

Scientific curriculum of Amata Mercurio

Education:

2004: PhD in Physics, University of Trieste

Thesis title: Dynamical evolution and galaxy populations in the cluster ABCG 209 at $z=0.2$,

Tutor: Dr M. Girardi

2000: Master Degree in Physics, University “Federico II”, Naples; Grades 110/110 cum laude

Thesis title: On the internal kinematics of elliptical galaxies

Supervisors: Prof. M. Capaccioli, Prof. G. Busarello.

Research interests:

A. Mercurio is mainly involved in the study of multi-wavelength galaxy properties in different environments, analyzing the luminosity function and the observed correlations of galaxy properties (e.g. color-magnitude and photometric plane relation), as well as the spectroscopic properties of galaxies (e.g. dynamics, line indices, velocity dispersion) in clusters and super-clusters. A. Mercurio developed dedicated software to measure spectral signatures (line indices) in galaxies and compare them to stellar population synthesis models in order to derive detailed star formation histories as a function of environment, characterized through both local density and dynamical properties of the clusters where galaxies reside. A. Mercurio acquired the expertise in the dynamical analysis of galaxy clusters during her PhD, working with the group of dr. M. Girardi.

Scientific collaborations:

A. Mercurio is involved in international collaborations with the university of Birmingham (C.P. Haines), the University of Durham (R. Smith) and the Australian National University (M. Dopita), aimed at studying the properties of galaxies in the Shapley supercluster taking advantage of already available multi-wavelength observations, including UV, optical, NIR, X-ray, radio and medium resolution spectroscopy.

Contracts:

2008-2010 Research contract (18 months), INAF-Osservatorio Astronomico di Capodimonte, Naples (INAF-OAC): Study of star formation and nuclear activity of galaxies in the Shapley super-cluster .

2008 Collaboration Contract (6 months), Physics Department, University “Federico II”, Naples (UNINA): Development of techniques for the study of photometric and spectroscopic galaxy properties as a function of the environment and possible applications within KIDS survey.

2006-2008 Research contract (18 months), INAF-OAC: Study of environmental effects on galaxy evolution in clusters and super-clusters.

2005-2006 Research contract (20 months), INAF-OAC: Evolution and environmental dependence of galaxy properties: preparation of the VST survey.

2004-2005 Research contract (12 months), INAF-OAC: Evolution of normal and active galaxies.

2000 Contract (4.5 months), INAF-OAC: Test of the software for the reduction of ESO-WFI (Wide Field Imager) data and data analysis of the Capodimonte Deep Field.

Grants and honors:

2005 Bronze medal of Tacchini prize for the PhD thesis.

2002 Grant from the IAC institute to attend the XIV Canary Islands Winter School of Astrophysics winter school on Dark Matter and Dark Energy in the Universe.

2002 Grant from the INAF-OAC to attend the National School of Astronomical Technologies on Instruments, techniques and methods for high spatial and spectral resolution in the Astronomy from the earth.

Successful Observational Proposals:

2004 P.I. of two proposals ESO-NTT (P75) e TNG-DOLORES, Multi-Object Spectroscopy.

2001-2006 Co-P.I. in ESO-NTT, ESO-VLT, AAOmega-Anglo Australian Telescope, SPITZER, WIFES.

2001 Co-P.I and observer Multi-Object Spectroscopy and optical Photometry, ESO-NTT, La Silla, Chile (P68).

Teaching experience:

2009: Lecturer of 6 workshops held in Potenza and Lagonegro during the Professional Refresher Workshops for the teachers of AUSER, Basilicata.

2007: two lectures of the course "The Institutes of Astrophysics" at UNINA.

Since 2003 I am involved as lecturer during school visits at INAF-OAC for students.

A. Mercurio interacted with a number of students at INAF-OAC and co-supervised one Master Thesis project.

Publications

Refereed Articles

Merluzzi, P., Mercurio, A., Haines, C. P., Smith, R. J., Busarello, G., Lucey, J. R., *ACCESS: NIR Luminosity and Stellar Mass Function of Galaxies in the Shapley Supercluster Environment*, 2010, MNRAS, 402, 753

Gargiulo, A., Haines, C. P., Merluzzi, P., Smith, R. J., Busarello, G., Lucey, J. R., Mercurio, A., Capaccioli, M., *On the origin of the scatter around the Fundamental Plane: correlations with stellar population parameters*, 2009, MNRAS, 397, 75

Mercurio, A., La Barbera, F., Haines, C. P., Merluzzi, P., Busarello, G. & Capaccioli, M., *Global Properties of the Rich Cluster ABCG 209 at $z \sim 0.2$. Spectroscopic and Photometric Catalogue*, 2008, MNRAS, 387, 1374

Haines, C. P., Gargiulo, A., La Barbera, F., Mercurio, A., Merluzzi, P. & Busarello, G., *The Different Physical Mechanisms that Drive the Star-Formation Histories of Giant and Dwarf Galaxies*, 2007, MNRAS, 381, 7

