

# CCD stellar photometry in 13 dwarf irregular galaxies

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**Abstract.** CCD images and photometry obtained with the 6 m telescope for the galaxies UGC 2905 = CPG 96b, UGC 3860 = DDO 43, UGC 3966 = DDO 46, NGC 3274 = UGC 5721, UGC 6541 = Mkn 178, NGC 3738 = UGC 6565, UGC 6572, UGC 6817 = DDO 99, UGC 7559 = DDO 128 in BV, as well as for the galaxies UGC 288, UGC 3755, UGC 3974 = DDO 47 and UGC 4115 in BVR are presented. The tables of the measurements include positions, sizes, magnitudes and colors of the stars and diffuse objects. Color-magnitude and color-color diagrams are also presented. The mean size of the star forming region for 12 galaxies is about 2 kpc.

**Key words:** dwarf irregular galaxies — CCD photometry

Among 215 galaxies with radial velocities  $< 500$  km/s (Karachentsev, 1994) 2/3 are dwarf irregulars. These objects are very important for elucidation of the velocity field of the nearby universe. Moreover, detailed studies of the stellar populations in such isolated star forming sites will allow us to investigate evolution of massive stars.

We resolved into stars 13 irregular dwarf galaxies, which have radial velocities  $V_0 < 500$  km s<sup>-1</sup> and are situated outside the known nearby groups. Using photometry of their brightest stars we obtained for them the distance moduli (Georgiev et al., 1996). In this paper we present the methodics and the results of the photometry.

The images of the galaxies were obtained in the prime focus of the 6 m telescope at the end of 1993. We used 580×520 pixel CCD chip with a readout noise of 13 electrons, which has a projected sky size of 120×80 arcseconds. The image frames, the photometric log in the photometric diagrams are given in the Appendices 1–3. The observational data are given in Table 1.

The basic data about the galaxies, extracted from the PGC-ROM catalogue (Paturel et al., 1992) are presented in Table 2 as follows: type — morphological type code,  $a(25)$  — isophotal diameter at the standard isophote of 25 mag/arcsec<sup>2</sup>,  $b/a$  — axial ratio at the standard isophote,  $V(h)$  — heliocentric velocity,  $W(50)$  — 21-cm line width at 50% of the peak,  $V_0$  — corrected radial velocity (Karachentsev, Makarov, 1995),  $A(B)$  — galactic extinction, plate — the band of the presented plate; other plates are given in the paper of Georgiev et al. (1996).

Data reduction was done by a PCVISTA-PLUS

package which was originally performed by Treffers and Richmond (1989) and complained later with numerous additional procedures by Georgiev (1995b). After the process of de-biasing, dark subtraction and flat fielding we replace many pixel values, affected by cosmic events or chip defects, with locally fitted plane. After this the frames with dimensions 580×400 pixels and scale 0.2 arcsecond per pixel were processed as follows. Each frame was decomposed into the smoothed and residual components, using median filtering with a window diameter of 33 pixels (Georgiev, 1996a). The residual frame shows very well the faint cosmic events and defects. It was additionally cleaned and added to the smoothed one for restoration of the original. Then the frame was smoothed by sliding the surface of the 5-th degree with a window diameter of 9 pixels. This procedure decreases the FWHM of the stellar images by 5–6% and amplifies the faint stellar images. The corresponding fast algorithm (Georgiev, 1996b) is based on two-dimensional convolution with analytically derived coefficients.

The photometric calibrations to the system BVR were determined using observations of standard stars of Landolt (1992). The total instrumental magnitudes, corresponding to infinite photometric apertures were obtained by means of the magnitude growth curves. The color equations are

$$\begin{aligned} V - v &= const - 0.08(b - v) - 0.21/\cos Z \\ B - V &= const + 1.17(b - v) - 0.13/\cos Z \\ V - R &= const + 0.86(v - r) - 0.04/\cos Z \end{aligned}$$

where  $b$ ,  $v$  and  $r$  are instrumental magnitudes and  $Z$  is the zenith angle.

The frames of the galaxies obtained in different bands were rebinned to a common origin, corresponding to the frame in V band. The strong local background gradient shifts the center of the stellar image up to 3 pixels and causes an additional photometric error of about  $0.1^m - 0.2^m$ . To avoid this problem we make single-star photometry on the residual images subtracted with median filtering with window diameter  $\simeq 10$ (FWHM). We carefully checked that the fluxes of isolated stars, used for determination of the aperture correction, were not affected by this procedure.

A single-star aperture photometry on the residual frames was simultaneously carried out in 2 (or 3) bands by a special program called UMAG. The aperture stellar photometry realized in UMAG is based on fast method for building the magnitude growth curve inside the photometric aperture (Georgiev, 1995a). In this work the method was significantly improved with the plane fit of the local background using the pixels of the aperture peripheral circle. Such kind of background independent photometry, but using a point spread function model, was performed also by Notni et al. (1996). The aperture diameter in our photometry was usually 11 pixels (about 2 arcseconds or 1.6 (FWHM)). The program UMAG derives the aperture correction using some (preliminary photometric) stars, and reduces the instrumental magnitudes to the standard system. Using an IBM 486 PC it produces the widths, standard magnitudes, colors and growth curves for about 5 objects per a second. The Tables, presented in Appendix 2, are the direct outputs of this program.

We found prior stellar photometry only for the galaxy UGC 7559 (Hopp and Shulte-Ladbeck, 1995). The comparison of the photometric data for 42 common objects is shown in Fig.1. We note that after  $22^m$  our magnitudes are generally more faint and the difference at  $23^m$  is about  $0.2^m$ . We conclude that this discrepancy is due to different telescopes and methods of photometry. Using DAOPHOT one might derive magnitudes of the faintest stars brighter than using an aperture photometry. Such particularity of DAOPHOT is especially noted in the literature (Piotto et al. 1990, Bresolin et al., 1993). However, the most downward deviated objects in Fig.1 have diffuse appearance in our frames, but they may be starlike objects in the frames of Hopp and Shulte-Ladbeck (1995), where the resolution is 0.5 arcseconds per pixel. Generally, the confidence of the photometric data of stellar objects is very good and the scatter is  $> 0.1^m$  only for objects fainter than  $21^m$ .

Comparing the photometric results obtained from observations at different nights we conclude that our zero-point shift, caused by the changes of the atmosphere extinction and the aperture correction error may be about  $0.1^m$ . The estimated internal magni-

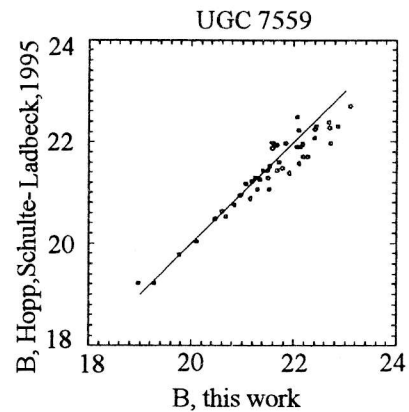


Figure 1: Comparison of the B magnitudes of UGC 7559 from this paper to the ones given in the paper of Hopp and Schulte-Ladbeck (1995). The line for perfect relation is indicated.

tude error of our photometry is  $< 0.05^m$  up to  $21^m$  and  $> 0.1^m$  after  $22^m$ .

In most cases when the galaxies were not too large we estimated their integral magnitudes and colors. The sky level was determined from the mode of suitable boxes at the edges of the frames, outside the body of the galaxy. The foreground stars were replaced with locally fitted planes and the photometry was done by magnitude growth curves of the galaxies. We believe our underestimation of the total magnitudes to be  $< 0.1^m$  and our photometric error is  $< 0.1^m$ . The results are given in Table 3.

The present photometry was already used for determination of some important parameters of the investigated galaxies, derived in the paper of Georgiev et al. (1996). They are collected in Table 3 as follows:  $B(T)$  and  $(B-V)_0$  — total apparent B magnitude and galactic extinction free color; when the data was got from PGC-ROM they are marked by asterisk, MOD — distance modulus from the brightest blue and red supergiants of the galaxy, D — photometric distance in Mpc,  $M(BT)$  — total absolute magnitude in B band.

The present data were used for deriving the apparent radial distribution of the blue and red supergiant candidates in 12 galaxies. The result is presented in Fig.2. The distances are computed toward nuclear objects, designated in the tables in Appendix 2 as NUC. The numbers correspond to number of stars in concentric annuli with apparent width of 100 pc, centered to the suspected nuclear object. Total amount of the used stars are 71 blue and 14 red. The used blue stars are marked in Appendix 2 by letter B, but only the brightest red stars, which magnitudes correspond



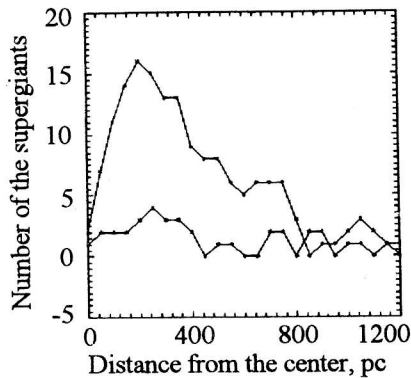


Figure 2: Apparent distribution of the blue (upper curve) and red (down curve) supergiants in 12 galaxies with account of their distances.

to the respective blue supergiants are included. Two galaxies with uncertain nuclear objects are excluded: UGC 3966 because it seems to be double and UGC 4115 because of its high irregularity and missing nuclear region. The galaxy NGC 2537 (Arp 6, Mkn 86, UGC 4274), that will be the subject of a separate paper, is included here also.

The apparent distributions of the blue and red stars show peaks at about 200 pc from the nuclear object. The diameter of the star forming site for 12 galaxies is about 2 kpc.

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## 1. APPENDIX 1. IMAGES OF THE GALAXIES

Original and residual frames (subtracted under median window of 33 pixels) of the investigated galaxies are presented. The tick marks give the coordinate systems of the frames with a step of 20 pixels or 4.1 arcseconds. The coordinate origin is in the upper left corner, X and Y coordinates increase right and down, respectively. One bright foreground star was removed from the image of the galaxy UGC 4115. The image of galaxy UGC 7559 was particularly affected by the traces of bright stars after telescope stopping (caused by electric shock). The shapes of four traces were modeled and then subtracted from the frame. Fortunately the visible resulting distortions are far from the centre of the galaxy.

Table 1: *Journal of the observations*

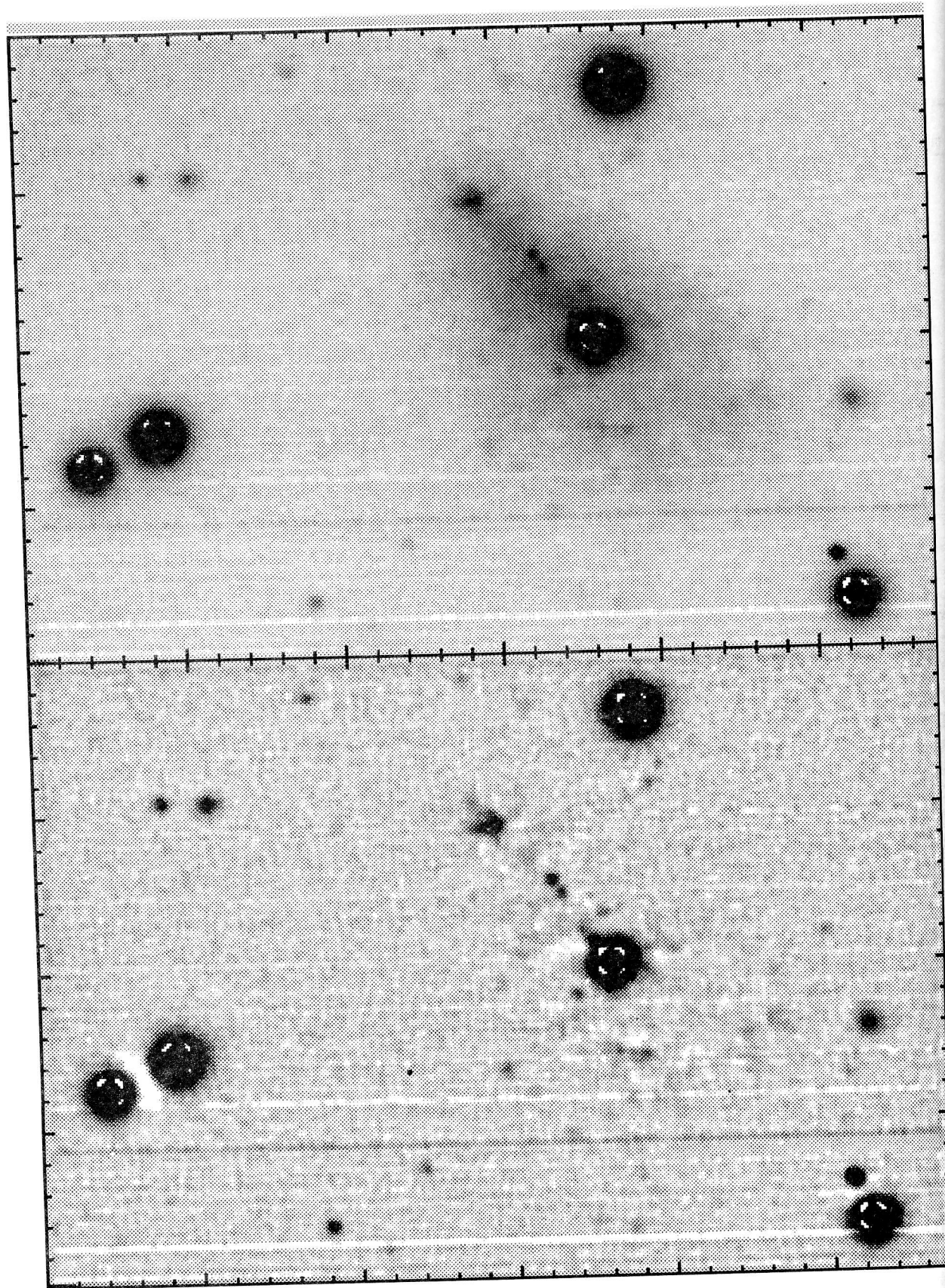
UGC number	date of observation	seeing "	exposures (sec)			other name of the galaxy
			B	V	R	
288	24.08.92	1.5	-	600	600	
288	27.08.92	1.2	1800	-	-	
2905	21.11.93	1.3	900	600	-	CPG 96b
3755	20.11.93	1.5	900	600	400	
3860	21.11.93	1.4	900	600	-	DDO 43
3966	21.11.93	1.5	600	600	-	DDO 46
3974	20.11.93	1.5	900	600	600	DDO 47
4115	20.11.93	1.5	-	-	600	
4115	7.12.93	1.2	900	600	-	
5721	20.11.93	1.8	900	600	-	NGC 3274
6541	5.12.93	1.2	600	600	-	Mkn 178
6565	5.12.93	1.2	600	600	-	NGC 3738, Arp 234
6572	5.12.93	1.2	300	600	-	NGC 3741
6817	7.12.93	1.1	900	600	-	DDO 99
7559	7.12.93	1.2	300	600	-	DDO 128

