52	0.30	1	80	—	—	—	bl.	155	15.67	1.00	0.34	2
7	15.03	1.58	0.78	2	81	13.25	1.39	0.59	1	156	15.06	0.66	0.39	1
8	15.25	0.97	0.18	2	82	15.39	0.66	0.41	1	157	15.78	1.07	0.42	2, bl.
9	12.91	—0.01	0.76	2	83	14.33	0.63	0.32	1	158	14.93	1.73	0.94	2
10	16.08	0.96	0.26	1	84	15.64	0.73	0.49	1	159	14.61	0.99	0.18	2
11	13.95	0.39	0.28	1	85	15.74	0.74	0.38	1	160	13.73	1,27	0.30	1
12	15.51	0.93	0.48	1	86	15.15	0.98	0.18	2	161	15.85	1.40	0.72	2
13	13.03	0.50	0.37	1	87	13.83	0.57	0.33	1	162	15.20	0.71	0.41	1
14	13.58	0.99	0.17	2	88	15.98	0.83	0.41	1,bl.	163	13.20	0.51	0.56	1, bl.
15	14.62	0.64	0.28	1	89	15.92	0.81	0.41	1,bl.	164	—	—	—	bl.
16	15.63	0.77	0.47	1	90	15.38	0.75	0.39	1	165	13.88	0.56	0.30	1
17	14.96	0.61	0.27	1	91	14.03	0.53	0.20	1	166	16.07	0.82	0.33	1
18	14.94	0.86	0.15	2	92	13.78	0.44	0.19	1	167	15.96	0.89	0.32	1
19	16.29	0.56	0.37	2	93	16.48	0.73	0.41	1	168	16.32	0.85	0.44	1
20	15.47	0.81	0.40	1	94	15.13	1.07	0.35	2,bl.	169	15.95	0.78	0.48	1
21	15.77	0.96	0.30	1	95	16.28	0.85	0.34	1	170	15.34	0.64	0.40	1
22	16.44	0.85	0.27	1	96	15.84	0.74	0.48	1					
23	13.67	0.30	—	bl.	97	15.00	0.95	0.20	2					
24	14.14	0.47	0.33	1	98	15.67	0.85	0.42	1,bl.					
25	14.50	0.56	0.31	1	99	15.16	0.67	0.35	1					
26	15.38	0.70	0.44	1	100	15.01	0.70	0.35	1					
27	14.94	1.50	0.82	2	101	15.44	0.95	0.28	1					
28	15.75	0.86	0.36	1	102	15.60	1.17	0.48	2					
29	15.43	0.70	0.43	1	103	13.36	1.54	0.79	1					
30	16.15	0.82	0.36	1	104	15.09	0.64	0.36	1					
31	16.00	0.93	0.30	1	105	15.95	0.89	0.32	1					
32	14.03	0.44	0.26	1	106	14.47	0.57	0.23	1					
33	14.85	0.64	0.37	1	107	14.90	0.74	0.31	1					
34	15.21	0.72	0.39	1,bl.	108	16.40	0.78	0.39	1,bl.					
35	14.70	0.80	0.40	1,bl.	109	16.43	0.85	0.36	1,bl.					
36	13.35	1.09	0.52	1	110	15.71	0.80	0.41	1					
37	15.27	0.93	0.19	2	111	14.98	0.64	0.42	1					
38	15.30	1.04	0.28	2	112	13.73	0.52	0.38	1					
39	15.42	0.84	0.37	1	113	14.73	0.70	0.33	1,bl.					
40	14.56	0.72	0.30	1	114	14.72	0.65	0.36	1,bl.					
41	15.67	1.36	0.72	2	115	15.07	0.70	0.39	1					
42	14.73	0.96	0.18	2	116	15.61	0.83	0.45	1					
43	15.11	0.68	0.32	1	117	14.44	0.69	0.27	1					
44	16.25	0.75	0.28	1	118	—	—	—	bl.					
45	14.66	0.68	0.30	1	119	15.79	0.70	0.43	1					
46	15.49	0.94	0.27	1	120	14.23	0.72	0.32	1					
47	15.74	1.01	0.38	2	121	14.88	0.93	0.20	2					
48	14.02	1.69	0.90	2	122	14.27	0.67	0.25	1					
49	15.73	0.78	0.48	1	123	14.70	0.67	0.31	1					
50	15.51	0.93	0.21	1	124	15.12	0.77	0.34	1					
51	15.50	0.81	0.36	1	125	14.83	1.26	0.55	2,bl					
52	16.13	0.90	0.30	1	126	15.07	0.73	0.39	1,bl.					
53	14.83	1.03	0.15	2	127	13.61	—	—	bl.					
54	16.16	0.79	0.31	1	128	—	—	—	bl.					
55	16.07	0.73	0.41	1	129	14.58	0.70	0.24	1					
56	13.21	0.90	0.18	1	130	16.06	0.73	0.40	1					
57	15.05	1.50	0.67	2	131	14.90	0.69	0.33	1					
58	13.13	1.49	0.73	1	132	16.30	0.96	0.32	1					
59	16.40	0.72	0.34	1	133	15.53	0.72	0.41	1					
60	15.45	1.40	0.67	2	134	14.34	0.78	0.39	1,bl.					
61	14.40	0.75	0.28	1	135	14.48	0.61	0.28	1					
62	13.93	0.54	0.21	1	136	14.80	1.67	1.03	2					
63	16.12	0.74	0.43	1	137	14.97	0.75	0.38	1					
64	13.50	0.42	0.37	1	138	14.05	0.66	0.21	1					
65	16.17	0.80	0.34	1	139	14.76	1.69	0.94	2,bl.					
66	16.09	0.97	0.47	1	140	15.01	0.74	0.34	1					
67	15.83	0.82	0.47	1,bl.	141	15.22	0.94	0.18	2					
68	15.84	1.18	0.59	2,bl.	142	16.15	0.93	0.34	1					
69	16.01	0.85	0.42	1	143	14.96	0.65	0.29	1					
70	14.01	0.56	0.22	1	144	13.78	0.60	0.32	1,bl.					
71	14.74	0.70	0.36	1	145	—	—	—	bl.					
72	16.10	0.73	0.35	1	146	15.22	1.70	0.82	2					
73	15.88	1.09	0.43	2	147	15.48	0.75	0.43	1					
74	16.04	0.82	0.37	1	148	16.05	0.92	0.25	1					
75	16.07	0.96	0.19	1,bl.	149	15.71	0.73	0.52	1					