Paulin-Henriksson, S., Antonuccio-Delogu, V., Haines, C. P., Radovich, M., Mercurio, A. & Becciani, U., *Weak Lensing Mass Reconstruction of the Galaxy Cluster Abell 209*, 2007, A&A, 467, 427

Haines, C. P., La Barbera, F., Mercurio, A., Merluzzi, P., & Busarello, G., *The different environmental dependencies of star-formation for giant and dwarf galaxies*, 2006, ApJL, 647L, 21

Haines, C. P., Merluzzi, P., Mercurio, A., Gargiulo, A., Krusanova, N., Busarello, G., & La Barbera, F., *Shapley Optical Survey - II. The effect of environment on the colour-magnitude relation and galaxy colours*, 2006, MNRAS, 371, 55

Mercurio, A., Merluzzi, P., Haines, C. P., Gargiulo, A., Krusanova, N., Busarello, G., La Barbera, F., Capaccioli & M., Covone, G., *Shapley Optical Survey - I. Luminosity functions in the supercluster environment*, 2006, MNRAS, 368, 109

La Barbera, F., Covone, G., Busarello, G., Capaccioli, M., Haines, C. P., Mercurio, A. & Merluzzi, P., *New insights into the structure of early-type galaxies: the Photometric Plane at $z\sim 0.3$* , 2005, MNRAS, 358, 1116

Alcalà, J. M., Pannella, M., Puddu, E., Radovich, M., Silvotti, R., Arnaboldi, M., Capaccioli, M., Covone, G., Dall'Ora, M., Grado, A., De Lucia, G., Longo, G., Mercurio, A., Musella, I., Napolitano, N., Pavlov, M., Rifatto, A., Ripepi, V., & Scaramella, R., *The Capodimonte Deep field I - presentation of the survey and first follow-up studies*, 2004, A&A, 428, 339

La Barbera, F., Merluzzi, P., Busarello, G., Massarotti, M., & Mercurio, A., *Probing galaxy evolution through the internal colour gradients, the Kormendy relations and the Photometric Plane of cluster galaxies at $z=0.2$* , 2004, A&A, 425, 797

Haines, C. P., Mercurio, A., Merluzzi, P., La Barbera, F., Massarotti, M., Busarello, G., & Girardi, M., *Galaxy Evolution in the Environment of ABCG 209*, 2004, A&A, 425, 783

Mercurio, A., Busarello, G., Merluzzi, P., La Barbera, F., Girardi, M., & Haines, C. P., *Transformations of galaxies in the environments of the cluster ABCG 209 at $z\sim 0.2$* , 2004, A&A, 424, 79

La Barbera, F., Busarello, G., Massarotti, M., Merluzzi, P., & Mercurio, A., *Evolution of UV--NIR Structural Properties of Cluster Galaxies*, 2003, A&A, 409, 21

Mercurio, A., Massarotti, M., Merluzzi, P., Girardi, M., La Barbera, F., & Busarello, G., *Optical Luminosity Functions of the Abell Galaxy Cluster ABCG 209 at $z=0.21$* , 2003, A&A, 408, 57

Mercurio, A., Girardi, M., Boschin, W., Merluzzi, P., & Busarello, G., *Structure and evolution of galaxy clusters: Internal dynamics of ABCG 209 at $z\sim 0.21$* , 2003, A&A, 397, 431

PhD Thesis

Mercurio, A., 2004, *Dynamical evolution and galaxy populations in the cluster ABCG 209 at $z=0.2$* , *Tesi di dottorato*, University of Trieste, Italy, astro-ph/0412077

Non-refereed Publications

Mercurio, A., Haines, C. P., Gargiulo, A., La Barbera, F., Merluzzi, P.; Busarello, G., *Galaxy evolution as a function of environment and luminosity*. Proceedings of the Workshop: *The interface between galaxy formation and AGN's*, 18-22 May 2008, Vulcano (Messina), arXiv:1006.5001

La Barbera, F., de Carvalho, R. R., Gal, R. R., Busarello, G., Haines, C. P., Mercurio, A., Merluzzi, P., Capaccioli, M. & Djorgovski, S. G., *Environmental Effects on Internal Color Gradients of Early-Type Galaxies*, proceeding of the conference Galaxy Evolution Across the Hubble Time, Edited by F. Combes and J. Palous, Proceedings of the International Astronomical Union 2, IAU Symposium #235, held 14-17 August, 2006, Praga, Repubblica Ceca. Cambridge: Cambridge University Press, 2007, pp. 191

Haines, C. P., Gargiulo, A., Mercurio, A., Merluzzi, P., La Barbera, F., Busarello, G. & Capaccioli, M., *The Different Environmental Dependencies and Evolutions of Giant and Dwarf Galaxies*, proceeding of the conference Galaxy Evolution Across the Hubble Time, Edited by F. Combes and J. Palous, Proceedings of the International Astronomical Union 2, IAU Symposium #235, held 14-17 August, 2006, Praga, Repubblica Ceca. Cambridge: Cambridge University Press, 2007, pp. 202

