

A SEARCH FOR GALAXIES IN VOIDS: VOID 1306 + 34, +35, +36

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This paper is a part of series of papers that we have published already [¹⁻⁶]. They describe a collaborate project called VOIDS between the Institute of Astronomy, Bulgarian Academy of Sciences and Max-Planck Institute for Astronomy, Heidelberg, Germany. This project is devoted to studying large spaces that lack galaxies called voids. For details and more information about voids refer to [⁷⁻¹⁰].

The results published already show that in previously studied voids a large amount of faint galaxies is observed: In this paper we study the void 1306 + 34, +35, +36(1950). 2745 galaxies were detected altogether in this direction and their coordinates are available as a computer catalogue on our DECstation. Here we present coordinates and description of 120 of the brightest and most interesting of them.

We have taken three plates to cover the void. Plate numbers, centre coordinates and other observational data are presented in Table 1. We used the Ritchie camera of the 2m Ritchie-Cretien Coude telescope at the National Astronomical Observatory - Rozhen, Bulgaria. On the telescope a plate with dimensions 30 X 30 cm covers a field of one squared degree approximately. The exposition time of 150 minutes is enough to detect faint objects. The plates are taken under very good seeing - 1" or even better.

Coordinates of 2745 galaxies, all that were detected on these plates, were measured on an Ascorecord machine. SAO standard stars taken with the Overlay program on the VAX machine in Heidelberg, Germany were used as astrometric standards. A software for PC made by one of us (A.S. - Astronomical Utilities Program) was used to convert the rectangular coordinates of the measured objects to equatorial ones for the equinox 1950. We found only eleven galaxies in MGC and RC3 catalogues [¹¹⁻¹²] that are visible on our plates too. The astrometry is approximately accurate up to $\pm 5''$.

T a b l e 1 Observational data for the void 1306 + 34, +35, +36

Plate No	alpha h m	1950 deg	delta date April 1992	expos. min	filter	emulsion	dimens Cm x cm
1898	13 06	+34	26/27	150	none	ORWO ZU	21 30 x30
1899	13 06	+35	26/27	150	none	ORWO ZU	21 30 x30
1897	13 06	+36	25/26	150	none	ORWO ZU	21 30 x30

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T a b l e 2: Brighter and more interesting galaxies in the void 1306 + 34, +35, +36

No	alpha 1950.00	delta d m s	description
1	13 3 26.2	36 1 19	= UGC 8187
2	13 3 40.8	35 55 20	i ca. 45 deg
3	13 3 42.4	35 50 29	on face, bright core
4	13 3 42.5	36 14 56	on face, spirals, bright core, faint bar, = UGC 8191
5	13 3 49.0	3 12 13	
6	13 3 49.9	35 16 52	faint, a star near
7	13 3 50.1	36 07 11	
8	13 3 52.6	35 22 35	faint, on edge
9	13 3 53.4	35 04 40	on edge
10	13 3 54.3	34 24 59	satellite ?
11	13 3 55.7	34 25 15	one spiral, bright core
12	13 3 56.5	35 46 55	double, interacting
13	13 4 01.4	33 50 14	
14	13 4 03.9	36 24 41	bright core
15	13 4 04.8	34 13 15	
16	13 4 06.2	35 32 29	on edge
17	13 4 10.1	35 07 01	bright core, spirals
18	13 4 21.5	35 24 32	bright, spirals. = UGC 8200
19	13 4 23.3	34 27 57	
20	13 4 23.5	35 22 09	elliptical, bright, a star near, = UGC 8199
21	13 4 30.3	34 51 48	faint, on edge
22	13 4 32.5	34 10 07	on face, spirals?
23	13 4 40.0	35 16 32	irregular, double
24	13 4 46.6	33 58 45	
25	13 4 47.7	34 20 37	on face
26	13 4 48.2	36 01 34	
27	13 4 48.3	34 01 20	on edge
28	13 4 49.1	34 34 14	on edge, bright core
29	13 4 49.5	34 02 37	on edge, bright core
30	13 4 49.9	33 58 02	
31	13 4 51.7	35 00 33	faint, on edge, core
32	13 4 52.9	35 35 07	bright core
33	13 4 54.1	35 44 57	on edge, bright core
34	13 4 54.7	34 13 38	
35	13 4 59.8	36 03 26	on face, two spirals, bright core, = MGC 62939
36	13 5 00.8	34 15 46	
37	13 5 04.6	35 16 44	irregular, bright
38	13 5 07.8	35 45 43	bright, elliptical
39	13 5 12.4	35 54 43	bright core, on edge
40	13 5 14.4	35 54 54	on edge
41	13 5 16.6	33 49 24	
42	13 5 17.9	35 40 54	bright core
43	13 5 20.3	33 59 33	
44	13 5 22.7	35 15 13	faint, on edge
45	13 5 23.4	35 40 16	on edge
46	13 5 27.5	33 44 32	
47	13 5 30.5	36 06 13	bright core, = MGC 62942
48	13 5 32.5	33 44 31	
49	13 5 33.2	34 21 19	bright, bright core, spirals, bar?, on face, = MGC 6
50	13 5 33.6	35 11 53	bright, on face, two spirals, core, bulge, bar
51	13 5 38.3	33 45 17	
52	13 5 38.6	33 45 11	double, interacting?
53	13 5 42.5	34 16 33	bright, elliptical
54	13 5 43.2	34 22 53	
55	13 5 47.0	35 44 24	on edge
56	13 5 51.7	36 01 26	bright core
57	13 5 53.7	34 09 23	
58	13 5 54.0	33 32 45	

