



Il Colle di
Galileo

Galaxy Evolution and Environment: observations meet simulations and theory

Department of Physics and Astronomy, University of Florence, Arcetri, November 15-17, 2017

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Abstract. The series of conferences “Galaxy Evolution and Environment” aims to bring together the astronomical community active in Italy in this field of research to share the results of ongoing projects and to stimulate new ideas and collaborations. The fifth edition of the GEE took place in Arcetri (Florence) and was based on the comparison of observational results on the evolutions of galaxies and their dependence on the environment with regard to simulations and theoretical predictions.

Keywords. Galaxies: evolution, galaxies: general, galaxies: clusters, galaxies: groups, galaxies: interactions, intergalactic medium, ISM: general

The evolution of galaxies is strictly related to the environment in which galaxies are formed and the constantly evolving environment which they encounter during their lifetime. Understanding and distinguishing the main mechanisms that shape galaxies over time (e.g. galaxy-galaxy interactions, interactions between galaxies and intergalactic medium, gas stripping, growth of cosmic structures) is one of the main objectives of modern extragalactic astronomy. This is a very active field of research in Italy, where many researchers are involved in observational programmes at different wavelengths, aimed at tracing the properties of different galactic components (stellar and gaseous) throughout cosmic time and in different environments (from low-density regions to groups and clusters of galaxies). Observational efforts must go hand in hand with the development of theories and complex simulations of galaxy evolution. It was with this in mind, that the “Galaxy Evolution and Environment” (GEE) series of conferences started in 2009 with its first edition held in Bologna, and has been repeated every two years since then (Milan, Padua, Naples). The fifth edition of the GEE was held in Arcetri, hosted by the Physics and Astronomy Department of the University of Florence, and

was organised by Anna Gallazzi and Stefano Zibetti (INAF-ArcetriAO) together with Angela Iovino (INAF-BreraAO) and Bianca Poggianti (INAF-PaduaAO).

The scientific purpose of the GEE5 meeting was to discuss recent progress and ongoing studies on the evolution of galaxies and their environment from the joint perspective of observations on the one hand, and simulations and theory on the other. The meeting programme was organised into sessions that covered different topics. Large spectroscopic surveys are used by many groups to follow the evolution of galaxies through time and space, in different environments, monitoring their structure, stellar populations and the rate of star formation. Particular attention is paid to galaxy clusters, as ideal galaxy evolution laboratories, and to the study of the evolution of their dominant central galaxy (BCG) and the flow of baryons within them. The Italian community is strongly involved in the study of the ISM of galaxies, from different points of view (gas in different phases, dust) and using tracers at different wavelengths. Several contributions have shown how the interstellar medium reacts to different properties of galaxies, and how internal feedback processes (such as winds fed by star formation or AGN) and the environment can influence the distribution and content of the interstellar medium in galaxies (see Fig. 1). The absolute complexity of these observations can only be addressed with the help of a theoretical context and increasingly precise simulations that include the physics of the various phases (dark matter and baryons), as highlighted in some summary presentations.

The meeting was attended by about 60 astronomers working in Italy and some from abroad, with a significant contribution by PhD students and young researchers. The GEE5 saw a very vibrant and active community, with an extensive network of collaborations, ready for future challenges, in which a major role will be played by deep and wide-field spectroscopic surveys and the advent of giant and revolutionary telescopes, such as E-ELT and the James Webb Space Telescope.

The meeting website, along with all the presentations, is available at this link: <http://www.arcetri.astro.it/gee5>.

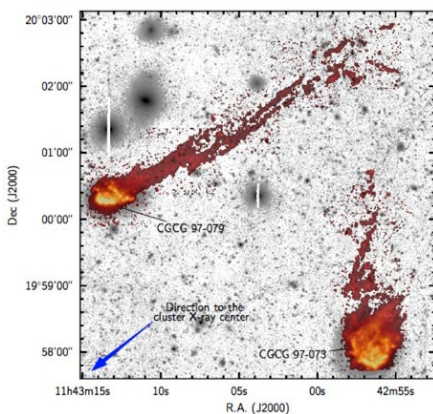


Figure 1. Galaxies in the Abell 1367 cluster with an interstellar medium stripped by “ram-pressure” due to the motion of galaxies through the intracluster medium. The grey background represents the stellar optical emission; the yellow-orange maps represent the ionized gas (H α) that traces the stripped interstellar medium (credits to G. Gavazzi in this conference).