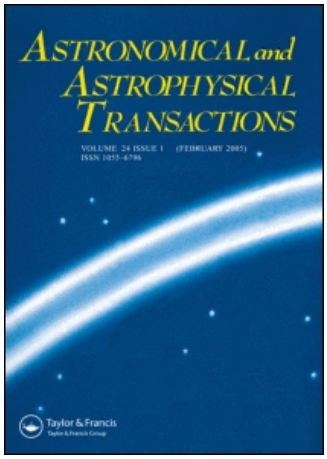

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SEARCH OF THE BLUE GALAXIES

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Following observations in Tonanzintla Observatory of Instituto Nacional de Astrofisica, Optica y Electronica (INAOE), a new list of blue galaxies is obtained with an Eastman Kodak spectroscopic plate emulsion 103-a-D, with UBV filters. The technique of Haro and Luyten (1962) was used.

The list of 45 blue galaxies which have been detected in Tonantzintla is presented. It is estimated that the limit on magnitudes is of about 19.5 m and a density of blue galaxies is near 3.4 per square degree. Two galaxies have a radio emission.

KEY WORDS Galaxies–blue

Blue starbursts galaxies with redshifts $Z > 0.1$ are of great cosmological interest. An excess population of blue galaxies in distant rich clusters – "Butcher–Oemler" effect (Butcher & Oemler, 1978; Butcher *et al.*, 1983), is now well established (Lavery *et al.*, 1992). This excess population is mainly composed of systems characterized by intense star formation (Couch & Sharples, 1987; Lavery & Henry, 1986). There are two mechanisms of induced star formation: due to galaxy-galaxy interactions and hot intercluster medium. To explain which mechanisms is of primary importance, it is very important to study blue galaxies in distant clusters. Detection of early stellar evolution in these galaxies would put significant constrains on the evolution scenario of galaxies, and hence simplify the job of observational cosmology.

In present paper we discuss the search technique and suggest a new list of blue galaxies at the plate centered at RA = 00^h52^m, DEC = $00°30'$ (1950.0), carried out with the 48″ Palomar Schmidt.

This work is the continuation of the project for the survey of blue galaxies, suggested by Haro in 1956, on photographic plates obtained with the Tonantzintla Schmidt camera 26″/30″. The plates were obtained with the technique of three successive exposures with different filters on the same plate, slightly displaced from one another. This technique was developed in Tonantzintla Observatory by Haro and Herbig (1955); Iriarte and Chavira (1957) and Chavira (1958, 1959). Characteristics of the filters used in the present survey are as follows: the *U* filter is Schott

Table 1.