(*) : Numbered in Basel

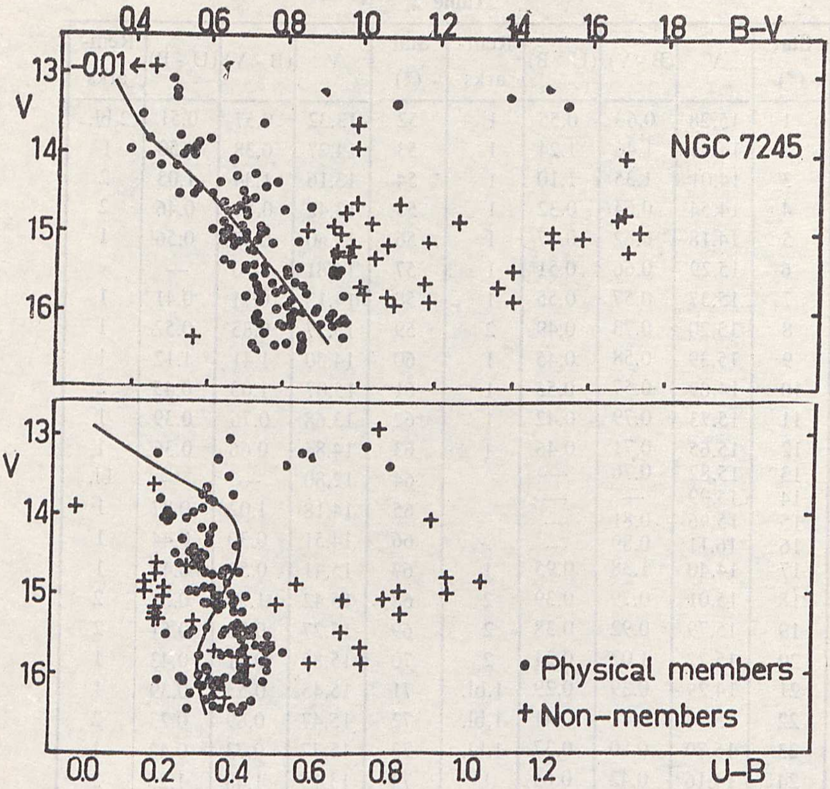
Remarks : (1) Rhysical member, (2) non - member, (bl) blend.

