

CURRICULUM VITAE A.V. MACCIÒ

Personal data:

Last Name: Macciò
First Names: Andrea Valerio
Place and date of birth: Roma, 30 January 1975
Citizenship: Italian
Marital Status: Married, two children
Address: Römerstr. 19
Heidelberg, D69115, Germany
Office Address: Max Planck Institut für Astronomie
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Education:

Laurea degree (M.Sc.) in Physics

University of Milan, March 1999 final grade: 110/110.

Title of thesis: "Struttura su grande scala e fenomeni di lensing gravitazionale" ("Large scale structure and gravitational lensing").

Adviser: Prof. Silvio Bonometto.

PhD in Astrophysics

University of Milano Bicocca, January 2004

Title of thesis: "Non linear features in dynamical & coupled Dark Energy models"

Advisers: Prof. S. Bonometto and Prof. A. Klypin

Current Employment:

I lead an independent Max Planck Research Group (Selbstständige Nachwuchsgruppen, W2 Professor) within the Galaxy and Cosmology department at the Max Planck Institut für Astronomie (MPIA), in Heidelberg.

Previous Employment:

Jan 2007 - Jun 2010	Research Associate	Max Planck Institut für Astronomie (MPIA), Heidelberg.
Jan 2004 - Dec 2006	Research Associate	University of Zurich, Institute for Theoretical Physics.
Oct 2003 - Dec 2003	Research Associate	University of Milano Bicocca, Physics Department.
Jun 2001 - Jul 2001	PhD Guest Student	New Mexico State University.
Oct 2000 - Sept 2003	PhD Student	University of Milano Bicocca, Physics Department.

Research interests

My research work is mostly devoted to study the large scale structure formation process in a cosmological contest. I work with computer simulation of structure formation, studying both the dark matter component (using Nbody codes: PKDgrav and GADGET) and the luminous one (via Hydro dynamical

simulations: GASOLINE, GADGET).

I'm interested in dark energy models beyond the standard Lambda Cold Dark Matter model (Dynamical Dark Energy and Coupled Dark Energy) and in the properties of the large scale structure of the universe and of dark matter haloes in such models. In order to compare different cosmological model and galaxy formation scenarios with current observational data I extensively use Gravitational Lensing techniques: Strong Lensing from Cluster, Galaxy weak lensing and QSO lensing. The overall goal of my research is to understand the large scale structure formation and the formation of luminous galaxies in a dark universe.

Teaching experiences

- January 2009 **Lecturer** at the HGSFP Winter School 2008/2009 “Graduate School of Fundamental Physics” Winter School 2008/09, (teaching “Numerical Simulations”), University Center Obergurgl, Austria
- March 2008 **Lecturer** at the Young Researcher Meeting of the Transregional Research Center 33. Series of lectures on the topic “Large Scale structure simulations *vs.* observations”, Heidelberg, Germany
- Summer 2006 **Lecturer** at the ISAPP 2006 “International School on Astro-Particle Physics” (teaching “General Relativity and Relativistic Cosmology”), Sorrento, Italy
- Spring 2006 **Lecturer** for “*Astronomy*”, course by Prof. P. Jetzer, (teaching “Galaxy Formation”), University of Zurich
- Spring 2006 **Teaching Assistant** for “*Astronomy*”, University of Zurich,
- Autumn 2005 **Lecturer** (in collaboration with Prof. B. Moore) for “*Astrophysics and Cosmology*”, University of Zurich
- Autumn 2004 **Teaching Assistant** for “*Numerical Methods in Astrophysics*”, University of Zurich
- Spring 2004 **Teaching Assistant** for “*Statistical Mechanics II*”, University of Zurich
- Autumn 2002 **Teaching Assistant** for “*Mechanics & Thermodynamics*” (Physics I), Politecnico di Milano,
- Autumn 2001 **Teaching Assistant** for “*Mechanics & Thermodynamics*” (Physics I), Politecnico di Milano

Supervision of Students

I have assisted the supervision of the following students, having several papers published with all of them before the end of their Diploma/PhD thesis.

