

SEARCHING FOR GALAXIES IN VOIDS —FIRST RESULTS

G. Petrov, B. Kovatchev

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At the end of 1990 a new observational program was proposed by the Max Planck Institute of Astronomy, Heidelberg, Germany and the Department of Astronomy of the Bulgarian Academy of Sciences. The main task of the program was to check the lack of galaxies in some regions of the cosmic space —the so called "VOIDS" [1]. The idea is to use the 2 m telescope of the National Astronomical Observatory "ROZHEN" with its large field of $1^\circ \times 1^\circ$. The program list contains one comparison field —the well known cluster of galaxies A 1376 with coordinates (1950) α : 11 h 40m 54s and δ : +20°00' and about a dozen of voids round the centres with coordinates (1950) listed in Table 1.

Using the exposure time ca. 3 hours we had hoped to reach a limiting magnitude bigger than the POSS limit —i. e. to detect fainter objects. The second step will be a detailed study of the most interesting objects using the CCD —camera of 1.2 and 2.2 m telescopes of the Calar Alto observatory, DSAZ, Spain.

Three plates were taken of the void 16 00+18 during 1991 —two blue and one red plate with a comparatively good seeing ca 1.5". Plate No 1830 as the one with the Δ limit was measured as the main plate. The second blue plate was used as a Δ plate. The red plate was not measured at this step because of the lower limiting magnitude. As an independent source we have used a POSS glass copy. All the three plates have been measured using "GLAREX" XY measuring machine of the MPIA, Heidelberg, Germany. The SAO stars were used as first standards taken with "OVERLAY" program, running on VAX. As secondary standards, 67 stars were measured in the $1^\circ \times 1^\circ$ around the centre of the void. Program "AMETRY" and 3th order fit were

Table 1 Blue plates (ZU 21 emulsion) taken with 2-m telescope of NAD

Plate No	VOID	Seeing	Date	Remarks
1808	A 1367	6"	10/11.04.1991	Cluster of Galaxies
1830	1600+18	1.5"	17/18.06.1991	
1831	1600+18	1.5"	18/19. 06. 1991	
1861	2320+1339	3"	12/13. 09. 1961	
1862	0041+05	3"	12/13. 09. 1961	
1863	0045+04	4"	14/15. 09. 1991	
1864	0045+06	2.5"	14/15. 09. 1991	
1865	0045+06	4"	10/11. 10. 1991	
1867	0045+05	2"	12/13. 10. 1991	
1868	0045+04	2"	12/13. 10. 1991	

Table 2

Distribution of the measured objects according to diameters, brightness and morphology

Diameters	Brightness	Morphology Remarks
1 - 90	B - 369	R - 1078
2 - 807	N - 610	L - 501
3 - 539	L - 836	S - 115
4 - 243	? - 13	I - 232
5 - 138		? - 16
? - 11		

used to determine the parameters of our plates and the coordinates of measured objects. As a result, the differences of the coordinates of the objects on the three plates became 1 —2 arcsec. In the Principal Catalogue of Galaxies [2] there are only 21 galaxies in the same field. We had measured ca. 200 objects on the POSS plate. Plate No 1830 contains 1835 objects and the control plate contains ca, 1200 galaxies. The difference between the two plates is

mainly because, of the shift of the centre of the second plate in comparison to the first one, i. e. the overlapped field is ca. $45' \times 45'$. Altogether 625 galaxies have been measured at least on two plates in the field cited above. Some qualitative evaluations have been made for the objects measured on plate No 1830:

a) Diameters in conditional scale: 1 $\rightarrow < 1.9''$, 2 $\rightarrow < 3.6''$, 3 $\rightarrow < 5.7''$, 4 $\rightarrow < 5.7''$, and S $\rightarrow > 5.7''$.

b) Brightness: B —Bright, N—Normal, and L —Low⁷ brightness objects.

c) Morphology: R —Ring, L—Lenticular, Prolongate, and I —Irregular. For the objects marked as "L" the position angle in degree has been added.

Simple statistics of the measured objects is presented in Table 2.