Table 2

Star (*)	V	(B - V)	(U - B)	Remarks	Star (*)	V	(B - V)	(U - B)	Remarks
1	15.28	0.63	0.55	1	52	13.32	0.57	0.51	2,bl.
2	14.43	1.46	1.24	1	53	14.27	0.38	0.50	1
3	14.01	1.35	1.10	1	54	13.16	1.34	1.03	2
4	14.54	0.64	0.32	1	55	13.42	0.81	0.46	2
5	14.18	0.62	0.37	1	56	15.60	0.69	0.56	1
6	15.29	0.66	0.51	1	57	14.61	1.70	—	
7	15.37	0.57	0.55	1	58	14.13	0.71	0.41	1
8	13.20	0.73	0.49	2	59	15.77	0.85	0.52	1
9	15.39	0.58	0.45	1	60	14.30	1.41	1.12	1
10	14.89	0.57	0.55	1	61	15.07	1.03	0.45	2
11	15.73	0.79	0.42	1	62	13.68	0.76	0.39	1
12	15.65	0.71	0.46	1	63	14.84	0.66	0.36	1
13	15.82	0.76	—		64	12.80	—	—	bl.
14	15.99	—	—		65	14.18	1.02	0.87	1
15	15.96	0.81	—		66	14.51	0.30	0.44	1
16	16.11	0.89	—		67	15.41	0.54	0.47	1
17	14.40	1.38	0.95	1	68	15.42	1.30	0.58	2
18	15.01	0.79	0.39	2	69	15.27	0.93	0.51	2
19	15.79	0.92	0.38	2	70	15.85	0.71	0.43	1
20	15.72	1.02	0.34	2	71	15.45	0.53	0.39	1
21	14.29	0.39	0.29	1,bl.	72	15.47	0.89	0.23	2
22	15.78	0.71	0.41	1,bl.	73	15.77	0.73	0.42	1
23	15.70	0.80	0.37	1,bl.	74	13.15	1.48	1.25	2
24	14.16	0.42	0.64	1	75	15.34	0.53	0.49	1
25	15.59	0.75	0.39	1	76	14.97	0.56	0.46	1
26	14.73	0.68	0.38	1	77	16.10	0.70	0.39	1
27	15.37	0.56	0.50	1	78	14.35	0.48	0.55	1
28	14.98	1.59	—		79	14.59	0.31	0.38	1
29	15.75	1.00	0.35	2	80	15.85	1.05	0.22	2
30	15.30	1.09	0.43	2	81	15.81	0.74	0.39	1
31	15.09	0.81	0.23	2	82	14.04	1.29	1.05	1
32	13.78	0.34	0.53	1	83	15.71	0.70	0.42	1
33	15.90	0.78	0.37	1	84	14.38	1.36	0.97	1
34	15.88	0.65	0.33	1	85	15.30	0.50	0.39	1
35	14.00	1.37	1.03	1	86	15.01	0.46	0.44	1
36	13.53	0.54	0.49	2	87	14.91	0.44	0.41	1
37	15.12	1.76	—		88	15.31	0.61	0.53	1
38	13.36	0.59	0.47	2	89	14.12	0.86	0.52	1
39	15.66	0.83	0.44	1	90	14.45	0.48	0.57	1
40	13.03	1.60	1.24	2	91	14.57	0.54	0.66	1
41	15.46	0.62	0.50	1	92	14.90	0.44	0.50	1
42	15.36	1.02	0.47	2	93	15.49	0.66	0.56	1
43	14.27	0.41	0.48	1	94	14.52	0.40	0.51	1
44	15.75	0.82	0.51	1	95	15.07	0.64	0.60	1
45	15.21	0.75	0.18	2	96	14.57	0.48	0.63	1
46	13.45	0.52	0.50	2	97	14.62	0.54	0.56	1
47	15.66	0.75	0.42	1	98	15.77	0.77	0.56	1
48	15.65	0.87	0.46	1	99	15.48	0.68	0.57	1
49	15.69	0.85	0.31	1	100	15.90	0.93	—	
50	15.51	0.58	0.51	1	101	15.42	0.96	0.29	2
51	15.65	0.92	0.54	2					