Table 2: *Basic data on the galaxies*

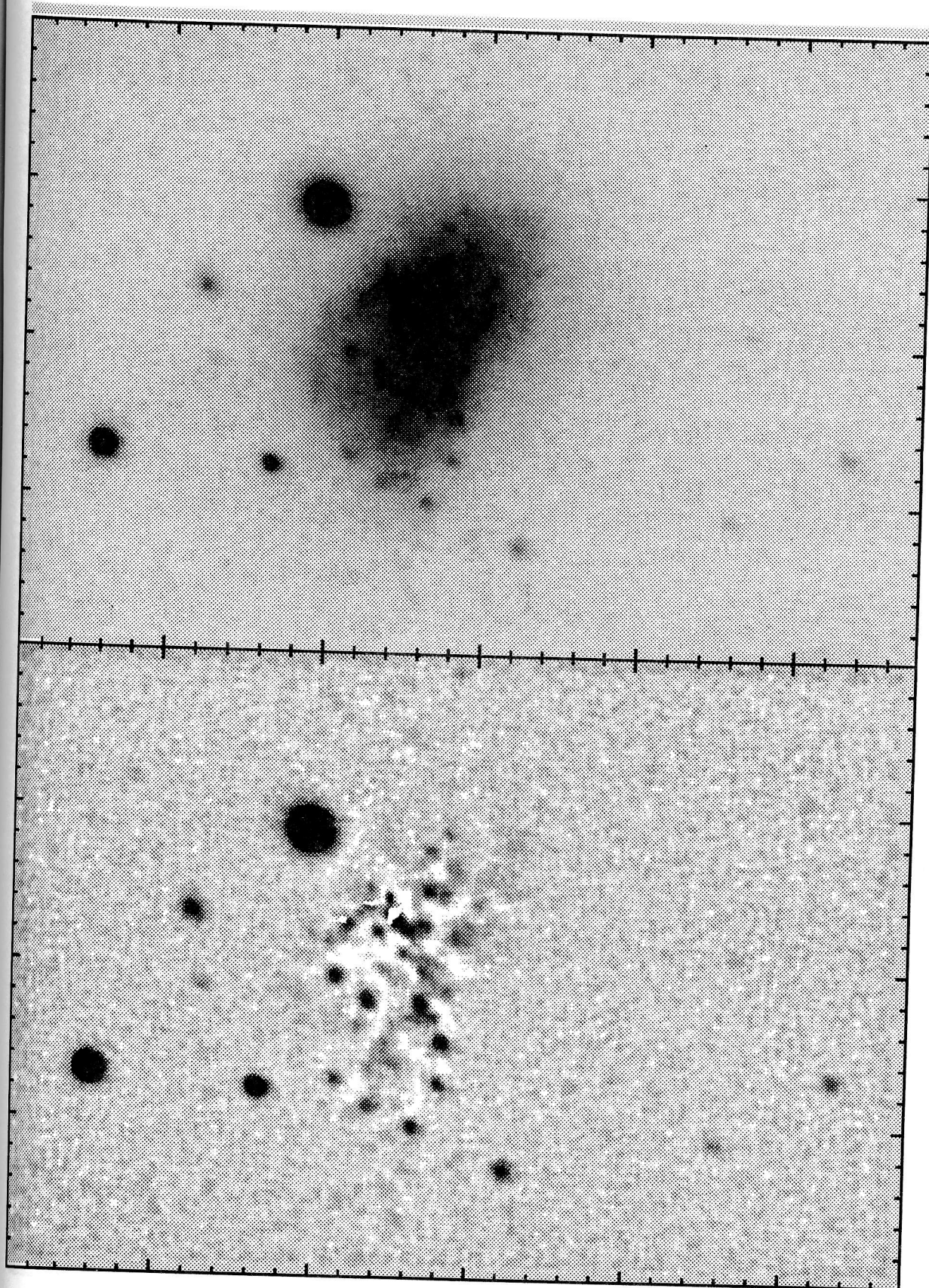
UGC	type	a(25)	b/a	V(h)	W(50)	$V_0$	A(B)	plate
288	10	1.3	0.64	188	45	462	0.36	V
2905	10	0.9	0.65	292	48	344	1.06	B
3755	10	1.7	0.58	323	57	191	0.71	B
3860	10	1.3	0.68	354	38	370	0.23	B
3966	10	1.8	0.98	361	71	368	0.22	V
3974	10	3.1	0.81	270	56	160	0.10	V
4115	10	1.8	0.56	338	84	210	0.11	R
5721	7	2.1	0.48	537	157	460	0.06	V
6541	10	1.2	0.54	251	31	299	0.00	B
6565	10	2.5	0.77	288	78	308	0.00	B
6572	10	2.0	0.55	230	96	263	0.00	B
6817	10	4.1	0.39	245	37	250	0.00	B
7559	10	3.2	0.63	218	59	231	0.00	B

Table 3: *Data based on the present photometry*

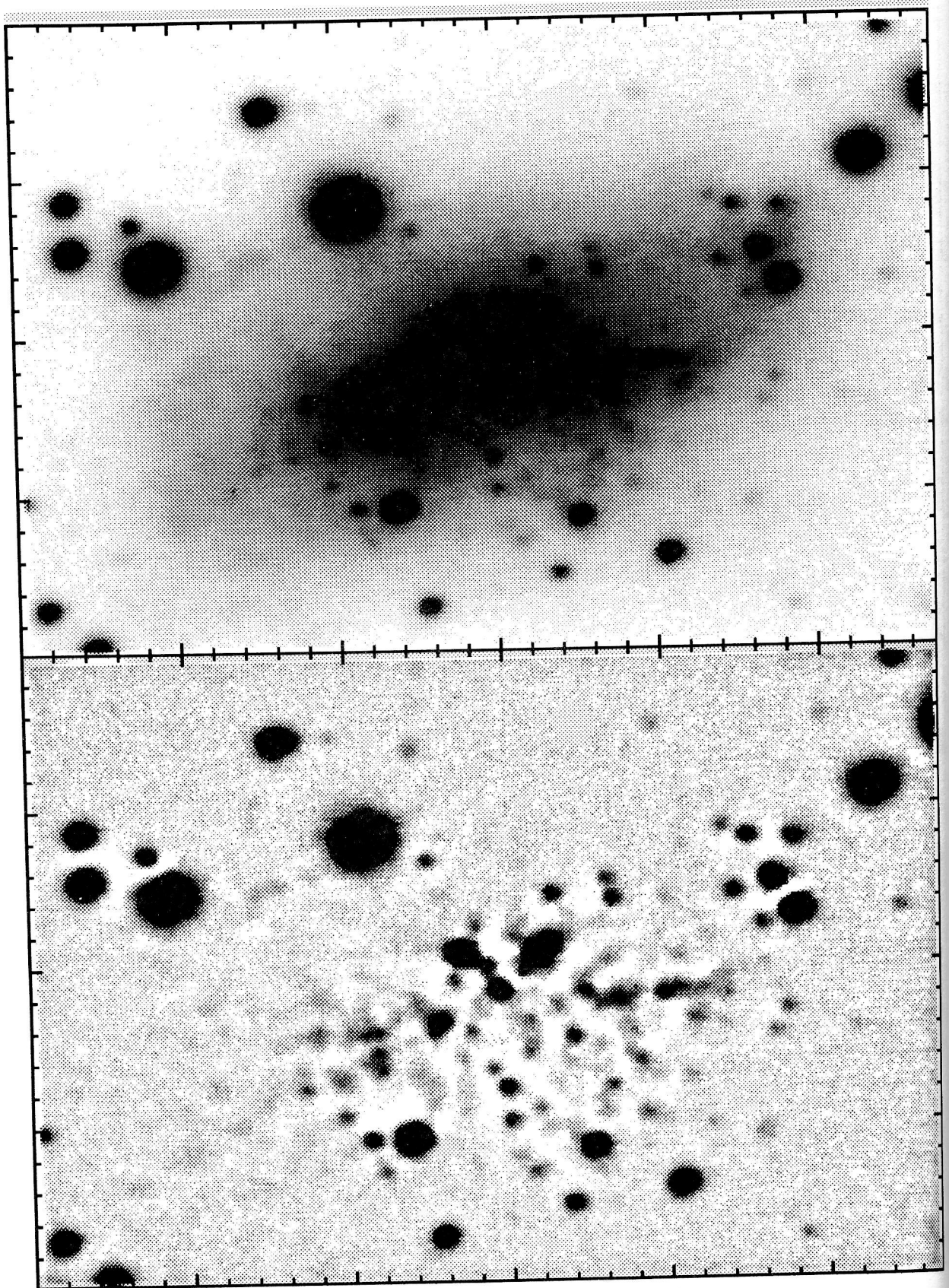
UGC	BT	$(B - V)_0$	MOD	D(Mpc)	M(BT)
288	15.76	0.32	29.14	6.73	-13.74
2905	15.74	0.38	28.83	5.83	-14.15
3755	14.25	0.37	28.08	4.14	-14.54
3860	15.25	0.36*	29.23	7.00	-14.21
3966	14.40	0.35	29.18:	6.85:	-14.95:
3974	13.61*	0.45*	28.15:	4.27:	-14.64
4115	14.45	0.38	28.61	5.27	-14.27
5721	13.26	0.35	29.51	7.98	-16.31
6541	14.23	0.34	27.73	3.52	-13.5
6565	12.01*	0.37*	27.73	3.52	-15.72
6572	14.52	0.30	27.7	3.47	-13.18
6817	13.62*	0.33	27.97	3.92	-14.35
7559	14.21*	0.34*	27.97	3.93	-13.76

