

Dwarf Galaxies in the Antlia Cluster: First Results

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1 Introduction

The Antlia cluster ($l = 273^\circ$, $b = 19^\circ$) is the third nearest galaxy cluster ($d = 35$ Mpc) after Virgo and Fornax. In spite of its proximity, it has been poorly investigated. Its population is dominated by early type galaxies, with dwarf ellipticals being the most abundant galaxy type [1].

Here we present the first results of a project aimed to study the galaxy population of the Antlia cluster. Our results correspond to the identification and classification of dwarf galaxies in the central cluster region, extending the list of [1] (FS90 catalogue), a photographic survey that is complete only up to $B_T \simeq 18$ mag ($M_B \simeq -14.7$ mag at the Antlia cluster distance).

The final aim of our project is to study the luminosity function, morphology and structural parameters of dwarf galaxies in the Antlia cluster with a more complete sample. We also intend to investigate the kinematics of the cluster (50 spectra have been already obtained).

2 Observations

The observations for the Antlia project were performed with the MOSAIC camera (8 CCDs mosaic imager) mounted at the prime focus of the 4-m Blanco telescope at the Cerro Tololo Inter-American Observatory (CTIO). The field of view is $36' \times 36'$. Kron-Cousins R and Washington C filters were selected due to their known good metallicity resolution [2]. Images from a field located at the cluster center were obtained during April 2002, and three adjacent fields during March 2004. These fields cover 1.5 square degrees of the Antlia cluster. The results presented here refer to the central field.

3 First results

The detection of extended sources on the images was performed with SExtractor [3]. In addition to 70 galaxies from [1], we detected many new dwarf galaxy candidates (dwarf ellipticals, dwarf spheroidals, and irregulars). The faintest candidates have $B_T \simeq 23.4$ mag ($M_B \simeq -9.3$ mag at the Antlia cluster distance).

We find that those objects identified by SExtractor that were considered as *definite members* of Antlia cluster by [1], follow a well defined relation in the color-magnitude diagram ($\sigma_{color} \sim 0.08$). Also those objects considered as *likely members* by [1], are mostly located within a region of 3σ level dispersion from the relation followed by *definite members* (hereafter, 3σ region). Those objects considered as Antlia cluster *possible members* by [1], tend to lie outside this region.

Until now we have studied 17 objects, four of which are new dwarf candidates and 13 are objects from [1]. Only four of these objects (three from FS90 and one new) depart from the 3σ region. The morphologies of all objects located within the region are consistent with dwarf galaxies.

No clear color gradients are detected for those FS90 objects located into the 3σ region, except for two galaxies (FS90 241 and FS90 188) which seem to become redder towards their centers. This, however, could in part be an effect of the different seeing in the C and R exposures.

The new candidates located within the 3σ region show clearly exponential brightness profiles and none of them seems to possess a nucleus. According to the definition proposed by [4], these new objects are faint enough to be considered as *dwarf spheroidals* ($M_B \geq -12.8$).

From its color profile, we are able to confirm that one object classified as Blue Compact Dwarf (BCD) by [1] (FS90 75) is indeed a BCD galaxy: its color gets redder outwards (see e.g. [5]) besides being the bluest object in our sample.

Only three objects of our sample (FS90 68, FS90 72 and FS90 231) are confirmed members of the Antlia cluster through their radial velocities, obtained from the 6dF catalogue [6] ($\langle V_{rad} \rangle_{Antlia} \sim 2900$ km s $^{-1}$).

References

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