59	13 5 54.2	35 13 42	faint
60	13 6 00.2	33 36 25	a star near
61	13 6 01.2	34 45 47	a star on it
62	13 6 03.4	35 28 35	on face, ring, bar, two stars on it, = MGC 62944, = NGC 4986
63	13 6 05.4	34 20 23	bright, on edge
64	13 6 08.4	35 17 38	faint
65	13 6 08.8	35 26 17	irregular, bright, = NGC 4986, = UGC 8221
66	13 6 09.1	35 25 52	irregular
67	13 6 12.6	33 35 38	
68	13 6 12.7	33 38 11	
69	13 6 13.1	35 23 47	faint, on edge
70	13 6 14.0	34 14 24	bright, bright core, on edge, bulge, disc, = MGC 62945
71	13 6 18.2	35 00 28	on edge
72	13 6 27.2	33 38 52	
73	13 6 27.2	33 55 16	
74	13 6 28.6	35 27 40	bright core
75	13 6 30.5	34 40 28	faint, on edge
76	13 6 31.7	34 03 42	bright, on edge, core
77	13 6 34.9	33 43 11	
78	13 6 40.1	33 55 45	
79	13 6 41.7	34 51 30	on edge
80	13 6 45.7	35 35 17	bright core
81	13 6 45.9	34 07 38	
82	13 6 47.2	33 38 41	bright core
83	13 6 47.7	34 55 20	
84	13 6 48.7	33 58 07	
85	13 6 48.8	33 35 11	
86	13 6 54.6	33 34 21	bright core, on edge
87	13 6 54.7	34 54 44	on face, spirals?
88	13 6 54.9	33 55 14	
89	13 6 57.8	34 09 37	
90	13 6 58.7	35 48 01	bright core
91	13 7 00.1	34 49 19	bright core, on edge
92	13 7 00.5	35 01 05	bright core
93	13 7 01.6	33 42 10	on edge
94	13 7 01.9	33 59 33	
95	13 7 04.5	35 18 20	faint, a star near
96	13 7 04.8	35 37 14	on edge
97	13 7 06.4	34 59 47	bright core
98	13 7 13.2	34 26 55	
99	13 7 16.2	34 46 18	bright core, on edge
100	13 7 16.6	34 28 40	
101	13 7 16.7	35 07 00	bright, bright core, bulge, disc, spirals
102	13 7 16.9	35 38 32	on edge, bulge
103	13 7 17.5	35 52 18	elliptical
104	13 7 21.8	35 27 33	bright core
105	13 7 23.8	35 13 55	bright core, bulge, disc, a star on it
106	13 7 26.3	33 53 55	
107	13 7 27.0	34 55 52	bright, on edge
108	13 7 31.2	34 38 20	bright core, on face
109	13 7 34.2	33 52 38	galaxy?
110	13 7 39.0	33 53 01	
111	13 7 39.1	35 52 19	
112	13 7 40.1	33 37 03	
113	13 7 44.4	34 27 00	bright, on edge, two spirals, = MGC 62948, = UGC 8246
114	13 7 49.1	35 08 31	
115	13 7 51.7	33 59 37	
116	13 7 52.7	34 54 43	
117	13 7 58.2	33 59 06	
118	13 8 06.4	33 49 14	
119	13 8 11.2	36 14 37	
120	13 8 15.6	33 45 50	

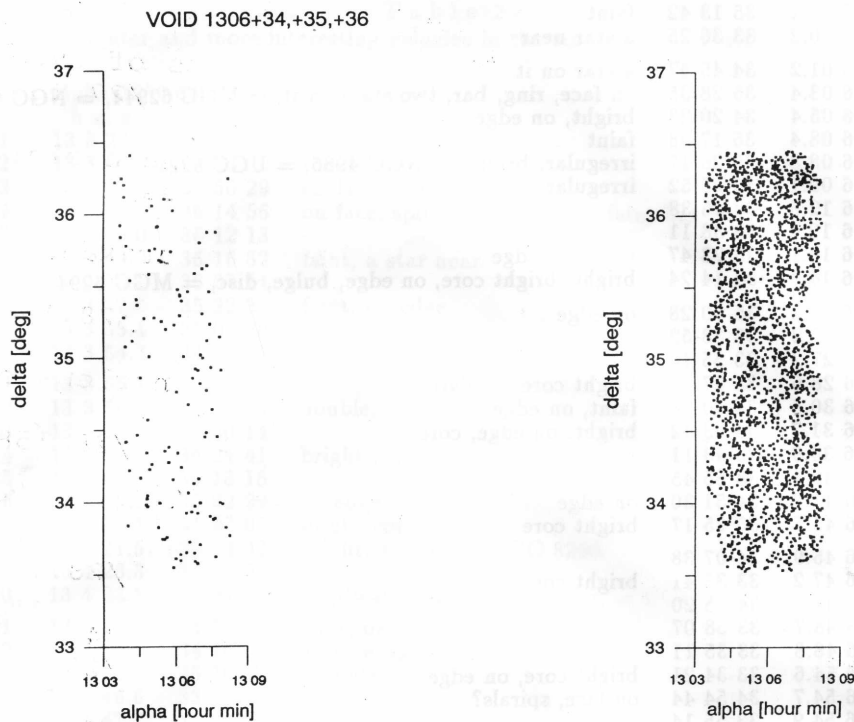


Fig. 2. All detected galaxies

Table 2 presents coordinates and description for 120 brighter and more interesting galaxies. In Figure 1 we present the alpha-delta distribution for the selected galaxies and in Fig. 2 the same for all 2745 detected galaxies.

The limiting magnitude in Fig. 2 is about 22^m . It is clearly seen in this figure that there are (in two-dimensional space) places with more concentration of galaxies and places with less concentration. The whole figure looks like a netting with empty and filled spots. The next step will be a cluster analysis of the distribution of the objects.

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