

A SEARCH OF ENVIRONMENTAL EFFECTS ON THE PHYSICAL CHARACTERISTICS OF GALAXIES IN GROUPS

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The characteristics of galaxies within the galaxy groups are investigated from point of view of the influence of the surroundings.

1. *Introduction.* The observed physical characteristics may be determined either by primordial conditions during the epoch of galaxy formation or by the influence of the surroundings after the formation of the galaxies. To get an insight into their formation and evolution the correlation between the observed physical characteristics of the galaxies and their surroundings should be investigated.

Mahtessian [1-4] investigated the characteristics of the galaxies depending on the surrounding density and the morphological content of the group using a sample of galaxy groups of Karachentsev [5]. It was found that the characteristic parameters of the galaxies are stronger correlated with the morphological composition of the group than with its density.

In this report an investigation of environmental influences on some physical characteristics of galaxies in galaxy groups, which have been identified by Mahtessian [4,6,7] is presented.

All galaxies which do not belong to these groups are assigned to the sample of single galaxies.

2. *Preparing the sample for the statistical analysis.* Our sample is limited by the distance (see [4,7,8]). Using $H=100$ km/s/Mpc the greatest distance is 80 Mpc and the smallest one is 3 Mpc.

The morphological types of the galaxies are taken from [14].

The Seyfert galaxies are taken from the catalogues [15] and [16].

The Markarian galaxies are taken from the catalogue [17].

3. *The dependence of the morphological content of the group, and the relative number of Seyfert and Markarian galaxies on the number of galaxies within the group.* In paper [8] the dependence of the morphological content of the group on the number of member-galaxies within the group is investigated. It is shown that the percentage of the E and S0 galaxies grows, while the percentage of spirals of late types sharply drops along the sequence "single galaxies - double galaxies - galaxy groups". The percentage of early type spirals does not depend on the number of surrounding galaxies.

The dependence of the relative number of Seyfert and Markarian galaxies on the number of member-galaxies within the group is examined in papers [9] and [12]. It was found that the frequency of occurrence of Sy1 and Sy2 galaxies in galaxy groups did not differ from the one in the sample of single galaxies, but the frequency of occurrence of Sy3 (Liners) was statistically higher in galaxy groups than among the single galaxies.

The frequency of occurrence of Sy1 and Sy2 galaxies does not differ in groups with different number of members. Only that of Sy3 grows from member-poor groups to member-rich ones.

The frequency of occurrence of Markarian galaxies is statistically lower in galaxy groups than among the single galaxies. The frequency of occurrence of Markarian galaxies decreases from member-poor groups to member-rich groups.

4. *The morphological content of the group as a function of group parameters.* The basis for the investigation of the correlation between the morphological content of the group and their parameters is a sample of galaxies which consists of at least five galaxies and no more than eighteen objects.

The investigated groups are divided into two subsamples according to the content of E and S0 galaxies being either smaller or greater than 40%. For these subsamples the mean density of the luminous matter, the velocity dispersion and the mean pairwise distances between the galaxies were calculated.

The statistical analysis shows that there are no significant statistical differences between the analogous parameters of the both subsamples of groups, with high and low relative number of E+S0 galaxies.

5. *The correlation between the characteristic parameters of a group from the availability of Seyfert and Markarian galaxies.* The availability of Seyfert galaxies as a function of group parameters is investigated in [9]. It is shown that the groups, which contain at least one Seyfert galaxy have in the mean signifi-

cantly larger velocity dispersion and smaller crossing time as compared with analogous quantities of groups without Seyferts.

The morphological content has obviously no influence on the existence of Seyfert galaxies in the groups. The group with and without Seyfert galaxies cannot be distinguished in this sense.

There is no correlation between mean pairwise distances and the availability of Seyfert galaxies in the groups.

The availability of Markarian galaxies as a function of group parameters is investigated in [12]. It was not found any obvious correlation between the velocity dispersion, the galaxy density within the group, the morphological content of the group, the crossing time and the availability of Markarian galaxies.

6. *Segregation of galaxies of different morphological types and luminosities or masses into groups.* The investigation of segregation of galaxies belonging to different morphological types and luminosity or mass in terms of their position relative to the centers of the groups and in terms of their peculiar radial velocities within the groups are presented in [10,11].

We investigate the groups of galaxies with from six to 18 members. In each of groups we are interested in the following transformation of the physical parameters of the galaxies:

a) The peculiar radial velocities within the group are divided to the dispersion of the velocities of the galaxies. The new parameter δV (thus obtained) will have in all groups a distribution with identical unit dispersion.

b) The distances of the galaxies to the geometric center of the group are divided to their mean values with respect to each group. The new parameter δR_c (thus obtained) will have in all groups a mean value equal to unit.

After these transformations, all groups are collected together into a single unified group in which each galaxy occurs with its own new parameters δV and δR_c .

Our investigation leads to the following conclusions:

The mean distances of the galaxies relative to the center of the groups gradually increase from elliptical to lenticular and spiral galaxies. However, galaxies classified as early or late type spirals are not distinguishable on the basis of this parameter.

The peculiar radial velocities of the elliptical, lenticular and spiral galaxies in the groups are statistically indistinguishable. However, spiral galaxies of early and late subtypes are distinguishable in terms of this parameter. The former subtype exhibit a smaller mean peculiar radial velocity than the latter subtype.

The most luminous and massive galaxies, on an average, are closer to the center of the group, while the faintest and lightest galaxies, are farther. The galaxies with

intermediate luminosities or masses occupy an intermediate position.

The segregation of galaxies of different luminosity or mass in terms of their mean peculiar radial velocities manifests itself less strongly.

Acknowledgements. This research was supported by grant ESO C&EE No. A-04-069.

ВЛИЯНИЕ ОКРУЖЕНИЯ НА ФИЗИЧЕСКИЕ ХАРАКТЕРИСТИКИ ГАЛАКТИК В ГРУППАХ

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Изучены физические характеристики групп галактик в зависимости от характеристик их окружения.

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