The distribution of the objects in the Alpha-Delta plane (i. e. coordinates of the objects) are presented in Figs 1, 2 and 3, where POSS means galaxies measured on the Palomar Observatory Sky Survey glass copy and CT —control plate No 1831.

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Department of Astronomy Bulgarian Academy of Science 1784 Sofia, Bulgaria

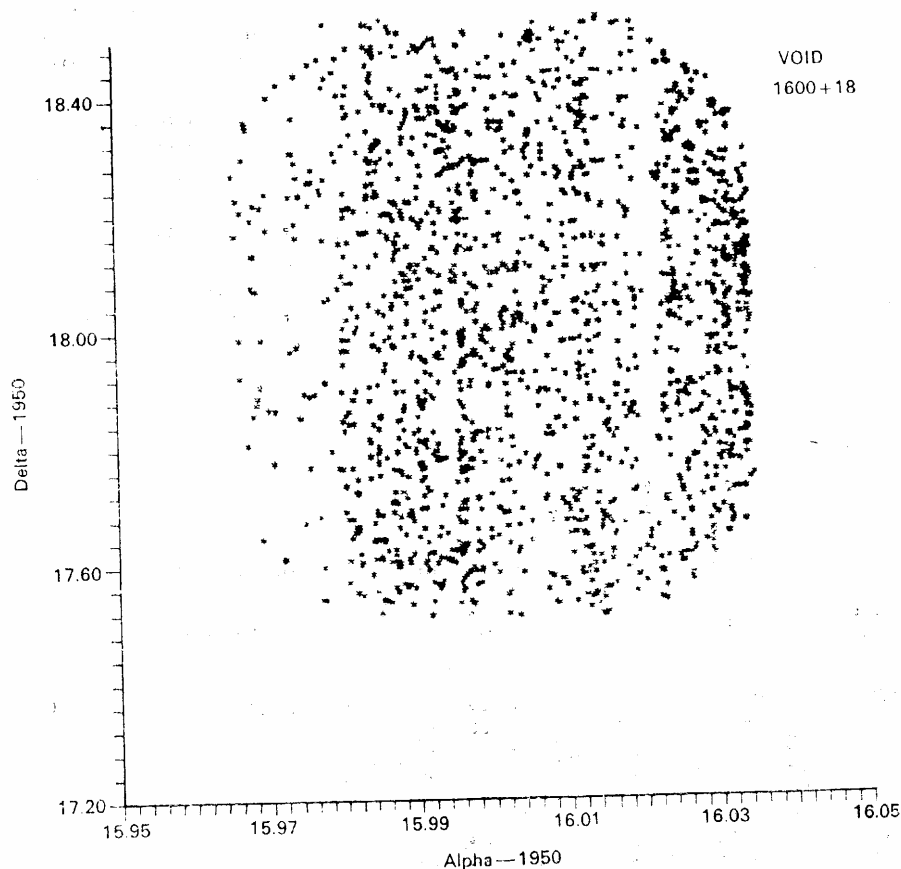


Fig. 1

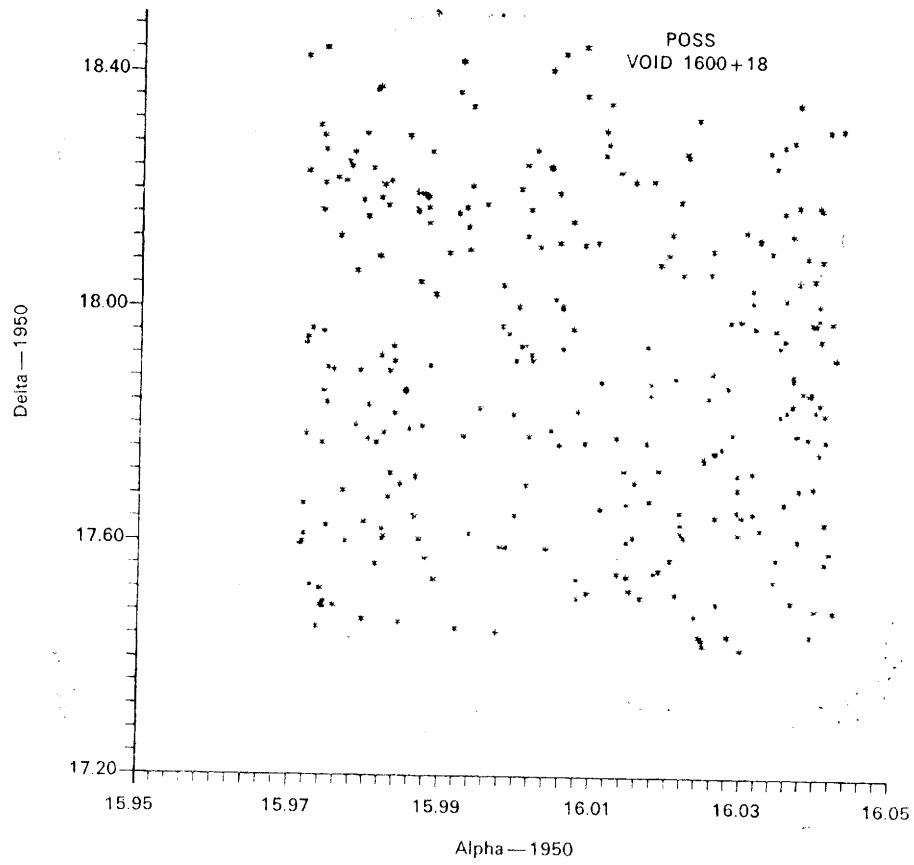


Fig. 2

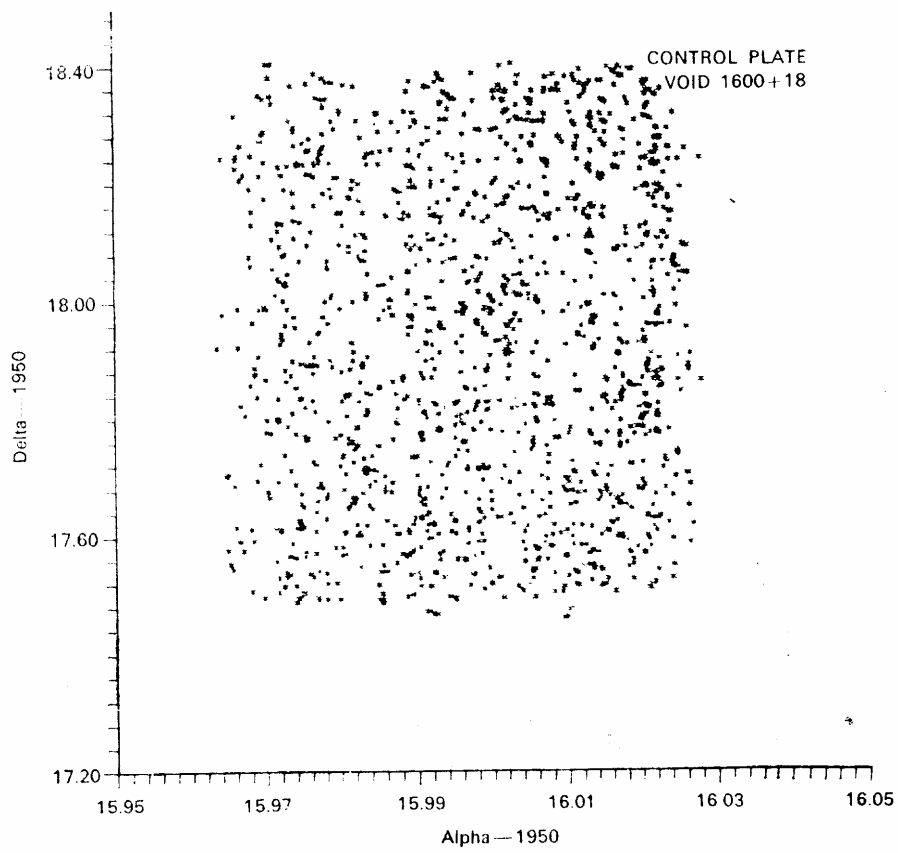


Fig. 3