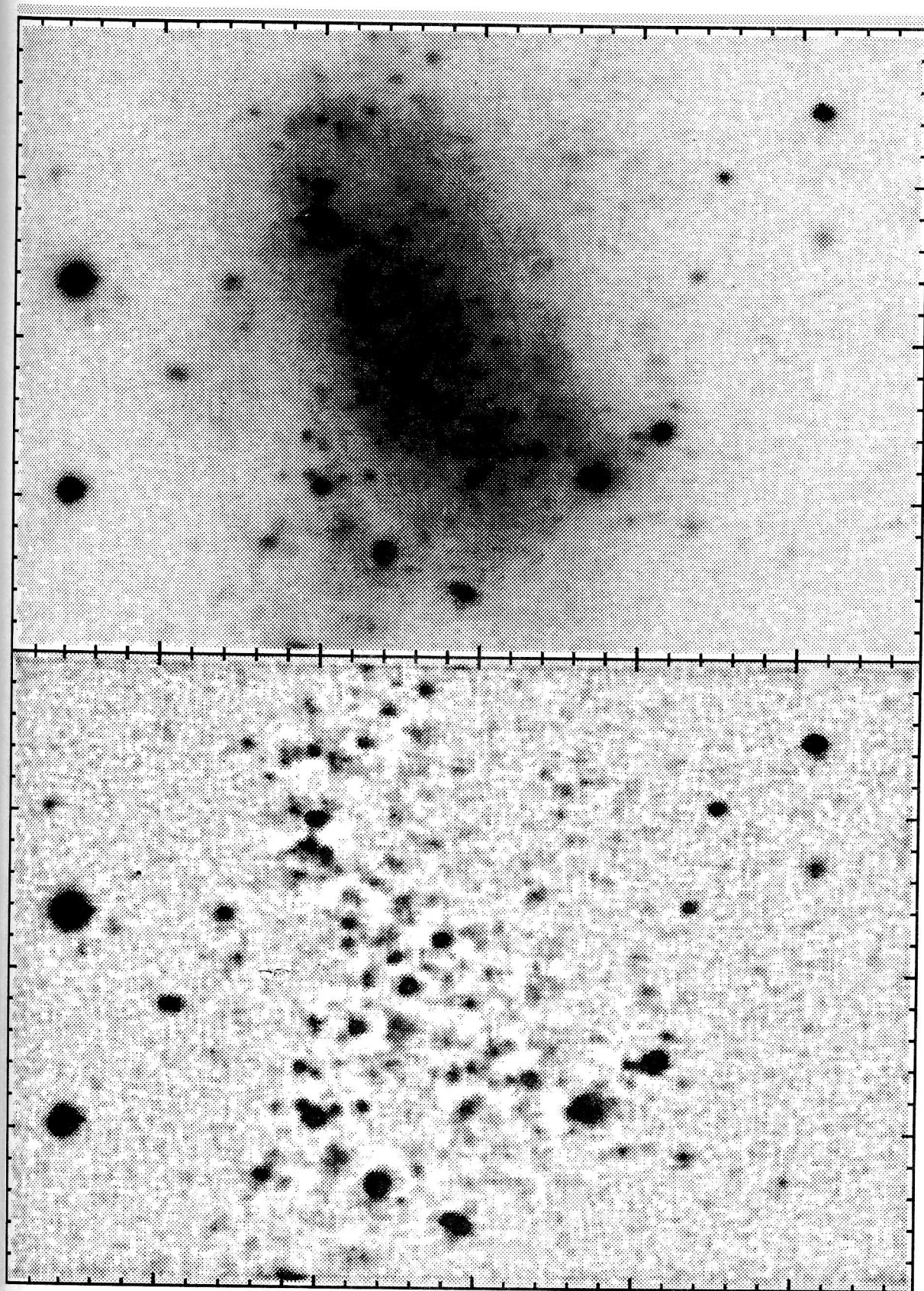




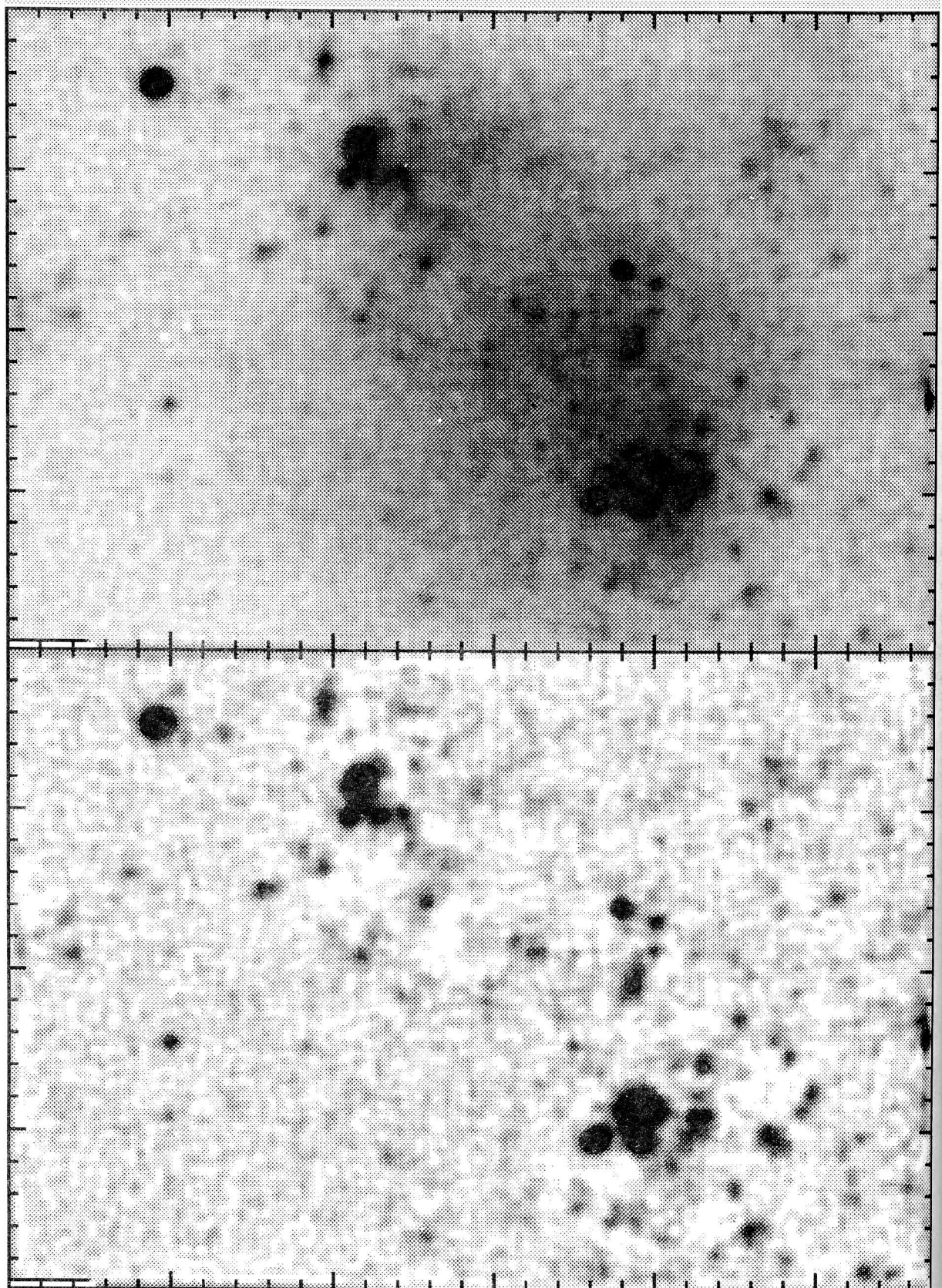


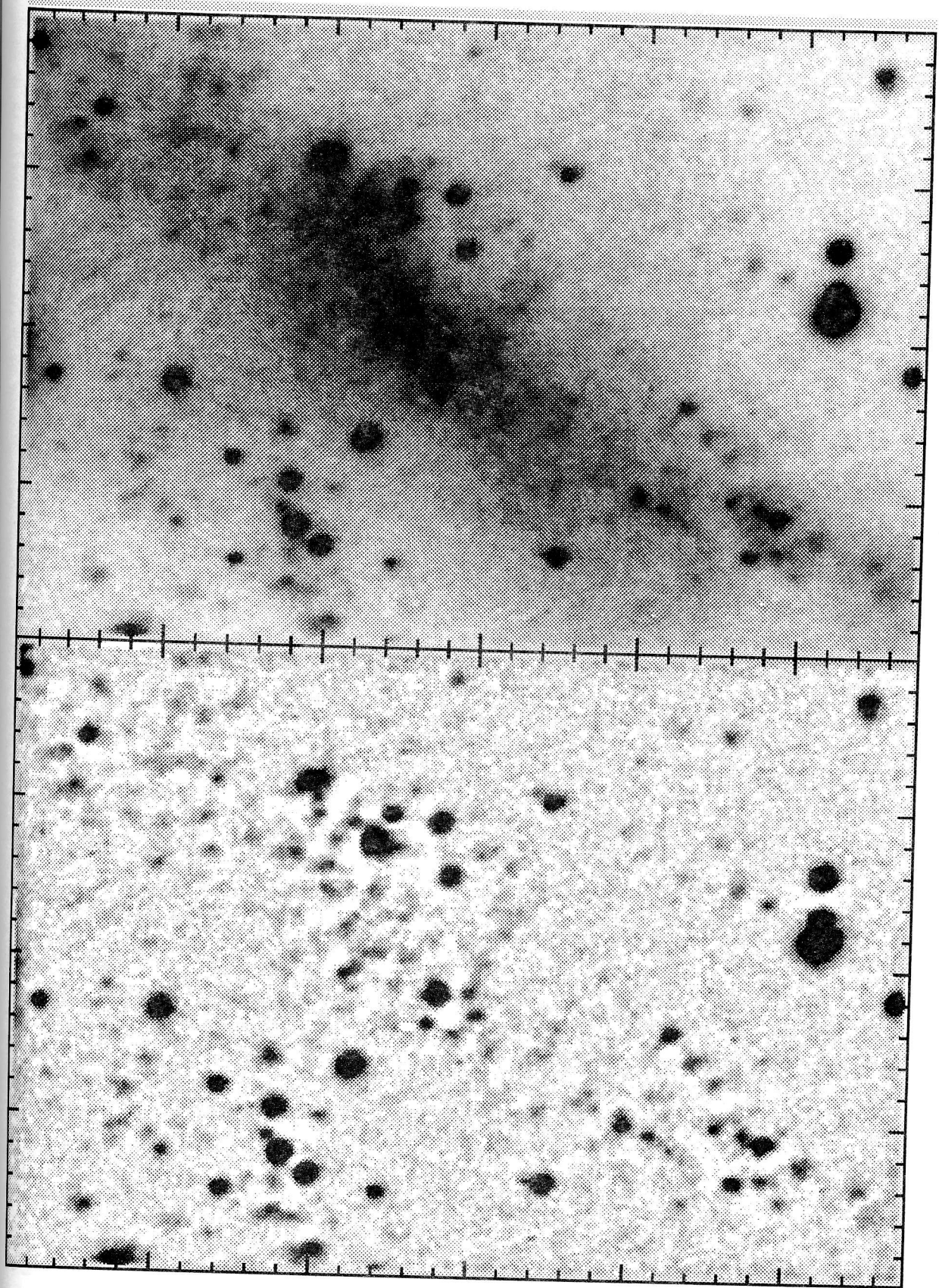




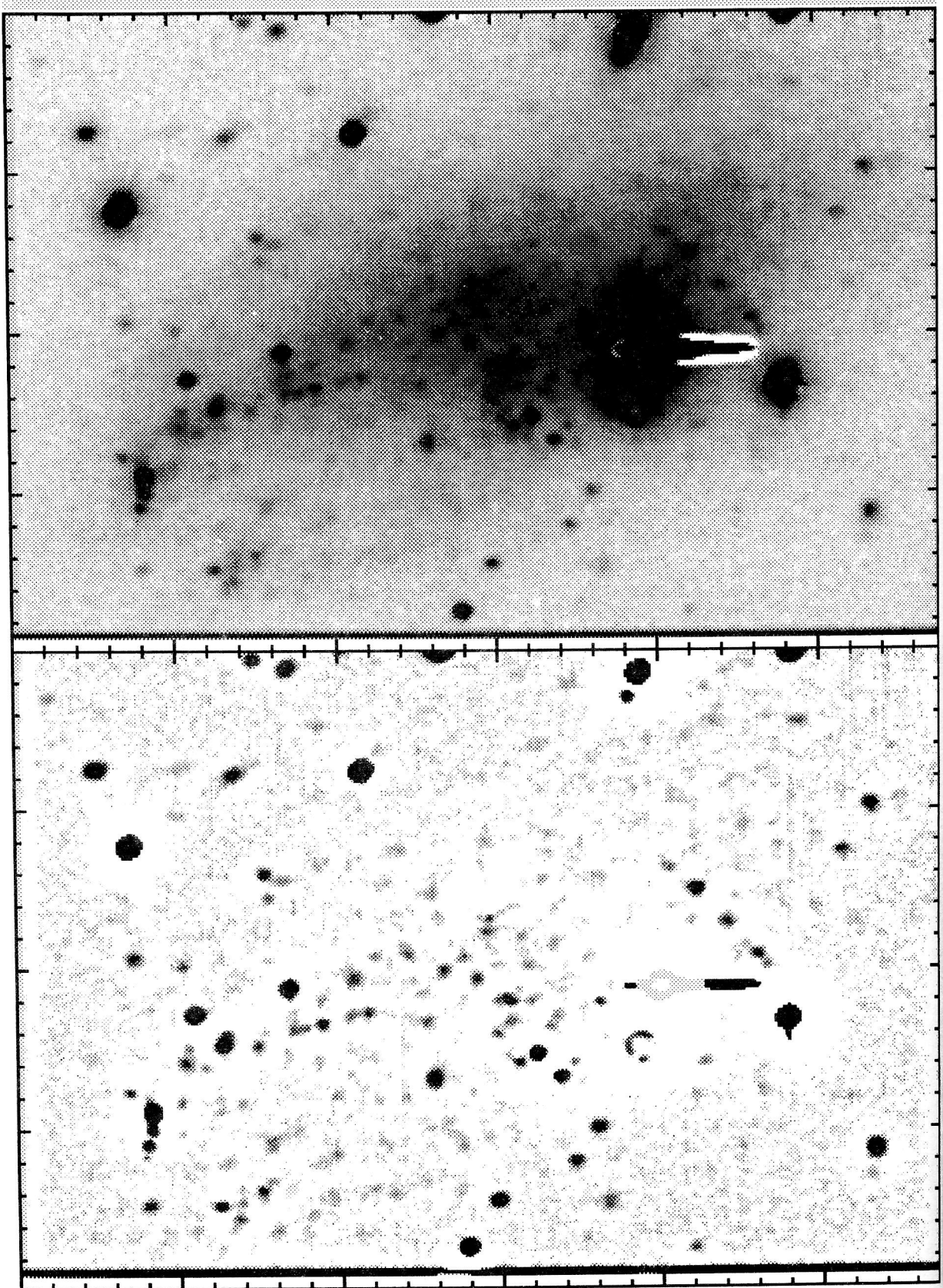


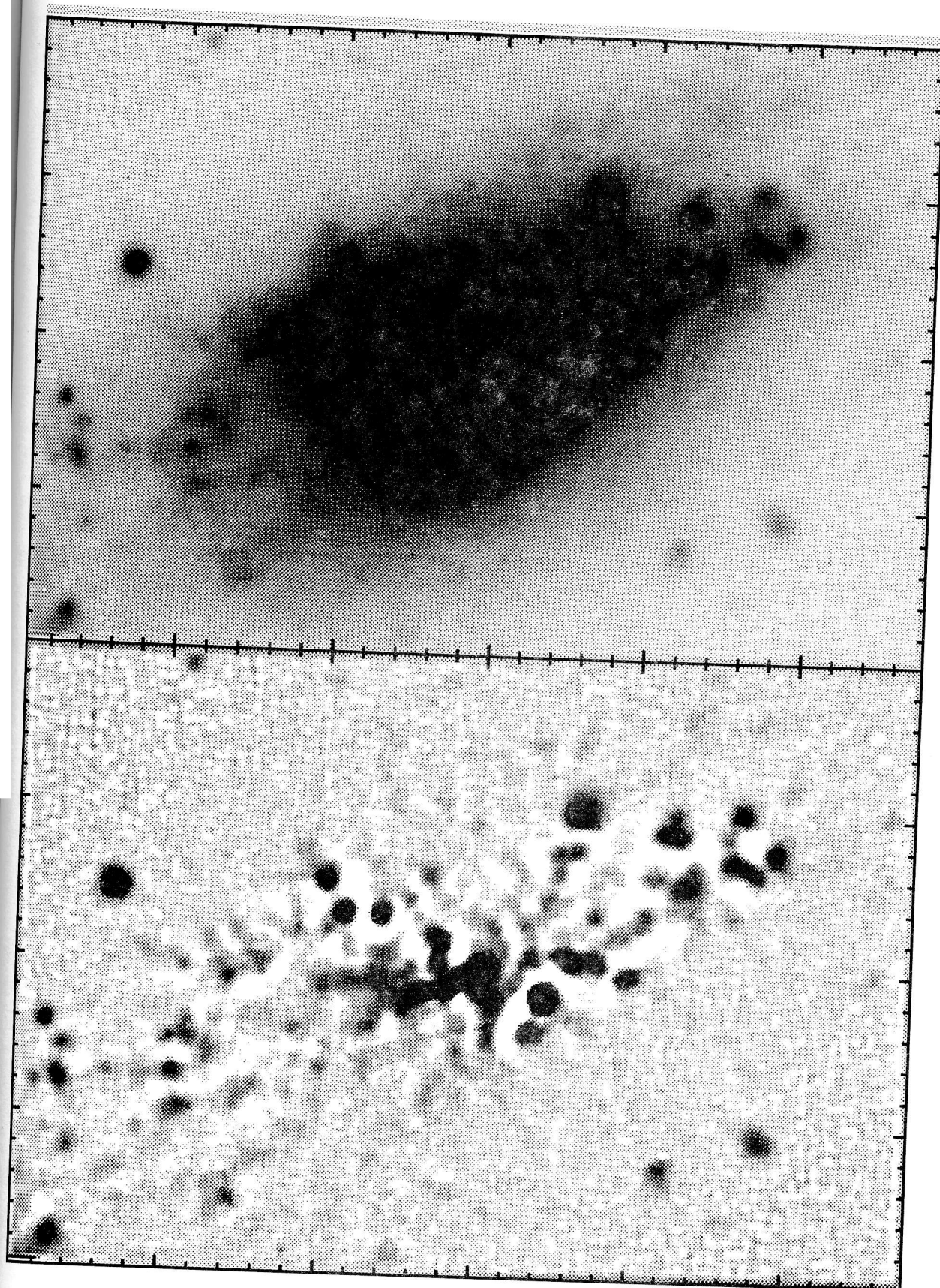




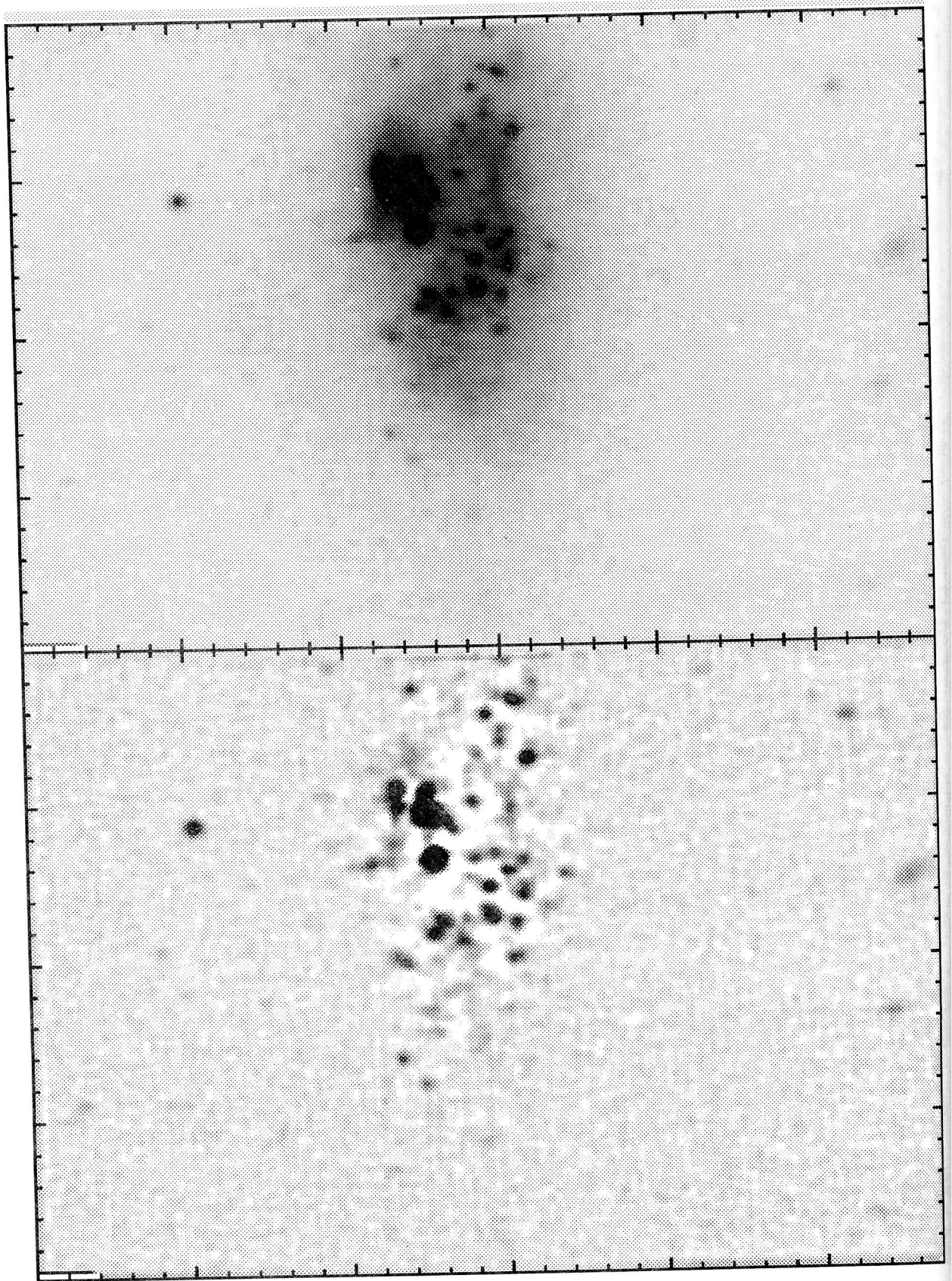


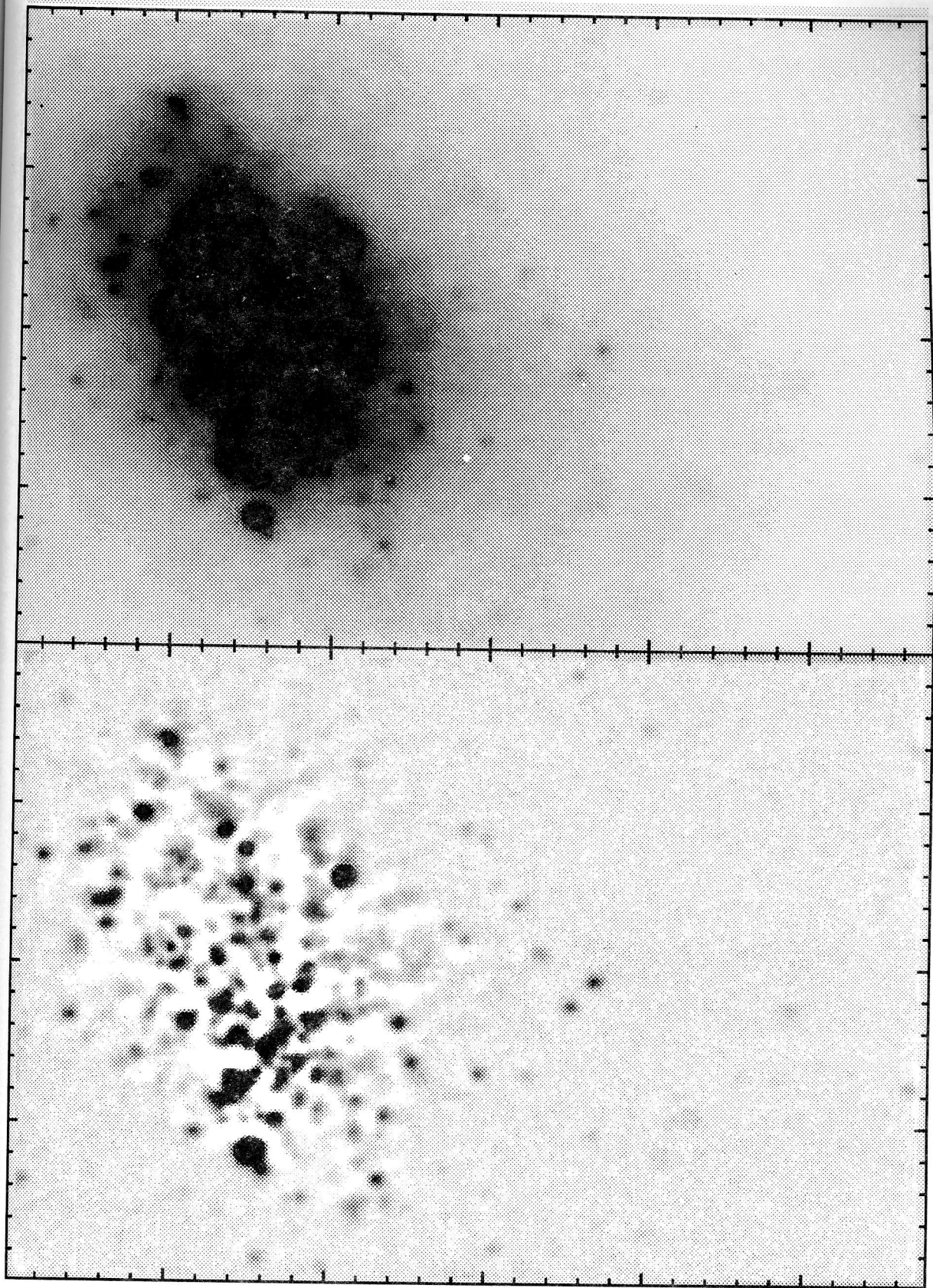




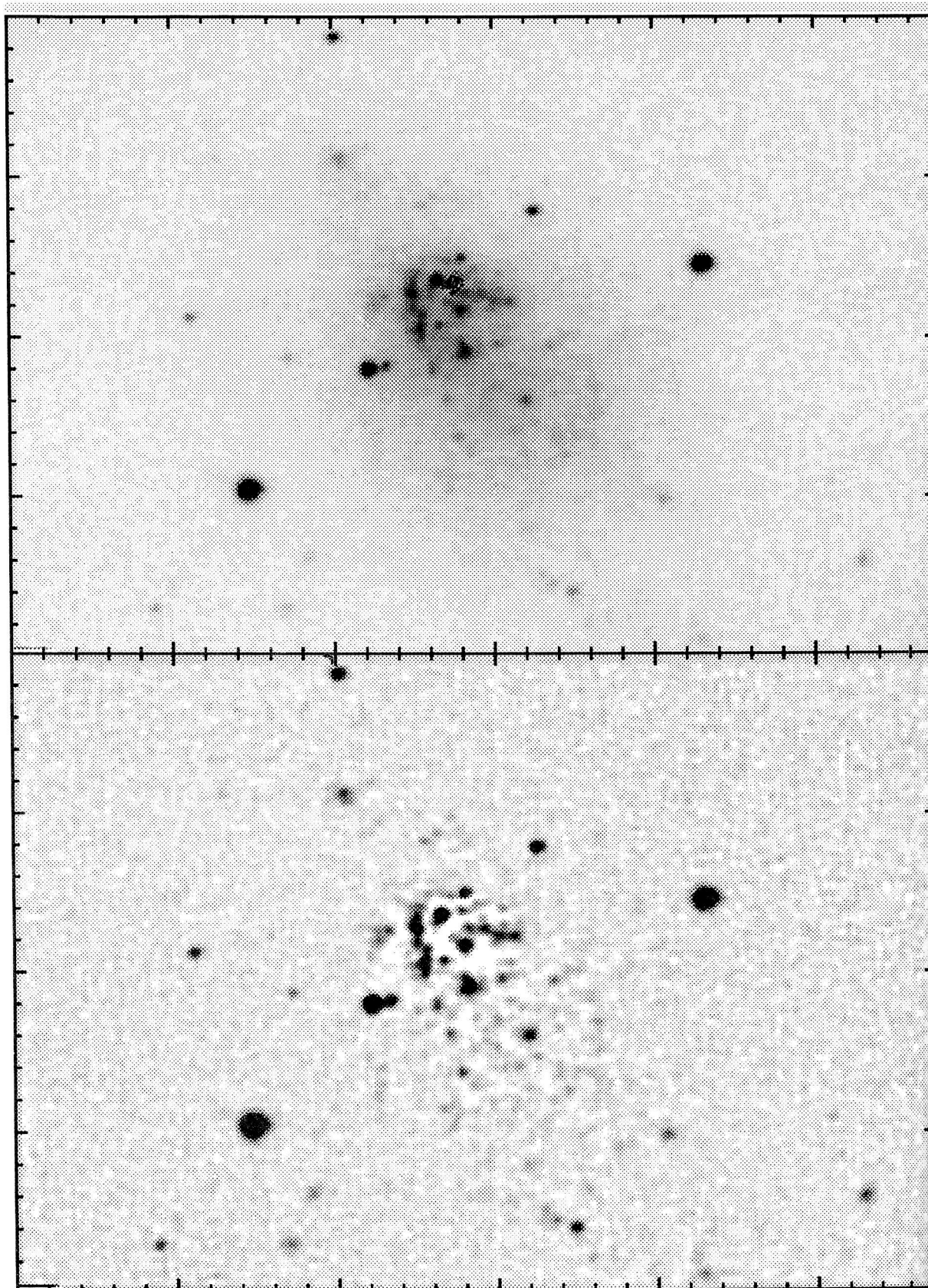


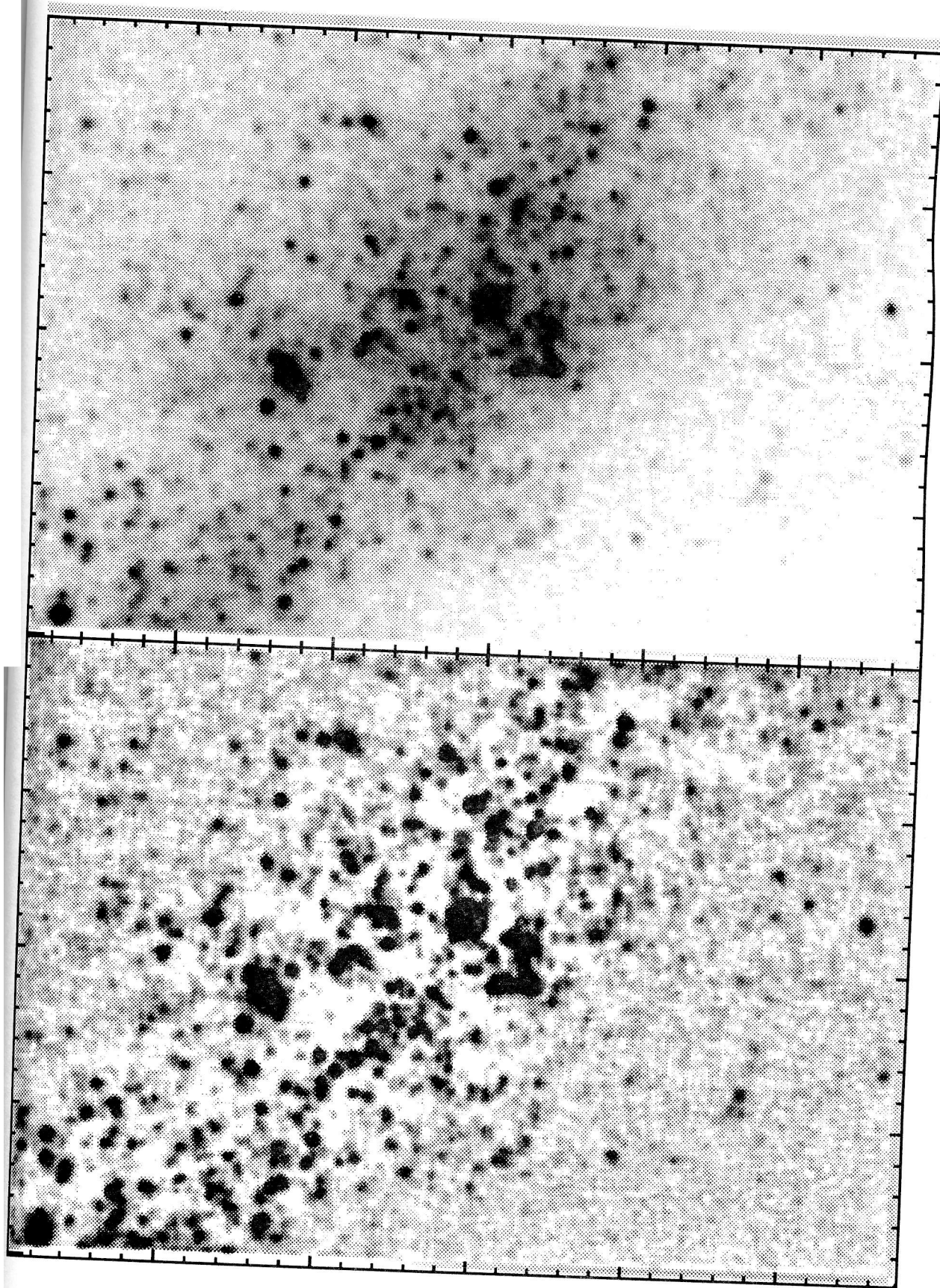




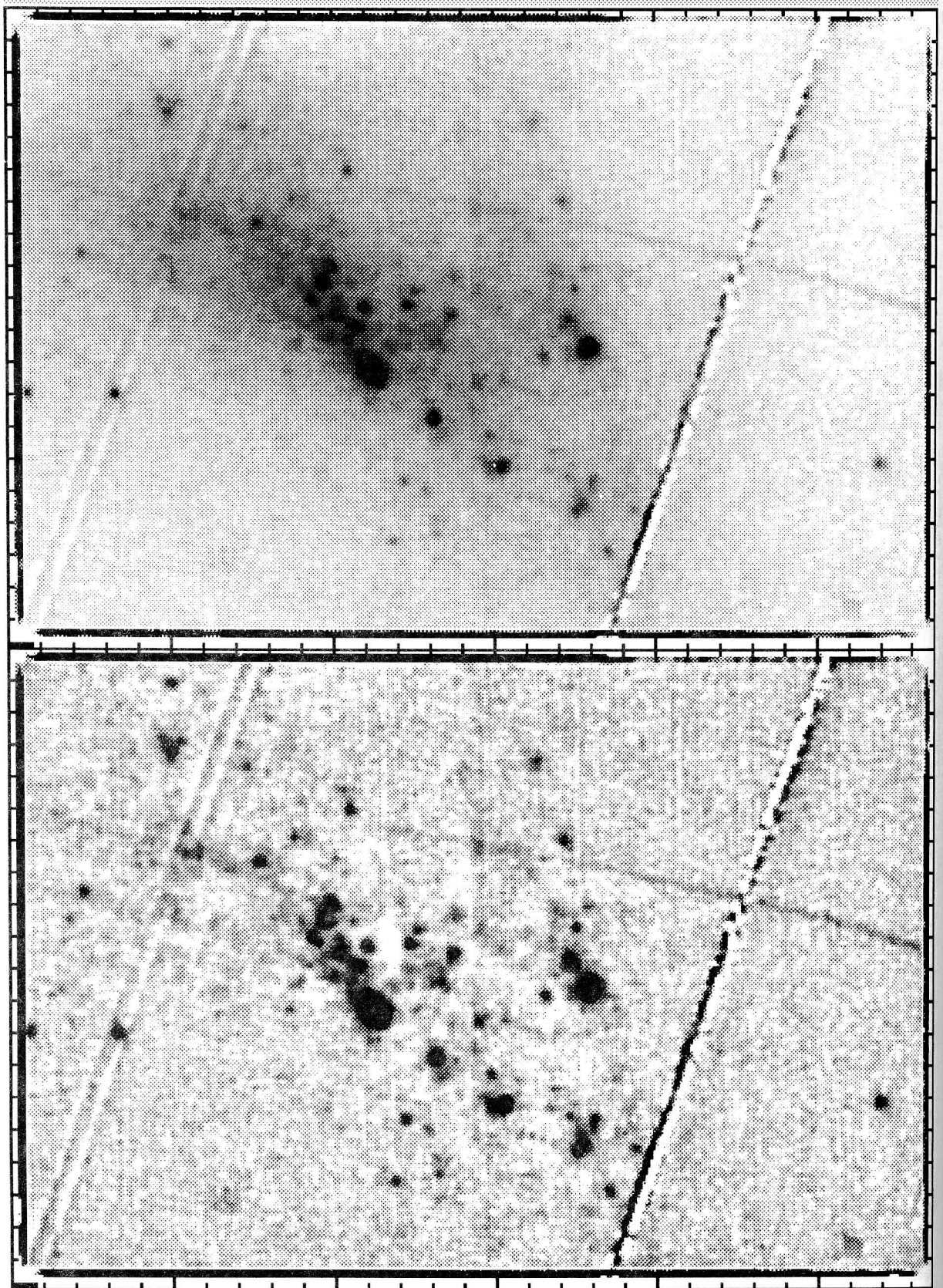












## APPENDIX 2. PHOTOMETRIC DATA

Results of the photometry of the investigated galaxies are presented in the next Table. The columns of the Table contain the number of the object, X and Y coordinates in pixels, FWHM of the object (in the aperture) and its mean square error (by different frames), B and V magnitudes, B-V and V-R colors. Different letters in the last column give classification of the objects as follows: B — blue supergiant, R — red supergiant, NUC — suspected nuclear object, D — diffuse object, S — foreground star. The numbers after the letters mean the brightness range of the object. Number 0 after B or R means that the object is too bright and it may be not a single supergiant star. The blue supergiant candidates are ranged by B magnitudes and other marked objects — by V magnitudes. The objects with initial numbers greater than 100 are measured with an aperture of 4 or 4.5 arcseconds.

U288	x	y	w	dw	B	V	B-V	V-R	type
1	275	93	6.24	0.56	23.03	23.03	-0.00	0.04	
2	302	102	5.39	0.59	23.90	23.63	0.27	-0.07	
3	374	93	6.64	0.86	23.30	23.27	0.03	-0.47	
4	396	70	5.03	0.25	23.89	23.05	0.84	-0.25	
5	326	145	5.63	0.12	21.96	21.53	0.43	-0.29	B0
6	333	153	5.42	0.35	23.40	21.69	1.72	1.02	R1
7	357	167	5.81	0.39	22.55	22.58	-0.03	-0.18	B3
8	344	176	5.44	0.15	22.40	22.78	-0.39	-0.04	B2
