

## THE NEXT GENERATION VIRGO CLUSTER SURVEY

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**Abstract.** The Next Generation Virgo Cluster Survey (NGVS) is a large program on the Canada France Hawaii Telescope to survey the Virgo Cluster (PI: Laura Ferrarese, <http://astrowww.phys.uvic.ca/lff/NGVS.html>). The survey will perform deep imaging of the central region of the cluster up to its virial radius and in five band-passes (u\*,g',r',i',z'). The total exposure time will be 771 hours over 4 semesters from Spring 2009 to Spring 2012, with a French exposure time contribution of 325 hours. Because of its depth and extension, the survey will be the main optical reference for all future studies of the Virgo cluster in the coming decades. The program's main scientific objectives are: the characterization of the faint-end shape of the luminosity function, galaxy scaling relations, globular cluster populations, the role of environmental effects in galaxy evolution, the role of nuclear star clusters and black holes in galaxy evolution, star formation and chemical enrichment in the cluster environment.

### 1 Introduction

The Next Generation Virgo Cluster Survey (NGVS) is a large program on the Canada France Hawaii Telescope to survey the Virgo Cluster (PI: Laura Ferrarese). The survey will perform deep imaging in five band-passes (u\*,g',r',i',z') of the region inside the virial radius of the cluster, for a total area of 104 deg<sup>2</sup>. The total exposure time will be 771 hours over 4 semesters, from Spring 2009 to Spring 2012, with a French exposure time contribution of 325 hours. The program is an international collaboration of mainly French, Canadian, and Hawaiian scientists.

### 2 Scientific objectives

The main objectives of the program are: the characterization of the faint-end shape of the luminosity function, galaxy scaling relations, globular cluster populations, the role of environmental effects in galaxy evolution, the role of nuclear star clusters and black holes in galaxy evolution, star formation and chemical enrichment in the cluster environment.

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In Spring 2008, we started collecting our first data from a Pilot Project that includes the central 4 deg<sup>2</sup> of the Virgo Cluster, centered on M87 (Canadian PI: Laura Ferrarese, French PI: Simona Mei).

Fig. 1 and 2 show our first images. The two figures are composite color images of the spectacular galaxy NGC 4438 and of the region around M87, respectively. Our images were reduced with TERAPIX.

The excellent quality of these images confirms that, with respect to previous optical surveys (e.g., the Virgo Cluster Catalogue (VCC); Binggeli et al. 1985, 1987), the NGVS will yield improvements in depth ( 100x in luminosity for point sources), surface brightness ( 40x), angular resolution ( 6x in encircled energy), completeness, wavelength coverage (five bands versus one for the VCC), and synergistic opportunities with the many planned or ongoing Virgo surveys at other wavelengths.

Our first large-program observations taken in 2009 are being reduced and analyzed by the collaboration.



**Fig. 1.** On the left, the central region of the Virgo cluster from our pilot project. On the right, NGC 4438, composite image from our pilot project. These images were reduced with TERAPIX. Credit : NGVS/CNRS/CEA

## References

- Binggeli, B. et al. 1985, AJ, 90, 1681
- Binggeli, B. et al. 1987, AJ, 94, 251