

Barbara Sartoris

Curriculum Vitae et studiorum

Personal informations

Name	Barbara
Surname	Sartoris
Date of Birth	May 12, 1983
Place of Birth	Turin (Italy)
Nationality	Italian

Contacts

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Employment and Education

Sept. 2002 - Sept. 2005	Undergraduated studies in Physics at the University of Turin.
Sept. 2005	Bachelor's degree in Physics at the University of Turin. Thesis title: ***Study of the Colour Index of Early-Type Galaxies***. Supervisors: Prof. S. Massaglia and Dr. A. Capetti. Grading: **110/110**.
Apr. 2008	Master degree in Astrophysics and Cosmic Physics at the University of Turin. Thesis title: *Study of the Cosmic Microwave Background Radiation in the DGP Cosmological Model*. Supervisor: Prof. A. Diaferio. Grading: **110/110 cum laude**.

Jan. 2009 - Dec. 2011	Ph.D. student at the Department of Physics, University of Trieste, Italy.
Jan. 2011 - Dec. 2011	**Awarded with a Studentship at European Southern Observatory,** Garching, Germany.
Mar. 2012	PhD in Physics with the certification of Doctor Europaeus at the University of Trieste. Thesis title: ***Cosmological Constraints with Clusters of Galaxies***. (https://dl.dropboxusercontent.com/u/28968703/sartoris_phd.pdf). Supervisor: Prof. S. Borgani. Co-supervisor: Prof. P. Rosati.
Jan. 2012 - Sept. 2012	Post-doctoral researcher at the Excellence Cluster Universe (Garching bei München, Germany).
Oct. 2012 - Sept. 2014	Post-doctoral researcher at the University of Trieste (Trieste, Italy).
Since Oct. 2014 (2 years grant)	Post-doctoral researcher at the University of Trieste (Trieste, Italy). *Observational cosmology with galaxy clusters: from current surveys to Euclid*.

Experience in training young scientists

2011	Co-Supervision of undergraduate student Matteo Costanzi at the University of Trieste.
Jan. 2012 - Dec. 2014	Co-Supervision of PhD student Matteo Costanzi at the University of Trieste.
Since Mar. 2015	Co-Supervision of undergraduate student Lorenzo Pizzuti at the University of Trieste.

Attended schools

May 24-29, 2009	School of Astrophysics Francesco Lucchin - Bertinoro (Bologna, Italy). Contributed talk: *Cosmology with galaxy clusters*.
Sept. 20-30, 2009	Highlights in Astrophysics - Rabac (Croatia). Contributed talk: *Cosmology with galaxy clusters*.

Research interests

Observational Cosmology	Optical and X–ray Studies of Galaxy Clusters; Cluster Mass Profiles from spectroscopic data; Dark Matter properties.
Theoretical cosmology	Cosmological constraints from cluster surveys; Formation of Large-Scale Structure in the Universe; Non-Standard Cosmological Models; Formation and Properties of Galaxy Clusters; Statistical Properties of the Large-Scale Cluster Distribution.

Publications

Publications on refereed journals: 12 (+2)

Publications on non-refereed journals: 2

Citations from ADS on refereed journals: 158 H-index= 7

Citations from ADS on non-refereed journals: 581 H-index= 8

Publication link: http://tinyurl.com/sartoris-publications

B. Sartoris, et. al.
Next Generation Cosmology: Constraints from the Euclid Galaxy Cluster Survey, submitted to MNRAS, arXiv:1505.02165.

M. Girardi, ..., **B. Sartoris**, et al..
CLASH-VLT: Substructure in the galaxy cluster MACS J1206.2-0847 from kinematics of galaxy populations, A&A accepted, arXiv:1503.05607.

Refereed publications

M. Costanzi, B. Sartoris, M. Viel, S. Borgani.
Neutrino constraints: what large-scale structure and CMB data are telling us?, 2014, JCAP, 10, 81.

P. Tozzi,..., **B. Sartoris**, et. al.
Chandra Deep Observation of XDCP J0044.0-2033, a Massive Galaxy Cluster at $z > 1.5$, 2015, ApJ, 799, 93.

B. Sartoris, et. al.
CLASH-VLT: Constraints on the Dark Matter Equation of State from Accurate Measurements of Galaxy Cluster Mass Profiles, 2014, ApJ, 783L, 11S, ApJ Letter.

A. Mana,..., **B. Sartoris**, et. al.
Combining clustering and abundances of galaxy clusters to test cosmology and primordial non-Gaussianity, 2013, MNRAS, 434, 684M.

M. Costanzi, **B. Sartoris**, J. Xia, A. Biviano, S. Borgani, M. Viel.
Constraining neutrino properties with a Euclid-like galaxy cluster survey, 2013, JCAP, 06, 020C.