9	304	192	5.89	0.30	23.84	23.15	0.69	-0.07	
10	292	211	6.03	1.20	23.16	23.11	0.05	-0.03	
11	401	189	5.99	0.50	23.13	23.11	0.02	-0.05	
12	340	216	5.63	0.23	24.08	22.47	1.61	1.19	R3
13	330	242	5.71	0.34	23.62	23.12	0.50	-0.08	
14	295	264	6.17	0.31	23.83	22.62	1.20	0.74	
15	356	256	4.70	0.68	23.47	23.65	-0.18	-0.23	
16	367	256	4.93	0.40	23.10	22.83	0.27	0.50	B5
17	384	257	5.67	0.17	22.75	22.63	0.13	0.27	B4
18	448	245	6.28	0.60	23.64	23.03	0.61	0.01	
19	464	235	5.92	0.18	23.33	23.12	0.21	0.36	
20	511	271	5.85	0.33	23.33	23.06	0.27	0.06	
21	336	308	6.09	0.61	23.19	23.53	-0.35	0.72	
22	402	286	5.90	0.16	24.10	23.74	0.36	0.32	
23	181	363	5.57	0.36	22.94	21.62	1.32	1.16	
24	274	112	5.78	0.13	23.18	23.23	-0.05	0.03	
25	292	120	4.41	1.41	23.36	23.22	0.14	0.38	
26	513	339	5.51	0.31	21.41	20.05	1.36	1.04	
27	190	109	6.00	0.97	23.63	23.55	0.08	0.11	
28	310	128	6.81	0.92	23.64	23.76	-0.13	0.39	
29	351	182	3.89	1.61	21.95	22.10	-0.14	0.21	B1
30	310	34	7.22	1.28	24.24	23.56	0.68	0.20	
31	388	81	5.30	0.51	24.14	23.13	1.01	0.91	
32	385	203	4.38	1.23	23.34	23.32	0.02	-0.28	
33	497	179	5.18	0.48	25.13	23.21	1.92	0.82	R6
34	374	366	6.37	0.45	24.48	23.09	1.39	0.91	R5
35	240	327	5.63	0.67	24.20	22.43	1.77	1.10	R2
36	351	363	6.22	0.91	25.22	23.26	1.96	1.20	R7
37	217	381	5.12	0.08	25.14	23.03	2.11	1.04	R4
38	80	91	5.55	0.22	-	21.07	-	1.20	R0
39	173	26	5.39	0.39	-	24.04	-	0.99	
40	273	14	5.30	0.24	-	24.86	-	0.98	



## GEORGIEV

101	289	110	9.40	0.38	20.31	20.97	-0.66	0.03	D1
102	524	241	9.56	0.36	21.63	21.24	0.38	0.42	D2
103	109	92	9.43	0.15	21.71	21.32	0.39	0.93	D3
U2905	x	y	w	dw	B	V	B-V		type
1	214	273	5.69	0.02	23.46	23.26	0.20		
2	234	288	5.77	0.73	23.56	23.15	0.42		
3	263	302	5.75	0.45	23.08	22.70	0.38		
4	278	272	4.83	0.46	23.41	22.90	0.51		
5	281	247	5.71	0.67	22.45	21.71	0.73		