Paola Solevi	Univ. of Milano	M.Sc. thesis	Summer 2004 -Spring 2005
Marco Miranda	Univ. of Zurich	Ph.D. thesis	Autumn 2003 - Spring 2007
Simone Weinmann	Univ. of Zurich	Ph.D. thesis	Winter 2005 - Spring 2007
Sinziana Paduroiu	Univ. of Zurich	Ph.D. thesis	Spring 2006 - Spring 2007
David Hernandez	MPIA	Summer Student	Summer 2007
Ben Moster	MPIA	Ph.D. thesis	Spring 2007 - Spring 2010
Juan Carlos Muñoz	AIP	Ph.D. thesis	Spring 2008 - Spring 2011
Jasha Schewtschenko	MPIA	Diploma Student	April 2009 - March 2010

Peer Review Referee

I am acting as international referee for the following journals: Nature, Monthly Notices of the Royal Astronomy Society (MNRAS), ApJ, ApJ Letters, New Journal of Physics and Astronomy & Astrophysics.

International Collaborations

University of St. Andrews (Prof. H.S. Zhao): *Substructure in Lensing: Evidence of Cold Dark Matter?*
International Joint Project of the Royal Astronomical Society (PI for Germany)

Hebrew University (Prof. Avishai Dekel): *Comparison between Semi-Analytic models and Numerical Simulations*

Zurich University (Prof. Ben Moore): *Warm Dark Matter Models*

Dark Cosmology Centre, Copenhagen (Prof. Steen Hansen): *Structure and Kinematics of Relaxed Dark Halos*

Munich Observatory (Dr. Thorsten Naab) : *Large Hydro Simulations for Galaxy Formation and Large Scale Structure*

KICP, University of Chicago (Dr. Andrey Kravtsov): *Hydro Dynamical codes comparison project*

Università di Milano-Bicocca, Heidelberg University (Prof. Silvio Bonometto, Prof. Christof Wetterich): *Large Scales Structure of the Universe and Dark Energy*

Ecole Polytechnique Federale de Lausanne, (Prof. M. Shaposhnikov): *Structure Formation in non standard Warm Dark Matter models*

International Meetings:

- “The Milky Way in the GAIA era”, Sept, 1-4, 2009, Heidelberg. Oral contribution.
- “Distribution of Mass in the Milky Way Galaxy”, July, 13-17, 2009, Leiden. Oral contribution.
- “Open Problems in Galaxy Formation”, May, 12-15, 2009, Potsdam. Oral contribution.
- “Particle Physics and Cosmology: From the Smallest Scales to the Largest”, April, 1-3, 2009, Copenhagen. Invited reviewer
- “Frontiers in Computational Astrophysics”, July, 13-18, 2008, Ascona. Oral contribution presented.
- “Dark Matter at small scales”, February 12-15, 2008, Paris. Invited reviewer.
- “Galaxy formation in a Dark Universe”, July 10-17, 2007, Heidelberg.
- “GIF meeting”, March 14-21, 2007, Jerusalem, Israel. Oral contribution presented.
- “The Impact of AGN feedback on galaxy formation”, May 20-26, 2007, Ringberg Castle. Member of the LOC.
- “Dark Galaxies and Lost Baryons”, June 25-29, 2007, 244 IAU Symposium, Cardiff. Invited Talk.
- “Galaxies in the Cosmic Web”, May 13-20, 2006, Las Cruces NM, USA. Oral contribution presented.
- “Contents and Structures of the Universe”, March 18 - 25, 2006, XXXXIth Rencontres de Moriond, La Thuille, Italy. Oral contribution presented.
- “Formation of disk galaxies”, June 27-July 1, Ascona, Switzerland, 2005. Oral contribution presented.