P. Tozzi,..., **B. Sartoris**, et. al.
Chandra ad optical/IR observations of a massive, newly discovered galaxy cluster at $z \sim 1.5$, 2013, A&A, 551A, 45T.

B. Sartoris, S. Borgani, P. Rosati, J. Weller.
Probing dark energy with the next generation X-ray surveys of galaxy clusters, 2012, MNRAS, 423, 2503S.

B. Sartoris, S. Borgani, C. Fedeli, S. Matarrese, L. Moscardini, P. Rosati, J. Weller.
The potential of X-ray cluster surveys to constrain primordial non-Gaussianity, 2010, MNRAS, 407, 2339 .

Refered publications in collaborations

C. Grillo, ..., **B. Sartoris**, et al..
CLASH-VLT: Insights on the mass substructures in the Frontier Fields Cluster MACS J0416.1-2403 through accurate strong lens modeling, 2014, ApJ, 800, 38.

M. Annunziatella, ..., **B. Sartoris**, et al.
CLASH-VLT: The stellar mass function and stellar mass density profile of the z=0.44 cluster of galaxies MACS J1206.2-0847, 2014, A&A, 571, A80.

V. Presotto,..., **B. Sartoris**, et. al.
Intracluster light properties in the CLASH-VLT cluster MACS J1206.2-0847, 2014, A&A, 565A, 126P.

A. Biviano,..., B. Sartoris, et. al.
CLASH-VLT: The mass, velocity-anisotropy, and pseudo-phase-space density profiles of the z = 0.44 galaxy cluster MACS J1206.2-0847, 2013, A&A, 558A, 1B.

Non-refered publications

Laureijs, R and the Euclid team.
Euclid Definition Study Report, 2011, arxiv:1110.3193.

B. Sartoris & S. Borgani.
Forecasting cosmological constraints from future X-ray cluster surveys Contribution to the Proceedings of the Rencontres de Moriond on Cosmology (La Thuile - 13-20 March 2010) .

S. Borgani, P. Rosati, **B. Sartoris**, P. Tozzi, R. Giacconi.
Astrophysics and cosmology with galaxy clusters: the WFXT perspective Contribution to the Proceedings of WFXT Science Meeting (Bologna - 25-26 November 2009) .

Attended conferences

- February 25-27, 2009 - New Horizons For Modern Cosmology, Dark Energy - Florence (Italy)
- July 6-10, 2009 - **By invitation of the SOC**: Wide Field X-ray Telescope Collaboration - Sexten (Italy)
- November 25-26, 2009 - WFXT Science Meeting - Bologna (Italy)

- March 13-20, 2010 - Rencontres de Moriond Cosmology - La Thuile (Aosta, Italy)
  Contributed talk: *Forecasting cosmological constraints from future X-ray cluster surveys*

- July 12-16, 2010 - **By invitation of the SOC**: The Future of Cosmology with Large-Scale Surveys - Sexten (Italy)
  Contributed talk: *Forecasts on non-Gaussianity and Dark Energy with WFXT*

- March 14-18, 2011 - Astrophysics and Cosmology with Galaxy Clusters - Santa Barbara (USA)

- July 04-08, 2011 - **By invitation of the SOC**: A New Generation of Galaxy Clusters Surveys - Sexten (Italy)
  Contributed talk: *Probing Dark Energy with current and future cluster surveys*

- February 27 - March 01, 2012 - Symposium Symmetries and Phases in the Universe - Irsee (Munich, Germany)

- May 14-16, 2012 - Euclid Mission Conference 2012 - Copenhagen (Denmark)

- May 12-17, 2013 - Euclid Consortium Meeting - Leiden (Netherlands)
  Contributed talk: *Cosmology constraints on neutrinos properties with current and future cluster surveys*

- July 01-05, 2013 - Tracing Cosmic Evolution with Clusters of Galaxies - Sexten (Italy)
  Contributed talk: *Cosmology with current and future cluster surveys*

- September 15-19, 2013 - CLASH team meeting - RAS, London (UK)
  Contributed talk: *Constraints on the DM equation of state parameter*

- December 15-19, 2013 - Euclid OU-LE3 meeting - Nice (France)

- May 05-09, 2014 - Euclid Consortium Meeting - Marseilles (France)
  Contributed talk: *Cosmology with Euclid cluster survey*

- July 07-11,2014 - **By invitation of the SOC**: Building the Euclid Cluster Survey - Sexten (Italy)
  Contributed talk: *Cosmology with Euclid cluster survey*
- October 01-03,2014 - The CLASH-VLT Meeting - Naples (Italy)
  Contributed talk: *The pseudo-phase-space density profile*

Seminars and invited talks

- April 8, 2010 - SISSA - Trieste (Italy)
  Forecasting cosmological constraints from future X-ray cluster surveys