6	267	223	5.77	0.55	22.77	22.26	0.50	B3	
7	234	222	5.61	0.57	22.57	21.92	0.65	B2	
8	213	207	5.42	0.29	22.78	22.13	0.65		
9	221	174	5.34	0.74	23.24	22.87	0.38		
10	234	162	5.12	0.55	23.43	23.32	0.11		
11	241	178	6.12	0.30	22.94	22.59	0.36		
12	257	191	4.96	0.14	23.41	23.12	0.29		
13	235	264	6.06	0.91	24.24	23.86	0.38		
14	249	168	5.61	0.15	22.46	22.13	0.32	B1	
15	260	176	6.26	0.44	23.24	22.70	0.54		
16	272	152	5.67	0.57	23.02	22.57	0.45		
17	274	126	6.14	0.63	23.66	23.21	0.44		
18	266	133	6.08	0.79	24.18	23.50	0.68		
19	274	126	6.14	0.63	23.66	23.21	0.44		
20	284	114	5.33	0.18	23.90	23.60	0.30		
21	285	136	4.89	0.33	24.34	23.46	0.88		
22	272	152	5.67	0.57	23.02	22.57	0.45		
23	281	155	6.54	0.34	23.75	23.21	0.54		
24	303	159	5.42	0.66	23.85	23.28	0.57		
25	268	173	5.95	0.49	23.86	23.66	0.21		
26	266	186	5.29	0.12	24.29	23.60	0.70		
27	272	195	6.18	0.56	24.26	22.83	1.43	NUC	
28	292	183	6.20	0.93	24.01	23.46	0.55		
29	276	231	6.28	0.53	23.58	22.90	0.67		
30	225	294	5.83	0.56	25.44	23.63	1.81	R7	
31	269	203	5.30	0.30	23.49	21.69	1.80	R1	
32	342	95	4.97	0.08	25.09	22.79	2.30	R4	
33	469	192	5.87	0.92	24.93	22.55	2.38	R3	
34	129	214	5.48	0.51	24.21	22.33	1.88	R2	
35	117	222	5.02	0.65	24.95	23.34	1.61	R6	
36	259	51	5.68	1.25	24.62	23.38	1.24		
37	255	17	4.77	0.07	25.18	23.30	1.88	R5	
101	59	269	5.40	0.35	18.48	17.27	1.21	S1	
102	165	279	5.86	1.35	21.06	19.12	1.94	S2	
103	121	167	8.09	0.09	22.02	20.74	1.27	D1	
104	323	329	8.19	1.46	22.31	21.01	1.29	D2	
105	532	267	8.97	0.45	23.12	21.67	1.45	D3	
106	458	309	6.69	1.37	23.42	22.58	0.84	D4	
107	291	14	7.08	0.54	23.59	23.36	0.22	D5	
108	218	348	9.23	1.25	24.11	23.05	1.06	D6	
U3755	x	y	w	dw	B	V	B-V	V-R	type
1	444	154	6.11	0.12	21.72	21.31	0.41	0.10	
2	398	219	5.84	0.25	21.51	21.35	0.16	0.07	B5