Name	*RA* epoch *1950.0*			*DEC*			*RA* epoch *2000.0*			*DEC*		
Ch 1	0	40	15.9	2	20	17.2	0	42	50.2	2	36	42.1
Ch 3	0	40	45.1	2	44	24.3	0	43	19.4	3	0	48.8
Ch 2	0	40	46.1	0	49	14.3	0	43	20.0	1	5	38.8
Ch 4	0	40	48.2	2	38	23.3	0	43	22.6	2	54	47.8
Ch 5	0	40	50.2	-0	15	24.6	0	43	23.9	0	0	59.9
Ch 6	0	41	35.2	1	11	53.9	0	44	9.2	1	28	17.8
Ch 7	0	42	37.9	0	12	10.3	0	45	11.8	0	28	33.2
Ch 8	0	43	21.0	1	16	42.3	0	45	55.1	1	33	4.6
Ch 9	0	43	49.5	2	19	30.9	0	46	23.8	2	35	52.8
Ch10	0	43	52.8	0	35	29.6	0	46	26.7	0	51	51.5
Ch11	0	44	19.9	0	20	20.2	0	46	53.7	0	36	41.7
Ch12	0	44	19.4	0	20	24.9	0	46	53.3	0	36	46.4
Ch13	0	45	7.0	0	25	35.9	0	47	40.9	0	41	56.6
Ch14	0	45	23.2	-0	51	23.3	0	47	56.8	-0	35	2.8
Ch15	0	46	26.7	-1	35	2.9	0	49	.1	-1	18	43.3
Ch16	0	47	31.8	-2	13	19.9	0	50	4.9	-1	57	1.4
Ch17	0	47	53.9	-1	5	15.3	0	50	27.4	-0	48	57.1
Ch18	0	49	15.3	0	17	8.7	0	51	49.2	0	33	25.6
Ch19	0	49	25.1	-0	45	43.3	0	51	58.7	-0	29	26.6
Ch20	0	49	59.8	0	3	10.9	0	52	33.6	0	19	27.1
Ch21	0	50	19.3	-0	21	2.2	0	52	53.0	-0	4	46.3
Ch22	0	50	25.0	0	49	44.3	0	52	57.4	1	6	.0
Ch23	0	50	23.6	0	5	52.7	0	52	57.4	0	22	8.4
Ch24	0	50	27.9	0	4	25.5	0	53	1.7	0	20	41.2
Ch25	0	50	30.4	3	2	42.9	0	53	4.9	3	18	58.5
Ch26	0	53	40.5	-1	34	52.6	0	56	13.8	-1	18	40.2
Ch27	0	53	42.8	-1	35	14.21	0	56	16.1	-1	19	1.9
Ch28	0	53	57.2	-2	1	13.1	0	56	30.4	-1	45	1.0
Ch29	0	54	11.9	1	41	7.0	0	56	46.2	1	57	18.8
Ch30	0	54	13.0	-1	33	12.4	0	56	46.3	-1	17	.6
Ch31	0	55	29.4	-0	9	35.7	0	58	3.1	0	6	34.7
Ch32	0	55	50.6	1	38	28.1	0	58	24.9	1	54	38.1
Ch33	0	56	9.1	-1	13	14.6	0	58	42.5	-0	57	4.9
Ch34	0	56	30.1	0	43	42.7	0	59	4.1	0	59	52.0
Ch35	0	56	43.7	2	40	46.4	0	59	18.3	2	56	55.4
Ch36	0	56	39.1	-0	6	37.9	0	59	12.9	0	9	31.2
Ch37	0	57	38.3	0	56	31.4	1	0	12.3	1	12	39.4
Ch38	0	57	45.1	-0	54	36.5	1	0	18.6	-0	38	28.6
Ch39	0	58	25.7	0	56	09.3	1	0	59.8	1	12	16.4
Ch40	0	57	59.2	-2	17	1.8	1	0	32.3	-2	0	54.2
Ch41	0	58	23.9	-2	11	53.8	1	0	57.0	-1	55	46.7
Ch42	0	59	25.9	0	12	57.2	1	1	59.8	0	29	03.1
Ch43	0	59	22.8	1	58	43.8	1	1	57.2	2	14	49.8
Ch44	0	59	25.7	2	57	20.6	1	2	.4	3	13	26.5
Ch45	0	59	57.5	1	4	16.1	1	2	31.6	1	20	21.4

UG 1 at wavelengths 3500–4000Å; the *b* filter at wavelengths 3900–4825Å; the *V* filter has a range of wavelengths 4825–5150Å. All exposures were taken using the Eastman Kodak 103aD emulsion.

Table 2.