- June 20, 2011 - **Invited talk** - Institut für Theoretische Physik - Heidelberg (Germany)
  Cosmology with current and future cluster surveys

- February 19, 2014 - **Invited talk** - Observatory of Naples - Naples (Italy)
  Constraints on the Dark Matter equation of state parameter

- December 9-13, 2014 - **Invited lectures** - International School of Astrophysics "Francesco Lucchin" 2014 - Teramo (Italy)
  Constraining cosmological models with galaxy cluster samples

- July 15, 2015 - **Invited talk** - Universitaets-Sternwarte Muenchen - Munich (Germany)
  Current and future cluster surveys: the importance of mass calibration

- August 3-14, 2015 - **Invited talk** - IAU XXIX General Assembly - Honolulu (Hawaii - USA)
  Cosmology with galaxy clusters

Professional Activity

Peer reviewer	Referee for international scientific journal Physical Review D
Conference organization	Local organizer (LOC) of the Conference "Tracing Cosmic Evolution with Clusters of Galaxies" - Sexten (July 2013).
	Coordinator of the group: Building the pipeline for cosmological constraints at the conference "Building the Euclid Cluster Survey" - Sexten (July 2014).

Tecnical skills

Operating Systems	Linux, MAC OS, Windows
Programming languages	c, c++, Fortran, IDL

Languages

Italian (native), English (fluent)

Affiliations

- INAF Associate
- Euclid experiment: member of the Galaxy Cluster Science Working Group
- Euclid experiment: member of the Likelihood-fitting Working Package within the Galaxy Clustering Science Working Group
- Member of the Cluster Lensing And Supernova survey with Hubble (CLASH) group (PI Postmanm)
- Member of the CLASH–VLT group (PI Rosati)
- Member of the Wide Field X-ray Telescope mission concept (PI Giacconi)

Research statement

At present I hold a postdoctoral position at the University of Trieste in the group of Prof. Marisa Girardi and Prof. Stefano Borgani. My research interests are mainly related to the use of clusters of galaxies as a probe to constrain the parameters that describe cosmological models. To this aim

I have developed a versatile code based on the Fisher Matrix approach that provides constraints on all the main cosmological parameters from the cluster mass function and its evolution, and from the power spectrum and the bias between the matter and the haloes distribution. These constraints could be obtained for a variety of cosmological models (e.g. ΛCDM, primordial non-Gaussianity, quintessence), and the code is suited to take into account the characteristics of different experiments (e.g. eRosita, Euclid, SKA) from the Radio to the X-ray observational bands.
I am currently employing the experience acquired in this field, in the Euclid experiment where I am deeply involved as part of the Galaxy Cluster Science Working Group and in the Likelihood-fitting Working Package within the Galaxy Clustering Science Working Group. My role is to build a cosmological pipeline to explore the capability of the Euclid cluster survey and to set the cosmological requirement to optimize the performance and the constraining power of the final sample. During the last workshop "Building the Euclid Cluster Survey" in July I was, in fact, asked to coordinate the group "Building the pipeline for cosmological constraints" with Prof. Jochen Weller (Cluster SWG coordinator). In this contest I am closely working with people that are writing the algorithms to detect clusters within the Euclid surveys and I am studying how the different observational aspects such as the completeness and the purity of the sample, the miscentering of the cluster, the accuracy on the observable mass scaling relations, the galaxy membership can be linked to the theoretical expectations for the cluster mass function, power spectrum and correlation function and included in the likelihood modules to derive cosmological constraints.
My study of the different observational concern started during my experience at ESO, where I developed a code based on the Monte Carlo Markov Chain (MCMC) in order to derive cosmological constraints from present cluster data (e.g. RDCS) considering most of the observational issue related to cluster surveys. Moreover, I am part of the Cluster Lensing And Supernova survey with Hubble (CLASH) and CLASH-VLT groups, with the aim of merging my theoretical experience with the high quality cluster imaging obtained with Subaru and the Hubble Space Telescope (HST) and the spectroscopic data-set obtained from the VLT/VIMOS large program. From these data-sets, I derived the most stringent constraint on the Dark Matter Equation of State parameter to date and I derived cluster mass profiles from the dynamics of cluster galaxies. In this field I'm developing a method to overcome the problem due to the assumption of spherical symmetry in the such mass calculation. Moreover I study the dynamics of clusters comparing the pseudo phase space density profiles as obtained by the dynamical analyses of clusters belonging to the CLASH spectroscopic sample and in an extended set of cosmological hydrodynamical simulations of galaxy clusters and groups performed with the TREEPM+SPH GADGET-3 code in order to shed a new light on the accretion history of clusters, the dynamics of galaxies within the cluster and the dynamical status of a cluster.