3	327	186	6.02	0.37	21.25	21.30	-0.06	0.19	
4	318	194	6.42	0.20	20.23	19.62	0.62	-0.27	NUC
5	309	204	5.89	0.28	21.46	21.41	0.05	0.09	B4
6	294	214	6.21	0.15	20.56	20.16	0.40	-0.08	
7	371	216	6.04	0.31	23.24	22.07	1.18	0.53	
8	341	244	6.06	0.48	21.64	21.70	-0.06	0.08	
9	257	234	5.86	0.31	20.71	20.54	0.17	-0.13	B1
10	217	242	5.36	0.14	21.93	21.74	0.19	-0.40	
11	217	253	5.32	0.16	21.99	21.91	0.09	0.16	
12	172	276	5.71	0.22	22.15	21.98	0.17	-0.04	
13	196	294	5.64	0.37	22.27	22.07	0.20	0.02	
14	213	309	5.86	0.33	21.16	20.48	0.68	0.37	
15	253	286	5.50	0.06	22.98	22.08	0.90	0.76	
16	239	247	5.45	0.42	23.13	21.79	1.34	0.41	
17	289	264	5.65	0.17	22.11	21.48	0.63	0.35	
18	297	276	5.45	0.15	21.13	20.43	0.71	0.32	
19	319	289	6.20	0.39	22.63	22.27	0.36	-0.13	
20	313	330	5.22	0.14	22.51	22.29	0.22	-0.07	
21	386	295	5.23	0.47	22.93	22.40	0.53	0.15	
22	366	275	6.08	0.40	22.24	22.29	-0.05	0.03	
23	383	259	5.51	0.67	22.30	22.18	0.12	0.16	
24	416	233	5.38	0.35	22.32	22.49	-0.17	-0.13	
25	477	229	6.01	0.18	22.33	22.11	0.22	0.05	
26	436	114	5.76	0.15	22.16	21.75	0.41	0.28	
27	361	146	5.76	0.18	22.18	21.52	0.66	0.22	
28	280	177	5.47	0.47	22.45	21.78	0.68	0.29	
29	349	217	5.89	0.19	21.82	21.70	0.12	-0.03	
30	286	201	5.93	0.18	21.31	21.38	-0.06	-0.25	B2
31	75	128	5.22	0.54	20.82	19.49	1.33	0.73	
32	248	132	5.60	0.28	22.08	21.16	0.92	0.49	
33	190	54	5.61	0.56	23.15	22.24	0.92	0.78	
34	246	14	5.55	0.73	23.47	22.60	0.86	0.79	
35	479	121	5.31	1.00	21.39	21.07	0.32	0.07	B3
36	394	48	5.27	0.84	23.04	22.38	0.66	0.36	
37	500	44	5.55	0.84	23.33	21.78	1.54	0.69	R4
38	451	119	6.00	0.29	21.09	20.15	0.94	0.46	
39	365	158	5.64	0.09	21.44	20.42	1.01	0.48	
40	327	154	5.64	0.13	21.42	20.02	1.40	0.95	
41	254	242	4.84	0.97	22.12	20.90	1.22	0.82	
42	221	329	5.68	0.11	22.48	21.01	1.46	0.97	R1
43	301	297	5.77	0.27	21.66	20.12	1.54	1.02	R0
44	338	349	5.55	0.22	21.13	20.24	0.88	0.49	
45	468	243	5.41	0.10	22.77	21.21	1.56	0.86	R2
46	548	166	5.61	0.07	22.80	21.33	1.47	0.68	R3
47	466	146	5.68	0.21	19.97	19.08	0.89	0.27	
48	407	338	5.33	0.63	19.40	18.33	1.07	0.54	
49	352	314	5.43	0.57	19.56	18.72	0.83	0.33	
50	256	370	5.45	0.67	20.01	18.50	1.51	1.14	
51	18	370	5.22	0.87	19.41	18.47	0.94	0.75	
52	34	114	5.28	0.78	19.06	18.15	0.91	0.48	
101	156	57	7.28	0.66	18.52	17.68	0.84	0.30	S3
102	269	193	6.84	1.15	18.83	17.94	0.89	0.32	S4

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	103	237	307	6.14	1.13	18.17	17.43	0.74	0.28	S1
	104	481	167	6.63	1.16	18.64	17.55	1.09	0.45	S2
U3860	x	y	w	dw	B	V	B-V	type		
1	450	94	5.71	0.02	22.37	21.96	0.41			
2	247	192	6.57	0.01	23.27	23.05	0.22			
3	278	179	5.74	0.33	21.98	21.73	0.25			B3
4	399	268	6.05	0.08	23.84	23.52	0.32			
5	287	264	5.28	0.36	23.31	23.45	-0.13			B2
6	335	266	5.18	0.01	21.97	21.99	-0.03			
7	197	231	5.97	0.02	23.54	23.17	0.36			
8	199	292	6.05	0.13	21.86	21.64	0.23			
9	175	286	5.66	0.09	23.81	23.09	0.72			
10	200	264	5.42	0.45	23.41	23.18	0.23			
11	398	257	5.41	0.09	23.09	23.13	-0.04			
12	422	238	5.29	0.10	23.39	23.47	-0.08			
13	229	284	5.62	0.26	22.93	22.36	0.57			
14	212	287	5.87	0.18	23.27	23.09	0.18			
15	190	260	5.74	0.03	22.80	22.81	-0.01			
16	226	234	6.24	0.29	22.63	22.55	0.08			NUC
17	259	209	5.63	0.03	22.57	22.03	0.55			
18	342	73	5.64	0.14	23.94	23.37	0.57			
19	220	169	5.30	0.38	22.95	22.80	0.15			
20	205	126	6.29	0.05	22.80	22.87	-0.07			
21	194	120	5.84	0.04	22.88	22.75	0.13			B4
22	197	103	5.87	0.10	22.07	21.93	0.14			
23	186	99	5.70	0.17	23.48	23.08	0.40			
24	197	61	5.47	0.10	22.84	22.88	-0.05			
25	228	55	5.81	0.03	22.89	22.45	0.44			
26	243	35	6.11	0.45	23.35	23.34	0.01			
27	266	21	5.85	0.12	23.12	22.96	0.15			
28	193	284	6.42	0.60	23.00	23.03	-0.02			
29	268	196	5.42	0.15	23.70	22.82	0.87			
30	272	155	6.52	0.40	23.81	23.61	0.21			B1
31	286	356	5.40	0.11	21.82	21.75	0.06			B6
32	292	359	6.37	0.38	22.05	22.07	-0.02			
33	264	323	5.19	0.43	23.54	23.53	0.01			
34	287	264	5.28	0.36	23.31	23.45	-0.13			
35	255	267	5.08	0.21	24.25	23.57	0.67			
36	298	218	4.80	0.01	23.66	23.39	0.27			
37	308	199	5.43	0.05	23.71	23.13	0.59			
38	220	181	5.36	0.55	23.16	23.35	-0.19			R1
39	257	169	5.26	0.19	24.38	22.53	1.86			
40	297	22	4.67	0.22	25.09	23.58	1.51			
41	197	61	5.47	0.10	22.84	22.88	-0.05			
43	155	56	6.24	0.57	23.36	23.09	0.26			
44	272	262	5.52	0.43	24.39	22.95	1.44			
45	212	165	4.13	1.71	24.97	22.76	2.21			
101	44	163	6.12	0.36	17.15	17.03	0.12			S1
102	42	296	5.71	1.06	18.59	17.93	0.65			S2
103	512	53	5.60	0.68	20.46	19.13	1.33			S3
104	513	131	8.99	0.45	22.45	21.60	0.86			D6
105	434	157	6.92	0.55	22.66	21.91	0.75			D7



106	413	254	6.87	0.35	20.39	20.26	0.13	D2
107	372	285	9.78	0.75	20.35	19.80	0.55	D1
108	239	333	8.38	0.17	20.54	20.30	0.24	D3
109	168	327	8.09	0.35	22.04	22.04	0.00	D9
110	109	222	9.47	0.01	21.93	21.58	0.35	D5
111	142	163	9.31	0.29	22.20	21.40	0.80	D4
112	31	98	7.41	0.31	23.05	21.96	1.09	D8
U3966	x	y	w	dw	B	V	B-V	type
1	379	161	6.42	0.24	21.75	20.80	0.96	S3
2	401	169	7.21	0.05	22.79	22.54	0.25	
3	403	119	6.56	0.34	23.54	23.45	0.08	
4	386	209	7.78	0.09	22.73	22.48	0.25	
5	459	96	6.93	0.08	23.02	23.10	-0.09	
6	471	110	6.78	0.43	23.22	23.17	0.05	
7	512	153	6.73	0.09	23.60	23.25	0.35	
8	485	253	7.49	0.39	23.45	22.84	0.62	
9	497	277	7.22	0.07	23.51	22.65	0.86	
10	491	287	6.59	0.07	22.93	23.23	-0.30	
11	471	301	7.07	0.15	22.39	22.49	-0.10	B2
12	430	258	6.83	0.18	22.79	22.57	0.21	
13	424	290	6.48	0.08	22.73	22.76	-0.03	
14	432	290	6.95	0.24	23.60	22.59	1.00	
15	482	378	7.32	0.61	23.95	23.59	0.36	
16	450	334	7.37	0.30	23.56	22.79	0.77	
17	387	355	7.44	0.47	23.27	23.64	-0.37	
18	375	347	7.23	0.27	23.64	23.71	-0.07	
19	372	355	6.88	0.02	23.11	23.23	-0.11	
20	351	346	7.47	0.15	23.38	23.39	-0.01	
21	235	314	8.01	0.56	23.84	23.73	0.11	
22	241	215	7.21	0.07	23.32	23.34	-0.02	
23	217	190	6.97	0.35	22.97	22.84	0.12	
24	256	158	7.15	0.06	22.81	22.93	-0.12	
25	243	101	6.60	0.24	22.74	22.61	0.14	B4
26	251	72	7.26	0.11	23.13	23.09	0.04	
27	250	38	7.99	0.25	23.64	23.15	0.49	
28	223	27	8.15	0.30	24.71	23.36	1.34	
29	193	136	6.97	0.20	22.70	22.81	-0.11	B3
30	181	125	7.95	0.17	23.38	23.20	0.17	
31	177	72	7.29	0.28	23.58	23.24	0.34	
32	314	181	7.02	0.56	23.66	23.25	0.41	
33	350	246	6.87	0.05	24.03	22.92	1.11	
34	259	365	7.54	0.14	24.19	23.43	0.76	
35	368	385	6.00	1.05	23.74	23.54	0.20	
36	183	246	6.77	0.53	24.07	23.63	0.44	
37	296	218	6.89	0.47	23.73	23.60	0.13	
38	297	208	7.01	0.59	24.06	23.28	0.78	
39	453	230	6.80	0.10	23.85	22.69	1.16	
40	474	243	7.06	0.22	24.18	23.28	0.89	
41	390	304	6.77	0.29	22.49	20.80	1.69	R1
42	210	103	7.13	0.03	21.59	21.40	0.19	B1
43	41	190	7.13	0.04	23.12	22.99	0.13	
101	389	285	6.47	0.39	17.74	16.90	0.85	S1

102	91	45	6.67	0.29	19.75	18.29	1.46		S2
103	216	85	9.78	0.38	20.15	19.61	0.54		D1
104	227	104	7.56	0.16	22.65	22.63	0.02		D3
105	99	244	7.06	0.51	22.85	22.52	0.33		D4
106	365	304	7.21	0.02	22.45	21.00	1.45		D2
U3974	x	y	w	dw	B	V	B-V	V-R	type
1	546	28	5.60	0.26	21.16	21.32	-0.16	0.18	B1
2	521	140	6.08	0.64	20.23	19.92	0.31	0.32	B02
3	519	167	5.31	0.49	21.79	20.18	1.61	1.06	R0
4	569	218	5.68	0.11	21.13	20.37	0.77	0.68	
5	486	309	5.77	0.51	22.69	21.79	0.90	0.85	
6	468	335	5.66	0.13	21.63	21.93	-0.30	-0.06	B3
7	426	241	5.71	0.14	22.52	21.96	0.56	0.42	
8	399	299	5.51	0.20	23.12	21.97	1.15	0.29	
9	347	337	5.78	0.28	21.45	21.03	0.42	0.42	B03
10	241	345	5.68	0.15	21.97	22.13	-0.16	-0.09	B5
11	198	334	5.85	0.38	20.94	20.20	0.74	0.34	
12	144	345	5.78	0.36	21.36	21.63	-0.27	-0.04	B2
13	180	322	5.92	0.44	20.94	19.91	1.03	0.83	
14	177	294	5.44	0.33	21.55	20.37	1.18	0.80	
15	141	281	5.75	0.24	22.71	21.55	1.17	1.09	
16	224	266	5.69	0.51	19.88	19.70	0.19	0.33	B01
17	278	220	5.64	0.28	20.83	20.17	0.66	0.40	NUC
18	348	97	5.71	0.23	22.82	21.49	1.33	0.89	
19	278	111	5.77	0.51	22.16	20.54	1.62	1.15	R1
20	246	107	6.05	0.31	22.22	21.72	0.50	0.62	
21	55	61	5.83	0.10	21.74	21.70	0.05	-0.06	B4
22	10	21	5.63	0.33	22.62	21.12	1.50	0.78	R2
23	27	230	5.70	0.56	22.55	21.30	1.25	1.01	
24	83	283	5.63	0.71	24.11	23.20	0.91	0.39	
25	106	322	5.37	0.11	23.24	22.72	0.52	1.03	
26	172	312	5.50	0.33	23.22	22.45	0.77	1.20	
27	176	358	5.76	0.10	22.65	22.94	-0.29	-0.43	
28	487	334	5.98	0.16	23.09	23.05	0.04	-0.17	
29	497	347	5.47	0.44	24.01	23.33	0.69	0.54	
30	475	304	5.35	0.59	23.00	22.88	0.12	-0.33	
31	485	159	5.07	0.40	23.86	22.98	0.88	1.14	
32	298	217	4.20	0.87	23.96	22.75	1.20	0.76	
33	304	232	6.33	0.23	22.65	22.59	0.06	-0.19	
34	273	239	5.89	0.14	22.53	22.50	0.04	-0.03	
35	221	207	6.00	0.94	22.69	22.66	0.03	0.57	
36	224	112	5.88	0.72	22.52	22.69	-0.17	-0.27	
37	135	86	5.46	0.61	22.95	23.04	-0.09	-0.04	
38	48	93	5.50	0.30	23.05	23.31	-0.25	0.14	
39	284	19	5.52	0.34	24.08	23.08	1.00	1.00	
40	459	53	5.16	0.27	23.94	23.22	0.71	1.20	
41	186	134	5.25	0.39	23.07	23.39	-0.32	0.52	
42	207	137	4.80	0.36	24.03	22.82	1.21	0.34	
101	194	85	9.35	0.34	20.75	20.69	0.06	0.19	D1
102	235	124	8.72	0.09	20.35	20.22	0.13	-0.33	D2
103	284	144	8.58	0.39	21.72	21.19	0.53	0.34	D3
104	104	233	7.44	0.46	21.73	20.66	1.07	0.55	D4