Name	*RA* epoch 1950.0			*DEC* epoch 1950.0			*mag* *m*	*v* *km s*$^{-1}$	*size* *(arc sec)*	*Ref*
Ch 3	0	40	46.1	0	49	14.3				
			45.8			15.17	17.28	30560	78 x 70	1
Ch 5	0	40	50.2	-0	15	24.6				
			50.7	-0	15	27.16	16.5	24670		1
Ch 7	0	42	37.9	0	12	10.3				
			37.0			24.	18.5			2
Ch16	0	47	31.8	-2	13	19.9				
			31.0	-2	13	00.0	16.		31 x 14	2
Ch18	0	49	15.3	0	17	8.7				
			15.6			36.16	16.76	4510	180 x 70	1
Ch19	0	49	25.1	-0	45	43.3				
			26.0	-0	45	12.	15		30 x 15	2
Ch20	0	49	59.8	0	3	10.9				
			59.9			35.	16.9	18560	70 x 60	1
Ch22	0	50	25.0	0	49	44.3				
			26.6		50	17.0	17.2	23478	80 x 48	1
Ch23	0	50	23.6	0	5	52.7				
			23.0	0	6	12.0	16.		15 x 10	2
Ch26	0	53	40.5	-1	34	52.6				
			40.0	-1	35	20.0				3
Ch27	0	53	42.1	-1	35	18.0				
			42.9	-1	35	04.0				4
Ch30	0	54	13.0	-1	33	12.4				
			13.1	-1	33	04.	17.4	12610	60 x 48	1
Ch34	0	56	30.1	0	43	42.7				
			30.1			54.0	16.2	5330	2.9 x 0.8	1
Ch41	0	58	25.7	0	56	09.3				
			25.5			20.0	17.19	12860	126 x 78	1
Ch45	0	59	57.5	1	4	16.1				
		59	57.0	1	4	36.0	16.0		10 x 8	2

Note. 1. Huchra, 1990.
2. MacAlpine *et al.*, 1977.
3. Pilkington *et al.*, 1965.
4. Schilizzi, 1975.

Forty five objects as candidates to blue galaxies from the plate covering an area of 12.7 square degrees were selected. The coordinates were determined according to the method of Schlesinger. The field under investigation is located between the two fields AO888 and AO894 which were studied with the 105 mm Schmidt telescope and reported in the KISO catalogue (Takase & Miyauchi-Isobe, 1985). Thus the suggested catalog gives coordinates of the new blue galaxies in the vicinity of these fields.

In Table 1 the coordinates of the galaxies, which were measured using stars from the PPMN catalog (Roser and Bastian, 1988) as standard stars, are presented with $rms = 2''$. The notations are:

- Column 1 gives the names of the galaxies.
- Columns 2 and 3 give the right ascension and declination for the epoch 1950.0.
- Columns 4 and 5 give the right ascension and declination for the epoch 2000.0.

The number density is found to be 3.4 blue galaxies per square degree, which is much more than the number density of the KISO survey for ultraviolet – excess galaxies (Takase and Miyauchi–Isobe, 1985) for the nearest fields. This can be explained by the high sensitity of the plate in use. The magnitude of the present survey is up to 19.5^m. It corresponds to 30% galaxies of our catalog being fainter than 18.5^m.

In Table 2 additional information about them are presented.

- Column 1 gives the name of the galaxy.
- Columns 2 and 3 give the right ascension and declination for the epoch 1950.0.
- Column 4 gives the magnitudes.
- Column 5 gives velocities.
- Column 6 – size in arc sec.
- Column 7 gives the references (our coordinates are without references).

Eight galaxies were known earlier (Huchra, 1990). The galaxy Ch 6 was tentatively classified as a quasar (MacAlpine *et al.*, 1977), but at our plate we can see that it has a very compact blue core surrounded by a nebulosity. The galaxies Ch27 (bright) and Ch26 (faint) are situated in the cluster of galaxies A119. These galaxies have radio emission. The right ascension (Pilkington & Scott, 1965; Scilizzi, 1975) of the radio sources coincide with those for our galaxies very well. But it seems that there is confusion in declinations in the radio measurements which are due to the close localization of the galaxies.

In the present catalogue there are two pairs of blue galaxies (Ch11–12 and Ch26–27). These galaxies are possible candidates to the galaxy-galaxy interaction. For this reason a more detailed investigation of them is required. In future, we plan to measure redshifts and also to carry out radio observations.

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