- “IAA Cosmology Workshop 2004”, May 24-28, 2004, Granada, Spain. Oral contribution presented.
- “Exploring the Universe: Contents and Structures of the Universe” 28 March - 4 April 2004, XXXIXth Rencontres de Moriond, La Thuille, Italy. Oral contribution presented.
- Multiwavelength Cosmology, 17-20 June 2003, Mykonos Island Greece. Oral contribution presented.
- DED, Dark Energy Day, 29 November 2002, Università di Milano-Bicocca, Milano, Italy. Oral contribution presented.
- VII National Cosmology Congress, 5-8 November 2002, Osservatorio Astronomico di Roma, Roma, Italy. Oral contribution presented
- New Dimensions in Astroparticles Physics, 7-20 July 2002, Gran Sasso Summer Institute, Gran Sasso Laboratory, Assergi, Italy. Oral contribution presented.
- The Cosmological Model, 16-23 March 2002, XXXVIIth Rencontres de Moriond, Les Arcs, France. Oral contribution presented
- New Era in Cosmology, 11-15th September 2001, Durham, UK.
- Tracing Cosmic evolution with Galaxy Clusters, 3-6 July 2001, Sesto-2001 Workshop, Sesto Pusteria, Italy. Oral contribution presented.
- Formation and Evolution of Galaxies, Workshop, 18-19 May 1999, Padua, Italy. Oral contribution presented.

Schools:

Summer School Relativistic Cosmology: Theory and Observations, Italy, Como, May 2000.

Press Releases:

- | | | |
|-----------|---------|---|
| Jan 2005 | Seattle | <i>Signature of Dark Energy in the Local Group</i>
Macciò, Governato, Horellou |
| June 2006 | Zurich | <i>The Universe is 13.7 Billion Years old</i>
Macciò, Saha, Coles, Williams |

PUBLICATION LIST

- 40)** *“The concept of virial temperature: when dark matter speaks, the baryons listen”*
S.H. Hansen, A.V. Macciò, I. Shlosman, Y. Hoffman
2010, ApJ submitted
- 39)** *“The non-causal origin of the black hole-galaxy scaling relations”*
K. Jahnke & A.V. Macciò
2010, ApJL submitted, arXiv:1006.0482
- 38)** *“High accuracy power spectra including baryonic physics in dynamical Dark Energy models”*
L. Casarini, A.V. Macciò, S. Bonometto, G. Stinson
2010, MNRAS submitter, arXiv:1005.4683
- 37)** *“Dissecting the spin distribution of Dark Matter halos”*
V. Antonuccio-Delogu, A. Dobrotka, U. Becciani, S. Cielo, C. Giocoli, A.V. Macciò, A. Romeo

2010, MNRAS in press, arxiv:1003.3877

36) “*Structure formation by fifth force: Power Spectrum from Nbody Simulations*”

H.S. Zhao, A.V. Macciò, B. Li, H. Hoekstra, M. Feix

2010, ApJL, 712, 179

35) “*New evidence for dark matter*”

A. Boyarsky, O. Ruchayskiy, D. Iakubovskiy, A.V. Macciò, D. Malyshev

2010, Nature submitted, arXiv:0911.1774

34) “*The enigmatic pair of dwarf galaxies Leo IV and Leo V: coincidence or common origin?*”

J. de Jong, N. Martin, H-W. Rix, K. Smith, A.V. Macciò

2010, ApJ, 710, 1664

33) “*How cold is Dark Matter? Constraints from Milky Way Satellites*”

A.V. Macciò & F. Fontanot

2010, MNRAS Letters, 28M

32) “*Can Gas prevent the Destruction of Thin Stellar Discs by Minor Mergers?*”

B. Moster, A.V. Macciò, R.S. Somerville, P.H. Johansson, T. Naab

2010, MNRAS, 403, 1009

31) “*Luminosity function and radial distribution of Milky Way satellites in a LCDM Universe*”

A.V. Macciò, X. Kang, F. Fontanot, R.S. Somerville, S. Koposov, P. Monaco

2010, MNRAS, 402, 1995

30) “*Universal Merging Histories of Dark-Matter Haloes*”

E. Neistein, A.V. Macciò, A. Dekel

2010, MNRAS, 403, 984

29) “*Constraints on the relationship between stellar mass and halo mass at low and high redshift*”

B.P. Moster, R.S. Somerville, C. Maulbetsch, F.C. van den Bosch, A.V. Macciò, T. Naab, L. Oser

2010, ApJ, 710, 1664

28) “*A quantitative explanation of the observed population of Milky Way satellite galaxies*”

