ALESSANDRO SARRACINO - CURRICULUM VITAE

Personal data

Alessandro Sarracino, born in Naples, Italy, December 22, 1981.

Work address: Laboratoire de Physique Théorique de la Matière Condensée (UMR CNRS 7600), Université Pierre et Marie Curie, 4 Place Jussieu, 75255 Paris Cedex France

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Academic and scientific career

Since December 2013: Research fellowship in the group of O. Bénichou at the LPTMC, Université Pierre et Marie Curie, Jussieu, Paris.

December 2009-November 2013: Research fellowship (from the GRANULARCHAOS project funded by MIUR) in the group of A. Puglisi and A. Vulpiani at the CNR-ISC and Department of Physics, University "Sapienza", Roma, Italy.

February 2009-November 2009: Research fellowship (from PRIN) at the Department of Mathematics and Informatics, University of Salerno, Italy.

January 2009: Ph.D. in Physics from the University of Salerno, Italy, with a Thesis on "Nonlinear fluctuation-dissipation relations: analytical derivation and numerical applications".
Thesis Advisor Professor Marco Zannetti.

October 2005: Laurea Degree in Physics from the University Federico II of Naples, Italy, with a Thesis on "Segregation and dynamic instabilities in granular mixtures", with the mark 110/110 *cum laude*.
Thesis Advisor Professor Antonio Coniglio.

Fields of research

Non-equilibrium statistical mechanics: breakdown of time-reversibility and detailed balance in Markov processes; entropy production and flucutation relations; generalized fluctuation-dissipation relations; applications to Ising systems, spin glasses and granular gases.

Granular systems: dynamics of a tracer particle in a granular bath; non-equilibrium fluctuating hydrodynamics: theoretical, numerical and experimental study of structure factors in driven granular fluids.

Fluctuation-dissipation relations: field-free algorithms for the measurement of the response function; second order fluctuation-dissipation relations and nonlinear susceptibilites; applications to coarsening systems and spin glasses; growing length-scales in disordered systems.

Brownian motors: ratchet effect driven by nonlinear friction; granular Brownian ratchets; ratchet effect in an aging glass.

Anoumalous dynamics: diffusion and response function in inhomogeneous systems; continuous time random walks and Lévy collsion process; Einstein relation and anomalous transport.

Publications

Nonequilibrium fluctuation-dissipation theorem and heat production
E. Lippiello, M. Baiesi and A. Sarracino
arXiv:1403.5104 (to appear in Phys. Rev. Lett.)

Nonequilibrium Brownian motion beyond the effective temperature
A. Gnoli, A. Puglisi, A. Sarracino, A. Vulpiani
PLoS ONE **9**, e93720 (2014)

Fluctuations in partitioning systems with few degrees of freedom
L. Cerino, G. Gradenigo, A. Sarracino, D. Villamaina, A. Vulpiani
Phys. Rev. E **89**, 042105 (2014)

Time asymmetry of the Kramers equation with nonlinear friction: fluctuation-dissipation relation and ratchet effect
A. Sarracino
Phys. Rev. E **88**, 052124 (2013)

Rare events and scaling properties in field-induced anomalous dynamics
R. Burioni, G. Gradenigo, A. Sarracino, A. Vezzani, A. Vulpiani
J. Stat. Mech. (2013) P09022

Fluctuation relations without uniform large deviations
G. Gradenigo, A. Sarracino, A. Puglisi and H. Touchette
J. Phys. A: Math. Theor. **46**, 335002 (2013)

Einstein relation in systems with anomalous diffusion
G. Gradenigo, A. Sarracino, D. Villamaina, and A. Vulpiani
Acta Physica Polonica B **44**, 899 (2013)

Non-equilibrium fluctuations in frictional granular motor: experiments and kinetic theory
A. Gnoli, A. Sarracino, A. Petri, and A. Puglisi
Phys. Rev. E **89**, 052209 (2013)

Ratchet effect driven by Coulomb friction: the asymmetric Rayleigh piston
A. Sarracino, A. Gnoli, and A. Puglisi
Phys. Rev. E **87**, 040101(R) (2013)

Brownian ratchet in a thermal bath driven by Coulomb friction
A. Gnoli, A. Petri, F. Dalton, G. Gradenigo, G. Pontuale, A. Sarracino, and A. Puglisi
Phys. Rev. Lett. **110**, 120601 (2013)

Entropy production in non-equilibrium fluctuating hydrodynamics
G. Gradenigo, A. Sarracino, and A. Puglisi
J. Chem. Phys. **137**, 014509 (2012)

The out of equilibrium response function in sub-diffusive systems
G. Gradenigo, A. Puglisi, A. Sarracino, A. Vulpiani and D. Villamaina
Physica Scripta **86**, 058516 (2012)

Einstein relation in superdiffusive systems
G. Gradenigo, A. Sarracino, D. Villamaina, and A. Vulpiani
J. Stat. Mech. L06001 (2012)

Non-equilibrium fluctuations in a driven stochastic Lorenz gas
G. Gradenigo, U. Marini Bettolo Marconi, A. Puglisi, and A. Sarracino
Phys. Rev. E **85**, 031112 (2012)

Dynamics of a massive intruder in a homogeneously driven granular fluid
A. Puglisi, A. Sarracino, G. Gradenigo, and D. Villamaina
Granular Matter **14**, 235 (2012)