105	175	261	9.10	0.72	22.45	21.93	0.52	0.56	D5
U4115	x	y	w	dw	B	V	B-V	V-R	type
1	63	76	5.86	0.11	23.12	21.63	1.49	0.83	R3
2	14	271	4.89	0.52	19.98	18.94	1.03	0.47	
3	203	191	5.44	0.32	22.18	20.68	1.50	1.02	R0
4	149	218	5.52	0.35	22.61	20.99	1.62	1.24	R1
5	169	234	6.07	0.21	21.19	21.00	0.19	-0.11	B02
6	149	249	6.15	0.33	22.08	22.05	0.03	-0.16	
7	133	283	6.15	0.07	20.17	19.91	0.26	0.16	B01
8	302	229	5.72	0.23	22.62	21.75	0.88	0.11	
9	337	174	5.76	0.97	22.32	22.30	0.02	-0.11	
10	306	152	5.87	0.39	22.02	22.05	-0.02	-0.01	
11	362	204	5.53	0.12	20.98	20.48	0.50	0.18	
12	354	298	5.63	0.34	22.14	21.29	0.85	0.37	
13	340	331	5.46	0.29	20.46	19.82	0.64	0.38	
14	208	319	5.39	0.45	21.95	22.03	-0.08	0.16	
15	526	45	5.62	0.45	22.78	22.31	0.47	0.05	
16	463	101	6.05	0.15	22.28	22.09	0.19	-0.52	
17	443	84	5.89	0.59	21.55	21.05	0.50	0.13	
18	539	13	5.82	0.15	22.47	21.76	0.71	0.40	
19	353	211	5.95	0.45	21.23	21.43	-0.20	-0.11	B3
20	227	210	5.57	0.50	21.46	21.27	0.18	-0.07	B5
21	134	302	5.49	0.57	21.23	21.24	-0.01	-0.08	B2
22	197	337	5.70	0.17	21.99	22.05	-0.06	-0.23	
23	296	161	5.26	0.24	23.16	22.43	0.73	0.14	
24	186	332	4.02	1.65	24.36	22.39	1.97	0.16	
25	526	45	5.62	0.45	22.78	22.31	0.47	0.37	
26	424	74	6.02	0.12	22.77	22.35	0.42	-0.60	
27	379	215	5.57	0.40	21.57	21.05	0.52	0.17	
28	292	197	5.64	0.47	21.96	21.95	0.01	-0.22	
29	241	179	6.61	0.56	22.56	22.44	0.11	-0.36	
30	135	293	5.97	0.80	21.12	20.91	0.21	-0.03	B1
31	118	273	5.51	0.46	21.43	21.49	-0.06	-0.15	B4
32	176	124	5.33	0.54	24.09	22.30	1.79	0.63	
33	318	165	5.92	0.39	22.21	21.84	0.37	0.09	
34	141	340	5.67	0.28	22.02	22.22	-0.19	0.04	
35	150	274	5.52	0.23	22.11	22.17	-0.06	-0.98	
36	254	198	5.60	0.68	22.50	22.06	0.44	-0.07	
37	273	157	5.48	0.07	22.81	22.40	0.40	-0.03	
38	280	117	5.64	0.33	22.46	22.74	-0.28	-0.45	
39	324	122	5.43	0.07	22.63	22.64	-0.01	-0.09	
40	394	216	5.44	0.29	22.39	22.47	-0.08	-0.38	
101	430	147	-	-	14.46	13.79	0.67	-	S1
102	512	155	-	-	16.61	16.00	0.61	-	S2
103	91	121	-	-	17.09	16.47	0.62	-	S3
104	530	348	-	-	18.50	17.85	0.65	-	S4
105	223	49	-	-	18.93	18.16	0.77	-	S5
U5721	x	y	w	dw	B	V	B-V		type
1	489	123	6.31	0.70	21.68	21.17	0.50		
2	476	135	6.71	0.25	22.36	21.69	0.66		
3	467	99	6.87	0.25	21.63	21.47	0.16		B5
4	421	112	6.59	0.33	21.70	21.24	0.46		

5	417	140	5.77	0.33	22.77	22.35	0.42	
6	362	124	7.56	0.19	22.42	21.87	0.55	
7	350	126	6.89	0.44	22.16	22.08	0.08	
8	352	137	6.16	0.26	22.04	22.08	-0.04	
9	374	165	6.64	0.24	22.68	21.86	0.83	
10	275	199	7.82	0.11	21.52	21.63	-0.11	
11	329	171	5.69	0.04	22.50	22.29	0.21	
12	310	178	6.25	1.08	22.77	22.14	0.63	
13	255	159	6.40	0.20	22.16	22.08	0.08	
14	306	245	6.54	0.49	21.89	21.55	0.34	
15	203	216	6.83	0.39	22.31	22.36	-0.05	
16	231	239	6.29	0.29	21.87	22.06	-0.19	
17	289	253	6.02	0.99	22.11	22.40	-0.29	
18	201	267	6.10	0.37	23.23	22.14	1.09	
19	184	241	6.32	0.35	22.29	22.48	-0.19	
20	141	208	5.89	0.23	22.34	21.94	0.40	
21	107	272	5.99	0.35	22.12	21.47	0.65	
22	111	293	6.46	0.33	21.73	22.06	-0.33	
23	143	351	6.63	0.29	21.88	21.93	-0.05	
24	30	378	6.79	0.08	21.17	21.09	0.09	B01
25	19	280	5.45	0.21	22.88	22.23	0.65	
26	34	277	6.86	0.15	21.20	21.29	-0.08	B02
27	36	257	5.67	0.24	22.32	21.79	0.53	
28	26	241	6.20	0.23	21.37	20.78	0.59	
29	39	320	6.36	0.39	22.51	22.38	0.13	
30	203	147	6.91	0.10	21.08	20.63	0.45	
31	213	167	7.01	0.45	21.05	20.05	1.00	
32	238	167	6.85	0.27	20.92	20.02	0.89	
33	275	184	7.12	0.11	20.55	20.38	0.17	B0
34	376	195	6.62	0.39	21.66	21.35	0.31	B3
35	395	204	6.59	0.25	21.46	21.29	0.17	B2
36	333	240	6.00	0.03	21.23	20.47	0.76	
37	310	222	7.15	0.87	21.74	21.52	0.22	
38	263	217	7.09	0.34	20.84	21.10	-0.26	B1
39	279	214	7.50	0.27	20.83	20.82	0.01	
41	70	156	5.91	0.61	19.95	19.16	0.79	
42	343	218	6.77	0.19	19.47	18.54	0.92	
41	68	155	8.99	0.85	20.12	18.84	1.27	S1
42	343	218	10.68	0.66	19.07	18.04	1.03	S2
100	295	206	12.29	0.47	19.73	18.96	0.76	NUC
101	363	99	12.42	0.19	19.96	19.45	0.51	D1
102	433	145	13.96	0.09	20.78	20.49	0.29	D2
103	484	308	10.98	2.24	22.48	20.98	1.50	D3
U6541	x	y	w	dw	B	V	B-V	
1	31	289	6.15	0.05	23.19	22.86	0.33	
2	83	192	5.66	0.04	23.28	21.85	1.43	
3	290	43	5.44	0.15	21.29	21.30	-0.00	
4	299	53	5.61	0.25	22.26	21.06	1.20	
5	315	72	5.53	0.00	20.51	20.57	-0.05	B2
6	281	99	5.84	0.00	21.49	21.10	0.40	
7	233	103	6.39	0.42	21.09	20.33	0.76	
8	292	172	6.12	0.15	20.69	20.69	0.00	



9	255	183	5.92	0.28	21.49	21.06	0.42	
10	248	278	5.56	0.13	22.39	21.82	0.57	
11	338	145	5.87	0.14	21.99	21.55	0.44	
12	298	32	4.87	0.05	22.33	22.57	-0.25	
13	276	18	5.59	0.03	23.51	21.86	1.65	R2
14	243	27	5.55	0.14	21.77	21.90	-0.13	
15	262	44	5.63	0.10	23.09	21.87	1.22	
16	284	68	6.04	0.12	22.08	21.39	0.69	
17	298	61	5.65	0.12	21.91	21.66	0.25	
18	280	135	6.15	0.05	21.81	21.41	0.40	
19	296	136	5.49	1.65	22.88	21.38	1.50	R1
20	312	136	5.82	0.13	21.73	21.63	0.10	
21	304	111	7.40	0.02	22.55	21.76	0.79	
22	291	153	5.62	0.09	20.82	20.70	0.12	B3
23	312	159	5.62	0.11	21.56	21.43	0.13	
24	307	175	5.77	0.29	21.40	21.35	0.06	
25	305	198	6.18	0.10	21.77	21.60	0.18	
26	272	186	6.39	0.11	21.83	21.66	0.18	
27	275	173	5.71	0.07	21.92	21.48	0.43	
28	261	175	6.38	0.10	21.03	20.77	0.26	
29	228	173	5.96	0.20	23.50	22.05	1.45	
30	237	201	6.19	0.01	21.74	21.49	0.26	
31	263	221	6.12	0.24	23.08	21.87	1.21	
32	234	262	5.74	0.01	21.86	22.10	-0.24	
33	226	332	5.97	0.04	23.52	22.31	1.21	
34	216	138	6.10	0.06	21.78	22.13	-0.36	
35	280	196	4.90	0.99	23.89	22.30	1.59	
36	319	23	5.66	0.25	22.56	22.56	0.00	
37	317	32	3.64	1.38	23.81	22.28	1.53	
38	307	34	6.01	0.15	21.14	21.02	0.12	B5
39	301	231	5.65	0.12	22.93	22.55	0.38	
40	256	245	5.22	0.62	22.36	22.72	-0.36	
41	105	113	5.58	0.29	20.72	20.80	-0.08	B4
42	251	103	5.28	0.10	17.80	17.79	0.01	NUC
43	250	94	4.51	0.14	19.95	19.91	0.04	B1
44	231	91	6.22	0.04	21.02	20.22	0.80	
45	255	135	6.23	0.15	18.17	17.40	0.77	S1
101	305	198	8.12	0.05	21.52	21.09	0.43	D1
102	519	47	8.20	0.30	22.02	21.09	0.93	D2
103	546	235	8.60	0.68	22.61	21.40	1.21	D3
104	287	316	9.36	0.39	23.05	21.98	1.07	D4
U6565	x	y	w	dw	B	V	B-V	type
1	209	144	5.41	0.12	18.19	17.94	0.24	B0
2	169	217	5.92	0.05	19.30	18.83	0.47	
3	162	251	5.64	0.00	18.56	18.40	0.16	
4	148	273	6.24	0.18	19.04	18.80	0.23	
5	145	244	5.75	0.11	19.37	19.06	0.31	
6	112	236	5.70	0.17	19.41	19.24	0.17	
7	136	115	5.17	0.00	19.50	18.88	0.62	
8	85	105	5.53	0.00	19.53	19.00	0.54	
9	133	76	5.17	0.00	21.16	20.75	0.41	
10	66	111	5.34	0.30	21.19	20.90	0.29	

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11	50	129	5.22	0.30	20.71	20.39	0.32	B8
12	23	133	5.49	0.08	20.59	20.35	0.23	
13	68	144	5.33	0.04	21.04	20.27	0.76	
14	67	158	5.75	0.00	20.57	20.26	0.32	
15	59	160	6.03	0.06	20.45	19.99	0.45	
16	63	176	5.49	0.15	20.45	19.85	0.60	
17	101	140	5.74	0.26	21.29	21.05	0.24	
18	111	147	4.57	0.47	21.15	21.01	0.14	
19	116	140	5.15	0.10	21.56	21.32	0.24	
20	148	127	5.53	0.00	19.58	19.40	0.18	
21	150	149	5.56	0.19	19.96	19.78	0.18	
22	167	152	5.68	0.03	20.50	19.94	0.56	
23	146	171	5.29	0.12	20.51	20.62	-0.11	B7
24	128	177	5.93	0.13	21.39	21.07	0.32	
25	111	181	5.47	0.06	20.08	19.62	0.46	
26	104	191	4.58	0.07	20.64	20.20	0.44	
27	102	217	5.85	0.08	21.16	20.81	0.35	
28	122	211	6.06	0.02	20.44	20.37	0.07	
29	132	196	5.23	0.18	19.55	19.48	0.07	B2
30	146	184	5.86	0.11	20.34	20.18	0.16	
31	162	181	6.67	0.19	20.58	20.40	0.18	
32	167	196	4.93	0.12	19.74	19.37	0.37	B3
33	188	188	5.89	0.34	20.94	20.75	0.19	
34	189	201	5.20	0.28	20.35	20.11	0.25	B6
35	184	214	5.46	0.16	19.50	19.49	0.01	
36	171	231	5.23	0.18	20.12	20.07	0.05	
37	155	231	5.11	0.06	19.54	19.28	0.26	B1
38	133	226	6.08	0.00	19.68	19.53	0.16	
39	147	214	5.82	0.15	20.86	20.41	0.46	
40	83	256	5.62	0.45	21.21	21.42	-0.21	
41	141	283	5.41	0.12	19.56	19.42	0.14	
42	143	271	6.86	0.00	19.11	19.38	-0.27	
43	156	269	6.52	0.44	19.72	19.69	0.03	
44	170	247	3.07	0.81	20.79	20.12	0.68	
45	186	246	5.35	0.06	20.14	20.42	-0.28	B5
46	189	235	6.38	0.20	19.88	19.83	0.05	
47	212	231	6.14	0.15	21.03	20.72	0.31	
48	223	228	5.60	0.02	21.50	21.16	0.34	
49	222	211	5.29	0.35	21.27	20.94	0.33	
50	245	236	5.48	0.05	20.30	19.93	0.37	
51	253	260	5.59	0.30	20.75	20.41	0.34	
52	237	293	5.32	0.07	20.96	20.22	0.74	
53	219	285	5.48	0.07	21.18	20.86	0.32	
54	160	327	3.08	0.83	20.50	19.97	0.53	
55	184	346	5.11	0.14	21.88	20.71	1.17	
56	150	298	4.93	0.14	20.90	20.41	0.49	
57	159	295	4.98	0.22	21.29	20.73	0.56	
58	168	297	5.41	0.00	19.63	19.39	0.24	
59	184	282	5.82	0.30	21.12	21.13	-0.01	
60	194	270	5.29	0.12	19.94	19.77	0.17	B4
61	183	259	5.86	0.22	19.80	19.88	-0.09	
62	202	256	5.63	0.46	21.14	20.27	0.87	