S. Koposov, J. Yoo, H.W. Rix, D. Weinberg, A.V. Macciò, J. Miralda-Escudé

2009, ApJ, 696, 2179

27) “*Central Mass of Milky Way satellites in the LCDM model*”

A.V. Macciò, X. Kang & B. Moore

2009, ApJL, 692, 109L

26) “*Dynamical Dark Energy: high accuracy power spectra at high redshift*”

L. Casarini, A.V. Macciò & S.A. Bonometto

2009, JCAP, 03, 014

25) “*Dark matter angular momentum profile from the Jeans equation*”

K. Schmidt, S. Hansen, J. An, L. Williams, A.V. Macciò

2009, ApJ, 694, 893

24) “*Alas: Dark matter structures were not that trivial*”

K. Schmidt, S. Hansen, A.V. Macciò

2008, ApJL, 689, 33

23) “*Concentration, Spin and Shape of Dark Matter Haloes as a function of the Cosmological Model: WMAP1, WMAP3 and WMAP5 results*”

A. V. Macciò, A. A. Dutton, F. C. van den Bosch

2008, MNRAS, 391, 1940

22) “*The formation of ultra-compact dwarf galaxies and nucleated dwarf galaxies*”

- T. Goerdt, B. Moore, S. Kazantzidis, T. Kaufmann, A.V. Macciò, J. Stadel
2007, MNRAS, 385, 2136
- 21)** *“Constraining Warm Dark Matter using QSO gravitational lensing”*
M. Miranda & A. V. Macciò
2007, MNRAS, 382, 1225
- 20)** *“Dependence of local reionization history from mass and environment”*
S. Weinmann, A.V. Macciò, I. Iliev, G. Mallema & B. Moore,
2007, MNRAS, 381, 367
- 19)** *“Universal Substructure Distributions in LCDM halos: Can we find a Fossil Group?”*
E. D’Onghia, A.V. Macciò, G. Lake, J. Stadel, & B. Moore,
2007, MNRAS submitted, arXiv:0704.2604
- 18)** *“Concentration, Spin and Shape of Dark Matter Haloes: Scatter and the Dependence on Mass and Environment”*
A. V. Macciò, A. A. Dutton, F. C. van den Bosch, B. Moore, D. Potter & J. Stadel,
2007, MNRAS, 378, 55
- 17)** *“Radial density profiles of time-delay lensing galaxies”*
J. I. Read, P. Saha & A.V. Macciò,
2007, ApJ, 667, 645
- 16)** *“Towards a Concordant Model of Halo Occupation Statistics”*
F. C. van den Bosch, X. Yang, H.J. Mo, S. M. Weinmann, A. V. Macciò, S. More, M. Cacciato, R. Skibba,
K. Xi,
2007, MNRAS, 376, 841
- 15)** *“The influence of orbital Behaviour and Chaos on the Shape of Dark Matter Halos”*
A.V. Macciò, I. Sideris, M. Miranda, B. Moore & R. Jesseit ,
2007, MNRAS submitted, arXiv:0704.3078
- 14)** *“The Hubble Time Inferred from 10 Time Delay Lenses”*
P. Saha, J. Coles, A.V. Macciò & L. Williams,
2006, ApJL, 650, 17L
- 13)** *“The origin of polar ring galaxies: evidence for galaxy formation by cold accretion”*
A.V. Macciò, B. Moore & J. Stadel
2006, ApJL, 636 25L
- 12)** *“Radial distribution and strong lensing statistics of satellite galaxies and substructure using high resolution LCDM hydrodynamical simulations”*
A.V. Macciò, B. Moore, J. Stadel & J. Diemand
2006, MNRAS, 366, 1529
- 11)** *“Tracing the Nature of Dark Energy with Galaxy Distribution”*
P. Solevi, R. Mainini, S.A. Bonometto, A.V. Macciò, A. Klypin & S.Gottloeber,
2006, MNRAS, 366, 1346
- 10)** *“The effect of low mass substructures on the Cusp lensing relation”*
A.V. Macciò & M. Miranda ,
2006, MNRAS, 368, 599
- 9)** *“Strong gravitational lensing and dynamical dark energy”*
A.V. Macciò,
2005, MNRAS, 361,1250
- 8)** *“The signature of Dark Energy on the local Hubble flow”*

