

## SX Phe stars in the Fornax dSph galaxy

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### Introduction

We started an observational project on the Fornax dSph galaxy to exploit the possibilities offered by the use of pulsating stars as distance indicators. In particular, the driving idea was to search for stars with  $P < 0.20$  d, since the size and surface brightness of the Fornax galaxy made it a very suitable target for wide-field monitoring with a middle-class telescope. Following the classification used for galactic variables, short-period pulsators in the Fornax galaxy should be SX Phe variables, since they are expected to be metal-poor stars.

### Observations

To pursue our goal we used the Wide-Field Imager (WFI) at the 2.2 m ESO-MPI telescope; we surveyed the northern part of the Fornax galaxy in November 2001. We obtained dense  $B$ -time series (exposure time 700 sec) to perform a reliable frequency analysis and complementary, less continuous  $V$ -time series (exposure time 1000 sec) to obtain mean magnitudes and amplitudes in a two-colour system. Preliminary results have been reported by Clementini et al. (2006) and Poretti et al. (2006). We have now completed the reduction of the eight chips of the WFI mosaic, detecting 86 short-period stars and hundreds of RR Lyr variables.

We emphasize that the detection of short-period variables was not an easy task. Indeed, the short periods made the regular variability hardly discernible when plotting the points separated by 12 min from each other. Therefore, we carefully applied frequency analysis methods both to the whole time series and to the measurements of a single night. This procedure allowed us to reject spurious candidates (i.e., stars for which the scatter in just one night mimics an apparent variability) and to enhance the real variability.

Not all the 86 SX Phe stars belong to the field of the Fornax galaxy. In chip #6 the globular cluster For 3 is resolved into stars, at least in the outer parts, and several RR Lyr stars have been found in the outer regions. Amongst them, two SX Phe variables have also been detected and we suggest that they very probably belong to For 3. The detection of SX Phe variables in a globular cluster in another Local Group galaxy is a remarkable observational result. The distribution of the standard deviations of the least-squares fits ranges between 0.04 and 0.20 mag with an average precision of 0.08 mag. This is a very satisfactory result considering that the variables have mean  $B$ -magnitudes between 22.5 and 24.2.

The Fornax sample is characterized by short-periods (left panel in Fig. 1): 59% of the stars have a period less than 0.07 d and 81% less than 0.08 d. There is an evident underabundance of stars with  $P > 0.10$  d, corroborating the hypothesis that these variables are likely metal-poor stars. The full  $B$  amplitudes range in an almost uniform way from 0.20 to 0.90 mag with an isolated peak in the 0.40–0.50 mag interval (right panel in Fig. 1). This fact strongly suggests that the majority if not all the variables are radial pulsators.

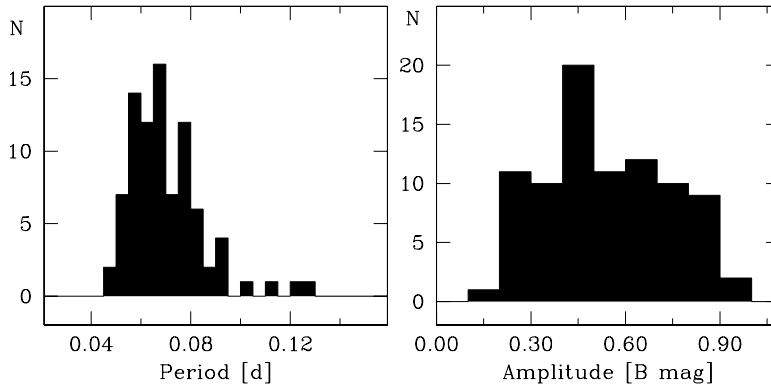


Figure 1: Distribution of the periods and amplitudes of SX Phe stars in the Fornax dSph galaxy

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## References

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