63	151	250	5.59	0.20	20.21	19.91	0.29	
64	232	333	5.64	0.11	20.88	20.26	0.62	
65	295	267	5.34	0.05	21.31	20.91	0.40	
66	353	224	5.47	0.06	21.31	20.47	0.84	
67	368	209	5.38	0.21	20.86	20.17	0.69	
68	334	191	5.49	0.37	21.96	21.32	0.65	
69	320	161	5.22	0.22	21.58	21.38	0.20	
70	286	182	5.09	0.15	21.80	21.41	0.39	
71	277	174	5.20	0.33	21.84	21.31	0.53	
72	41	233	5.54	0.01	21.00	20.56	0.44	
73	11	336	5.27	0.02	21.67	21.00	0.68	
74	117	305	5.80	0.27	21.09	21.06	0.03	
75	148	216	5.77	0.24	21.19	20.35	0.83	
101	101	59	9.09	0.35	19.76	19.43	0.32	
102	45	189	9.79	0.68	21.02	19.96	1.06	
103	493	225	6.46	0.64	22.78	21.10	1.67	
104	400	48	6.95	0.18	22.60	21.23	1.37	
105	356	15	6.39	0.21	22.51	21.49	1.02	
106	566	273	7.52	0.03	22.37	20.65	1.73	
U6572	x	y	w	dw	B	V	B-V	type
1	529	341	5.66	0.20	21.78	20.56	1.22	
2	407	302	5.73	0.02	21.91	22.07	-0.16	
3	349	359	5.02	0.03	21.15	21.00	0.15	B7
4	89	370	5.27	0.25	21.54	20.93	0.62	
5	112	187	4.72	0.07	20.96	20.95	0.01	B4
6	202	13	4.65	0.00	20.20	18.82	1.38	S1
7	325	121	4.58	0.07	20.08	20.09	-0.01	B1
8	280	150	4.72	0.07	20.46	20.65	-0.19	B2
9	265	164	4.68	0.03	19.39	19.62	-0.23	B0
10	280	183	5.64	0.11	20.35	20.41	-0.06	
11	283	209	5.46	0.29	20.48	20.23	0.25	NUC
12	320	239	5.11	0.06	21.04	20.82	0.22	B6
13	222	220	4.72	0.20	18.65	18.03	0.62	
14	233	218	4.97	0.21	20.56	20.83	-0.27	B3
15	172	213	5.08	0.04	21.81	21.97	-0.16	
16	255	118	4.96	0.04	22.17	22.15	0.02	
17	278	161	4.73	0.08	21.25	20.81	0.44	
18	251	173	5.65	0.12	20.56	20.37	0.19	
19	255	194	6.38	0.20	20.64	20.90	-0.26	
20	262	221	5.61	0.44	21.34	21.39	-0.05	
21	271	238	5.04	0.25	21.69	21.55	0.14	
22	278	263	5.04	0.13	21.37	21.59	-0.22	
23	285	271	4.94	0.15	22.76	21.44	1.32	
24	267	285	5.56	0.26	22.82	21.31	1.51	
25	300	230	5.66	0.02	22.46	21.43	1.03	
26	303	204	5.27	0.10	21.32	21.49	-0.17	
27	335	205	4.94	0.28	21.94	20.33	1.61	R1
28	362	231	5.12	0.07	22.33	22.21	0.13	
29	429	389	5.40	0.22	22.23	22.28	-0.06	
30	395	386	5.41	0.75	22.94	22.28	0.65	
31	336	355	5.23	0.18	22.21	21.88	0.33	
32	320	319	5.07	0.34	23.08	22.58	0.50	

33	184	338	6.03	0.41	22.21	21.31	0.89	
34	170	369	5.97	0.21	22.21	21.60	0.61	
35	124	330	5.83	0.28	23.66	21.83	1.84	
36	251	182	5.59	0.03	21.40	21.00	0.41	
37	232	174	5.17	0.25	21.57	21.86	-0.29	
38	313	259	5.11	0.32	22.29	22.22	0.06	
39	268	192	4.72	0.07	21.05	21.53	-0.48	
40	282	172	5.36	0.39	21.26	21.59	-0.33	
41	292	172	5.62	0.14	21.26	21.43	-0.17	
42	302	177	6.35	0.23	21.58	21.87	-0.29	
43	310	177	5.08	0.16	21.24	21.44	-0.21	
44	99	354	5.22	0.20	22.98	22.22	0.76	
45	257	151	5.13	0.04	22.13	22.08	0.05	
46	225	174	5.56	0.22	22.67	22.25	0.42	
47	226	180	5.71	0.09	21.82	22.01	-0.19	
48	303	160	4.98	0.06	22.01	22.15	-0.13	
49	304	170	4.84	0.21	22.30	22.37	-0.07	
50	379	200	6.22	0.58	23.37	22.61	0.76	
51	325	253	4.98	0.55	22.43	22.46	-0.03	
52	345	274	5.11	0.06	22.32	22.33	-0.01	
101	206	88	7.77	0.41	20.79	20.80	-0.01	D1
102	406	302	6.96	0.09	21.58	21.48	0.10	D2
103	429	386	6.45	0.05	21.85	21.70	0.15	D3
104	530	341	7.09	0.13	21.29	19.93	1.36	
105	170	370	7.97	0.55	21.42	20.84	0.58	
106	184	338	6.97	0.48	21.90	20.88	1.02	
107	122	330	7.92	0.91	23.34	21.20	2.13	
U6817	x	y	w	dw	B	V	B-V	type
1	513	38	5.43	0.21	22.12	22.05	0.07	
2	172	229	5.41	0.00	20.25	20.27	-0.03	B2
3	323	183	4.72	0.07	20.23	20.24	-0.02	B1
4	152	244	4.70	0.19	20.40	20.39	0.01	B4
5	160	213	4.91	0.26	20.77	20.74	0.03	B6
6	29	319	4.88	0.17	21.18	21.02	0.16	
7	28	334	5.69	0.28	21.50	21.25	0.25	
8	72	355	4.78	0.16	21.39	21.27	0.12	
9	172	348	4.58	0.07	21.89	21.93	-0.04	
10	179	344	4.58	0.21	21.68	21.73	-0.05	
11	199	316	4.78	0.27	21.08	20.76	0.32	
12	223	263	4.84	0.08	21.15	20.96	0.19	
13	211	272	4.83	0.04	21.47	21.16	0.31	
14	202	262	4.65	0.00	21.26	21.36	-0.10	
15	158	273	4.73	0.08	21.08	20.86	0.23	
16	99	200	4.75	0.04	21.42	21.28	0.14	
17	131	176	4.66	0.26	20.82	20.70	0.12	
18	182	208	4.98	0.06	21.39	21.41	-0.02	
19	210	206	4.99	0.08	21.17	21.04	0.13	
20	214	198	4.58	0.07	21.43	21.25	0.18	
21	242	189	4.51	0.14	21.16	21.09	0.06	
22	273	220	4.73	0.05	21.62	21.57	0.05	
23	275	65	4.44	0.22	20.76	20.53	0.22	
24	334	111	5.40	0.35	20.99	20.94	0.05	

25	390	41	4.92	0.13	20.86	20.80	0.06	
26	387	51	5.10	0.07	21.56	21.42	0.14	
27	292	97	5.18	0.01	21.15	20.85	0.30	
28	170	99	4.73	0.22	21.55	21.37	0.18	
29	163	139	4.88	0.04	21.75	21.37	0.38	
30	54	305	4.95	0.17	21.76	21.32	0.45	
31	60	286	5.04	0.13	22.06	22.12	-0.06	
32	10	306	4.85	0.17	22.48	21.92	0.56	
33	10	327	5.29	0.12	22.06	21.74	0.32	
34	26	372	4.98	0.04	22.01	21.75	0.26	
35	129	381	5.18	0.06	22.09	21.69	0.40	
36	195	332	4.87	0.03	21.95	21.66	0.30	
37	177	322	5.15	0.10	22.00	22.25	-0.24	
38	232	243	5.55	0.25	22.00	21.90	0.10	
39	242	242	5.36	0.05	22.21	22.29	-0.09	
40	246	218	4.89	0.16	22.17	22.23	-0.06	
41	235	156	4.56	0.04	21.96	21.82	0.14	
42	213	134	5.53	0.12	21.66	21.50	0.16	
43	177	148	5.44	0.15	22.05	21.79	0.26	
44	197	60	5.35	0.06	21.94	22.08	-0.14	
45	287	119	4.97	0.32	21.82	21.68	0.14	
46	341	137	4.70	0.19	21.75	21.50	0.25	
47	346	114	5.29	0.00	22.08	21.96	0.12	
48	370	99	4.98	0.06	22.09	21.82	0.28	
49	354	73	5.20	0.33	21.76	21.71	0.04	
50	356	57	4.94	0.15	21.70	21.50	0.20	
51	166	298	4.98	0.19	21.88	21.47	0.42	
52	123	248	4.88	0.04	23.11	21.65	1.46	
53	331	201	5.16	0.32	21.68	21.75	-0.06	
54	550	166	5.10	0.07	21.48	21.37	0.11	
55	31	67	5.46	0.14	22.12	21.47	0.65	
56	76	67	4.80	0.15	22.94	21.62	1.31	
57	329	17	4.81	0.16	22.68	21.37	1.31	
58	320	147	5.02	0.42	22.00	21.92	0.08	
59	285	182	4.49	0.27	22.08	22.05	0.03	
60	302	149	5.55	0.42	22.09	21.12	0.98	
61	289	168	3.71	1.46	22.08	20.46	1.63	R1
62	331	91	5.07	0.34	22.31	20.69	1.62	R2
63	479	45	5.34	0.05	23.42	21.61	1.81	
64	183	57	5.29	0.37	22.52	21.06	1.46	
65	256	153	5.20	0.71	22.82	21.25	1.57	
66	250	238	5.04	0.67	23.00	21.44	1.56	
67	168	370	4.73	0.22	20.53	20.62	-0.09	B5
68	151	301	5.24	0.29	23.84	21.86	1.98	
69	343	149	4.98	0.33	23.76	21.59	2.17	
70	365	15	5.04	0.13	21.96	21.95	0.01	
71	211	59	5.41	0.24	21.06	21.08	-0.02	
72	171	75	5.59	0.16	22.70	21.30	1.40	
73	88	57	5.54	0.01	23.39	21.91	1.49	
74	74	169	5.19	0.12	23.38	21.74	1.64	
75	100	181	5.19	0.32	22.48	21.88	0.61	
76	143	198	5.19	0.17	22.34	22.02	0.32	



77	120	301	4.93	0.41	23.47	21.92	1.55	
78	47	281	4.44	0.60	24.33	22.08	2.25	
79	87	383	5.02	0.15	22.38	21.96	0.42	
80	205	342	4.97	0.32	22.95	21.75	1.20	
81	259	334	4.69	0.04	22.51	21.92	0.59	
82	322	319	4.88	0.12	23.53	22.09	1.43	
83	392	319	4.73	0.05	22.57	22.05	0.53	
84	474	278	5.50	0.14	22.88	21.85	1.03	
85	353	213	5.12	0.34	22.96	21.96	1.00	
86	343	149	4.98	0.33	23.76	21.59	2.17	
87	263	139	4.85	0.07	22.23	21.50	0.74	
88	336	212	5.06	0.28	20.37	20.27	0.10	B3
101	296	170	8.52	0.07	19.06	18.57	0.49	NUC
102	164	223	9.16	0.02	19.30	19.36	-0.06	D1
103	25	383	6.93	0.21	19.65	19.47	0.18	D2
U7559	x	y	w	dw	B	V	B-V	type
1	194	170	4.92	0.13	19.77	19.35	0.43	B0
2	198	159	5.41	0.12	20.60	20.55	0.05	B2
3	262	255	5.05	0.00	20.10	19.40	0.70	
4	304	284	5.87	0.51	20.67	20.56	0.11	B3
5	297	264	5.14	0.48	21.67	21.97	-0.30	
6	370	336	5.79	0.03	21.52	21.00	0.51	
7	387	311	5.21	0.13	21.84	22.05	-0.22	
8	361	293	5.59	0.55	21.49	21.52	-0.03	
9	346	290	4.66	0.26	22.43	22.07	0.36	
10	538	283	5.57	0.40	21.29	20.70	0.59	
11	343	119	5.47	0.10	21.71	20.78	0.93	
12	324	142	5.96	0.92	22.69	21.76	0.93	
13	326	69	5.57	0.05	22.18	21.43	0.75	
14	350	174	5.10	0.24	21.58	21.65	-0.07	
15	346	193	5.21	0.29	21.25	20.28	0.97	
16	338	164	6.97	0.26	22.41	22.14	0.27	
17	244	293	5.30	0.13	21.40	21.30	0.10	
18	237	331	4.88	0.17	21.67	21.69	-0.02	
19	264	326	4.78	0.29	22.17	21.97	0.20	
20	275	166	5.51	0.75	22.09	22.04	0.05	
21	273	190	5.89	0.10	21.19	21.18	0.01	
22	266	207	6.11	0.40	21.91	21.94	-0.03	
23	246	184	4.73	0.22	20.96	21.00	-0.03	B4
24	250	175	5.20	0.69	22.05	21.99	0.07	
25	220	185	4.72	0.07	20.47	20.27	0.20	B1
26	202	190	5.36	0.31	21.16	21.05	0.11	B5
27	186	180	6.68	0.20	21.07	21.23	-0.16	
28	177	208	6.21	0.13	21.77	21.69	0.08	
29	67	239	4.86	0.21	20.84	20.11	0.73	
30	306	230	5.42	0.50	22.06	21.93	0.12	
31	46	152	5.08	0.04	21.58	21.51	0.06	
32	108	127	5.03	0.22	22.10	21.70	0.40	
33	374	268	5.08	0.09	22.68	22.11	0.57	
34	210	100	4.84	0.13	21.34	21.31	0.03	
35	146	74	5.55	0.02	22.40	22.16	0.24	
36	100	64	5.55	0.25	21.50	21.24	0.26	

37	95	56	5.85	0.58	22.11	22.14	-0.03	
38	100	21	6.29	0.01	21.53	20.90	0.63	
39	229	48	4.71	0.34	23.10	22.10	0.99	
40	205	87	5.26	0.36	22.72	21.01	1.71	R2
41	38	233	5.04	0.13	22.85	21.20	1.64	R3
42	257	298	4.69	0.01	22.26	20.71	1.55	R1
43	330	215	5.36	0.57	21.54	20.37	1.17	
44	153	133	5.39	0.34	21.16	21.01	0.15	B7
45	210	206	5.04	0.30	21.78	21.98	-0.20	
46	229	232	4.90	0.39	20.91	20.32	0.59	
101	359	210	6.58	0.19	19.28	18.52	0.76	S1
102	222	225	8.37	0.23	18.97	18.27	0.70	NUC
103	326	69	6.96	0.38	21.49	20.98	0.51	D1

### 1. APPENDIX 3. PHOTOMETRIC DIAGRAMS

Color-magnitude and color-color diagrams for the investigated galaxies. The small circles represent the photometry of stellar and starlike objects and the big ones indicate diffuse objects and bright stars.

