Stellar Evolution and Pulsation - Galaxy Clusters

International School of Astrophysics Francesco Lucchin

Teramo, December 9-13, 2014

Scientific Organizing Committee

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FOREWORD

The International School of Astrophysics ”Francesco Lucchin” was held in Teramo on 9-13 December 2014. The main aim of the School was to provide to young researchers a comprehensive background and to access to the most recent theoretical and empirical findings in two forefront research topics of Astrophysics: *Stellar Evolution and Pulsation* (Chairs: Adriano Pietrinferni and Marcella Marconi) and *Galaxy Clusters* (Chair: Piero Rosati). According to the consolidated tradition, it provided the opportunity to join together Italian and foreign PhD students and young researchers from several Italian universities and International research institutes. More than 30 participants coming from different countries attended the school.

Along the five days of the school, the speakers reviewed fresh results on the leading topics of Stellar Astrophysics, presenting the updated *status quo* of theory of stellar evolution and pulsation feeding new input from observations of the stellar populations in the Milky Way and Local Group galaxies, collected with the most important telescopes in the world and space facilities. Similarly, the series of lectures on Galaxy Clusters focused on the physical processes of galaxy formation in a cosmological framework, involving dark matter and baryons in determining the observed statistical properties of galaxies and their dependence on cosmic time and on environment evolution. The basic properties of galaxy clusters have been presented as well, providing an overview of current and upcoming extragalactic surveys that will enable a leap forward in cluster science in the next decade and beyond.

The days flew past in a friendly and pleasant atmosphere, with profitable discussions between students and lecturers, reaching its best during the social event held in the beautiful setting of the Cloister of San Giovanni in the ancient convent built in the late XIV century in the center of Teramo and nowadays hosting the Istituto Statale Superiore di Studi Musicali e Coreutici *Gaetano Braga*. The master musicians and students of the institute gave their performances according to a programme of classical and modern musics, and joint together their sensibility with astronomers. It is a pleasure to thank the director Federico Paci of the Istituto *Gaetano Braga* for the collaborative experience.

We would like to warmly thank all our sponsors. The participation of young reaseachers and lecturers has been made possible by the financial support of the Istituto Nazionale di Astrofisica (INAF), the Observatories of Napoli and Teramo, and the Ferrara University. In particular, the Observatory of Teramo has a long tradition in organizing the School of Astrophysics ”Francesco Lucchin”, starting from the edition held in Giulianova (Teramo) in 1996, followed by the schools in Sirolo (Ancona) in 2001, and in Teramo in 2012. Special thanks to the director of the Teramo Observatory, Roberto Buonanno, who gave us the possibility to use the observatory facilities and hosted all the participants for the section dedicated to the students' talks. We would like to thank the technical and administrative staff of the Teramo Observatory, and in particular we acknowledge the precious effort of Sabrina Ciprietti for her role in the local organizing committee, that so effectively helped in a fully successful and enjoyable meeting. We are also very grateful to Massimo Quintini for mastering the web page of the school. The cover of this volume were created by Lucio P. Pacinelli. We would like to express our deep gratitude for his friendly help.

Gabriella Raimondo, Adriano Pietrinferni, Michele Cantiello

Cover caption: Illustration of the Astronomical Observatory of Teramo and the Gran Sasso Mountain in the background (by L. Pacinelli). At the top of the figure the drawing Galileo Galilei made of the Praesepe cluster (from Sidereus Nuncius, 1610).