A.V. Macciò, F. Governato & C. Horellou,
2005, MNRAS, 359,941

7) “*Coupled dark energy: Parameter constraints from N-body simulations*”

A.V. Macciò, C. Quercellini, R. Mainini, L. Amendola & S.A. Bonometto
2004 PhRvD 6913516

6) “*Halo properties in models with Dynamical Dark Energy*”

A. Klypin, A.V. Macciò, R. Mainini & S.A. Bonometto
2003, ApJ, 599, 31

5) “*Modelling Dynamical Dark Energy*”

R. Mainini, A.V. Macciò, S.A. Bonometto & A. Klypin
2003 ApJ, 599, 24

4) “*Non linear predictions from linear theories on models with Dark Energy*”

R. Mainini, A.V. Macciò & S.A. Bonometto
2003, New Astronomy, 8, 173

3) “*Mass of clusters in simulations*”

A.V. Macciò, G. Murante & S.A. Bonometto,
2003, ApJ, 588, 35

2) “*Constraining lambda using clusters quadrupoles*”

A.V. Macciò, A. Gardini, S. Ghigna & S.A. Bonometto:
2002 ApJ, 564, 1

1) “*Limber equation for luminosity dependent correlation*”

A. Gardini, S.A. Bonometto & A.V. Macciò,
1999, New Astronomy, 4, 557

Conference proceedings

- A. V. Macciò, *QSO Gravitational Lensing and the detection of Dark Haloes*, 2007, Invited talk at the 244 IAU Symposium, Dark Galaxies and Lost Baryons, Cardiff June 2007, to appear in the proceedings.
- A. V. Macciò, B. Moore, J. Stadel, D. Potter, *Dark Satellites and Cosmic Reionization*, 2006, contribution to the XLIIst Rencontres de Moriond, From dark halos to light, La Thuille March 19-25 2006, to appear in the proceedings.
- M. Miranda, P. Jetzer & A.V. Macciò, *Lensing by Substructures* 2006, EAS Publications Series, 20, 287
- S. A. Bonometto, A. Klypin, A.V. Macciò, R. Mainini & P. Solevi: *Dark Energy Nature from N-body Simulations* 2004, 35th COSPAR Scientific Assembly, 1440
- A.V. Macciò, S.A. Bonometto, R. Mainini, R. & Klypin, A: *Structure Formation in Dynamical Dark Energy Models*, 2004 Proceedings of the Multiwavelength Cosmology conference, held on Mykonos Island, Greece, 17-20 June, 2003. Published by Kluwer Academic Publishers, Dordrecht, The Netherlands, 2004, p.199, 199
- G. Murante, S. Bonometto, A. Curir, A.V. Macciò & P. Mazzei: *Dynamics of collisionless self-gravitating structures*, Mem. S.A.It (2002), Vol 73, 1.
- A.V. Macciò, G. Murante & S.A. Bonometto: *Mass of clusters in simulations*, contribution to the XXXVIIth Rencontres de Moriond, The Cosmological Model, Les Arc March 16-23 2002, to appear in the proceedings.

Academic References

Accademic references about my scientific career can be asked to the following scientists.

- Prof. **Ben Moore**, Institute for Theoretical Physics, Director, University of Zurich, Winterthurerstr. 190, CH-8057 Zurich, Switzerland. Email: moore@physik.uzh.ch
- Prof. **Hans-Walter Rix**, Max-Planck-Institut für Astronomie, Koenigstuhl 17, 69117 Heidelberg, Germany. Email: rix@mpia.de
- Dr. **Rachel Somerville**, Space Telescope Science Institute, 3700 San Martin Dr, Baltimore, MD 21218, USA. Email: somerville@stsci.edu
- Prof. **Frank van den Bosch**, Department of Physics and Astronomy, the University of Utah. Salt Lake City, 115 S 1400, UT, USA. Email: vdbosch@physics.utah.edu