

The ACS Fornax cluster survey

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Abstract. We are conducting a survey of 44 early-type galaxies in the Fornax Cluster using the *Advanced Camera for Surveys* on the *Hubble Space Telescope*: the ACS Fornax Cluster Survey. We briefly describe the survey, the selection of the target galaxies and some of the scientific objectives.

Keywords. Surveys, galaxies: general, galaxies: clusters: individual (Fornax), galaxies: star clusters

The ACS Fornax Cluster Survey is a Cycle 13 program to image, in the F475W (g_{475}) and F850LP (z_{850}) bandpasses, 44 early-type galaxies in the Fornax Cluster using the *Advanced Camera for Surveys* (ACS) on the *Hubble Space Telescope* (HST). Observations are still being carried out and the program is expected to be completed during 2005.

Selection of target galaxies was based on the Fornax Cluster Catalog (FCC; Ferguson 1989). This survey, the most complete and homogeneous available for Fornax, covers $\sim 40^\circ$ squared centered at $\alpha \sim 3^h 35^m$ and $\delta \sim -35.7^\circ$. Within the survey area, the catalog contains 340 likely cluster members. Their classification was done mainly based on galaxy morphology, supplemented where possible by a small set of radial velocities.

The ACS Fornax Cluster Survey sample was built by selecting all members of the FCC with $B \leq 15.5$ mag that were classified as early-types (E, S0, dE, dS0, dE,N, dS0,N) by the FCC and by the NASA Extragalactic Distance Database (NED). This sample is comprised of 42 galaxies, 12 of which are classified as dwarfs. Additionally we included NGC 1340 and IC 2006 in the sample. While not included in the FCC, these galaxies were selected because of their usefulness for calibrating the surface brightness fluctuations (SBF) distance method, one of the main science objectives of this survey.

Combined with a similar survey of Virgo (Côté *et al.* 2004), this represents the most comprehensive imaging survey to date of early-type galaxies in cluster environments in terms of depth, spatial resolution, sample size and homogeneity. The ACS Fornax cluster survey is *complete* down to its limiting magnitude, as shown in Figure 1.

The scientific objectives of the survey include:

- A homogeneous study of the globular cluster (GC) systems of the whole sample, including determination of photometrical and structural parameters for thousands of GCs.
- Morphologies, luminosity profiles and dust content. We will carry out a comprehensive study of the nuclear morphologies, luminosity profiles and dust properties of the target galaxies, and probe their dependence on cluster environment.
- Extragalactic Distance Scale via the SBF Method. The compact nature of Fornax combined with the high SBF signal-to-noise at *HST* resolution will allow us to determine

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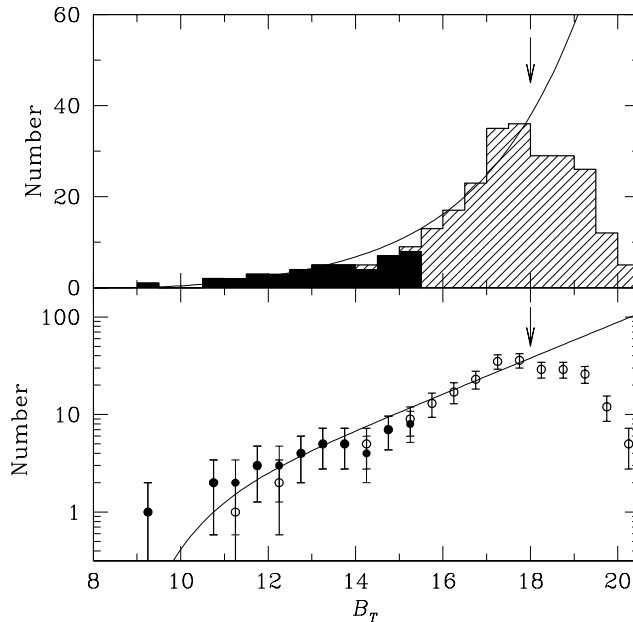


Figure 1. *Upper panel*) Luminosity function of 269 early-type galaxies that are classified by Ferguson (1989) as members of the Fornax cluster. (*upper, hatched histogram*). The arrow shows the FCC completeness limit, while the solid curve shows the best-fit Schechter function for E+S0+dE+dS0 galaxies from Ferguson & Sandage (1991). The filled lower histogram shows the luminosity function for the 44 early-type galaxies in the ACS Fornax Cluster Survey. (*Lower panel*) Same as above, expect in logarithmic form. The open circles show the luminosity function of 269 early-type members of the Fornax cluster according to Ferguson (1989). The arrow shows the completeness limit of the FCC, while the filled circles show the luminosity function of galaxies in the ACS Fornax Cluster Survey. The solid curve is the same as that shown in the upper panel.

the best calibration of the z_{850} -band SBF method. We will determine the zeropoints to 0.05 mag and measure its stellar population dependence as inferred from $(g_{475} - z_{850})$ colors.

- We will perform a detailed study of the properties of dwarf nuclei, the most massive GCs and Ultra-Compact Dwarfs, and the relation between them (e.g., Haşegan *et al.* 2005).
- Using archival *Chandra* data, we will study the properties of low-mass X-ray binaries and their connection with GCs for our program galaxies (e.g., Jordán *et al.* 2004).

References

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