(*) : Numbered in Istanbul

Remarks : (1) physical member, (2) non-member, (bl.) blend.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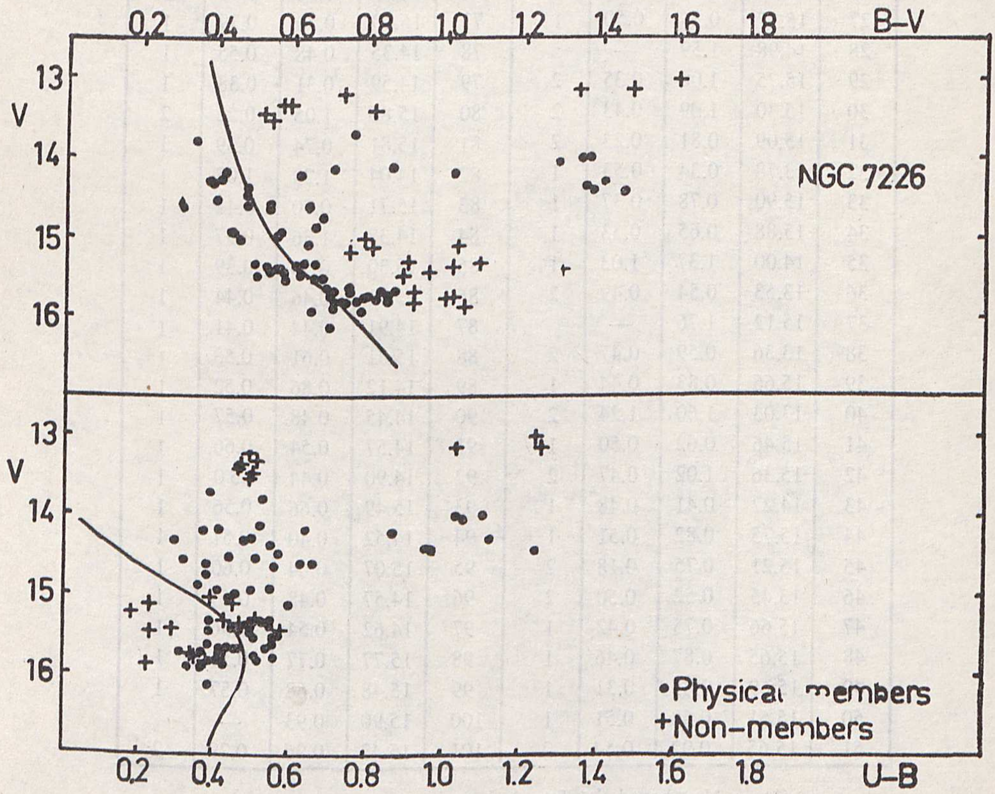
-0.01
V
13
14
15
16
NGC 7245
13
14
15
16
V
• Physical members
+ Non-members
0.0 0.2 0.4 0.6 0.8 1.0 1.2 U–B

Fig. 1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13
V
14
15
16
NGC 7226
13
V
14
15
16
•Physical members
+Non-members
0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 U–B

Fig. 2