Haines, C. P., Gargiulo, A., Mercurio, A., Merluzzi, P., La Barbera, F., Busarello, G., Capaccioli, M., *The Environmental Dependencies of Star-formation and the Origin of the Bimodality in Galaxy Properties*, Cosmic Frontiers ASP Conference Series, Vol. 379, proceeding della conferenza *Cosmic Frontiers*, 31 July-4 August 2006 all'Università di Durham UK. Edit by Nigel Metcalfe e Tom Shanks., p.206

Mercurio, A., Merluzzi, P.; Haines, C. P., Gargiulo, A., Busarello, G., La Barbera, F., Capaccioli, M., *Galaxy Transformations in Different Environments of the Shapley Supercluster*, proceeding della conferenza *Galaxy Evolution Across the Hubble Time*, Edito by F. Combes and J. Palous, Proceedings of the International Astronomical Union 2, IAU Symposium #235, held 14-17 August, 2006, Praga, Repubblica Ceca. Cambridge: Cambridge University Press, 2007, pp.224

Mercurio, A., Busarello, Merluzzi, P., La Barbera, F. & Haines, C. P., *Galaxy Populations in the Cluster Abell 209 at $z=0.2$* , 2006, Mem. S.A.It. Supplement (MSAIS), Vol. 9, p.322

La Barbera, F., Merluzzi, P., Busarello, G., Massarotti, M., Capaccioli, M., Mercurio, A., & Haines, C. P., *Probing the Galaxy Formation Scenario by the Structural Properties at redshift $z=0.2$* , Proceedings della conferenza internazionale *Observing, Thinking and Mining the Universe*, Sorrento (NA), 22-27 September 2003, edit by G. Miele and G. Longo. ISBN 981-238-688-2. World Scientific Publishing and Mainland Press, Singapore, p.325

Haines, C. P., Mercurio, A., Merluzzi, P., La Barbera, F., Busarello, G., Massarotti, M., & Capaccioli, M., *The Effect of Cluster Environment on Galaxy Evolution*, Proceedings della conferenza internazionale *Observing, Thinking and Mining the Universe*, Sorrento (NA), 22-27 September 2003, edit by G. Miele and G. Longo. ISBN 981-238-688-2. World Scientific Publishing and Mainland Press, Singapore, 2004, p.315

Busarello, G., La Barbera, F., Merluzzi, P., Haines, C. P., Mercurio, A., & Capaccioli, M., *Structure and Evolution of Cluster Galaxies*, Proceedings della conferenza internazionale *Observing, Thinking and Mining the Universe*, Sorrento (NA), 22-27 September 2003, edit by G. Miele and G. Longo. ISBN 981-238-688-2. World Scientific Publishing and Mainland Press, Singapore, 2004, p.55

Capaccioli, M., Alcalà, J. M., Radovich, M., Silvotti, R., Pannella, M., Arnaboldi, M., Puddu, E., Rifatto, A., De Lucia, G., Mercurio, A., Napolitano, N., Grado, A., Longo, G., Dall'Ora, M., Ripepi, V., & Musella, I., *The Capodimonte Deep field: research projects*, 2003, Mem. S.A.It. (MmSAI), Vol. 74, p.452

Mercurio, A., Girardi, M., Boschin, W., Merluzzi, P., & Busarello, G., *Internal Dynamics of ABCG 209 at $z\sim 0.21$* , 2003, Mem. S.A.It. Supplement (MSAIS), Vol. 3, p.214

Alcalà, J. M., Radovich, M., Silvotti, R., Pannella, M., Arnaboldi, M., Capaccioli, M., Puddu, E., Rifatto, A., De Lucia, G., Mercurio, A., Napolitano, N., Grado, A., Longo, G., Dall'Ora, M., Ripepi, V., Musella, I., & Scaramella, R., *Data reduction and astrometry strategies for wide-field images: an application to the Capodimonte Deep field*, 2002, SPIE, 4836, 406

Public Outreach

Brescia, M. & Mercurio, A. *Deep impact*, Med, Il mensile dell'alta qualità umana", 2004, Numero 4. anno 2, Novembre 2005, p.9-10

Mercurio, A. & Brescia, M. *Energia dall'acqua*, ``Med, Il mensile dell'alta qualità umana", 2004, Numero 3. anno 2, Giugno 2005, p.8

Brescia, M. & Mercurio, A. *Il futuro incerto: la biomassa*, Med, Il mensile dell'alta qualità umana, 2004, Numero 2. anno 1, Dicembre 2004-Gennaio 2005, p.20-23

Mercurio, A. & Brescia, M. *Energia e Benessere: l'obiettivo del terzo millennio - Parte I*, ``Med, Il mensile dell'alta qualità umana", 2004, Numero 1. anno 1, Novembre 2004, p.15-17