Structure factors in granular experiments with homogeneous fluidization
A. Puglisi, A. Gnoli, G. Gradenigo, A. Sarracino, and D. Villamaina
J. Chem. Phys. **136**, 014704 (2012)

Non-equilibrium length in granular fluids: From experiment to fluctuating hydrodynamics
G. Gradenigo, A. Sarracino, D. Villamaina, and A. Puglisi
Europhysics Letters **96**, 14004 (2011)

Fluctuating hydrodynamics and correlation lengths in a driven granular fluid
G. Gradenigo, A. Sarracino, D. Villamaina, and A. Puglisi
J. Stat. Mech. P08017 (2011)

Estimate of temperature and its uncertainty in small systems
M. Falcioni, D. Villamaina, A. Vulpiani, A. Puglisi, and A. Sarracino
Am. J. Phys. **79**, 777 (2011)

On anomalous diffusion and the out of equilibrium response function in one-dimensional models
D. Villamaina, A. Sarracino, G. Gradenigo, A. Puglisi, and A. Vulpiani
J. Stat. Mech. L01002 (2011)

The ratchet effect in an ageing glass
G. Gradenigo, A. Sarracino, D. Villamaina, T. S. Grigera and A. Puglisi
J. Stat. Mech. L12002 (2010)

Irreversible dynamics of a massive intruder in dense granular fluids
A. Sarracino, D. Villamaina, G. Gradenigo and A. Puglisi
Europhysics Letters **92**, 34001 (2010)

Identification of the critical temperature from non-equilibrium time-dependent quantities
E. Lippiello and A. Sarracino
Europhysics Letters **90**, 60001 (2010)

Granular Brownian motion
A. Sarracino, D. Villamaina, G. Costantini, and A. Puglisi
J. Stat. Mech. P04012 (2010)

Fluctuations of two-time quantities and non-linear response functions
F. Corberi, E. Lippiello, A. Sarracino, and M. Zannetti
J. Stat. Mech. P04003 (2010)

Fluctuation-dissipation relations and field-free algorithms for the computation of response functions
F. Corberi, E. Lippiello, A. Sarracino, and M. Zannetti
Phys. Rev. E **81**, 011124 (2010)

Nonlinear response and fluctuation dissipation relations
E. Lippiello, F. Corberi, A. Sarracino, and Marco Zannetti
Phys. Rev. E **78**, 041120 (2008)

Nonlinear susceptibilities and the measurement of a cooperative length
E. Lippiello, F. Corberi, A. Sarracino, and M. Zannetti
Phys. Rev. B **77**, 212201 (2008)

Under review

Coulomb friction driving Brownian motors
A. Manacorda, A. Puglisi, A. Sarracino

A model for friction microscopy without external force
A. Sarracino, A. Gnoli, A. Puglisi

Book chapter

Out-of-equilibrium generalized fluctuation-dissipation relations
G. Gradenigo, A. Puglisi, A. Sarracino, D. Villamaina, and A. Vulpiani
in "Nonequilibrium Statistical Physics of Small Systems: Fluctuation Relations and Beyond" (Wiley-VCH, Weinheim, 2013) R. Klages, W. Just, C. Jarzynski (Eds.)

Large deviations of Brownian motors
A. Sarracino and D. Villamaina
to appear in "Large deviations in physics" Series: Lecture Notes in Physics (Springer, 2014) F. Cecconi, M. Cencini, A. Puglisi, D. Vergni and A. Vulpiani (Eds.)

Proceedings

Species segregation and dynamical instability of horizontally vibrated granular mixtures
M. Pica Ciamarra, A. Sarracino, M. Nicodemi, and A. Coniglio
In Traffic and Granular Flow 2005, A. Schadschneider, T. Poschel, T.; Khne, R.; Schreckenberg, M.; Wolf, D.E. (Eds.) (2007)

Referee activity

New Journal of Physics

Europhysics Letters

Journal of Statistical Mechanics: Theory and Experiment

Journal of Physics A: Mathematical and Thepretical

Physica A

Teaching Experience

2012-2013: Co-supervision of two master thesis at University of Rome Sapienza.

February 2009-July 2009: Assistance in the course of "Physics" for the 1st year graduating students, in the Department Mathematics and Informatics of the University of Salerno.

Spring 2008: Integrative lessons of Physics held in the University of Salerno for the 1st year graduating students.

Organization of International Workshop

June 2012: "Non-equilibrium fluctuation-response relations", Isola del Giglio (Gr), Italy

Participation in Workshops and Schools

November 2013: Poster at "Conference on Friction and Energy Dissipation in Man-made and Biological Systems", The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy.

September 2013: Poster at "Large deviations and rare events in physics and biology", University of Rome Sapienza, Italy.

July 2013: Talk (invited) at 7th IDMRCS, Barcelona, Spain.

July 2013: Talk at "Small system nonequilibrium fluctuations, dynamics and stochastics, and anomalous behavior", KITPC, Beijing, China.

April 2013: Seminar at Dipartimento di Fisica, University of Padua, Italy.

March 2013: Poster (Best poster session award) at "38th Conference of the Middle European Cooperation in Statistical Physics", Trieste, Italy.

March 2013: Seminar at LPTMC, Université Pierre et Marie Curie Paris VI, France.

November 2012: "Grandes déviations et systèmes de particules en interaction, états stationnaires hors équilibre", IHP Paris, France.

June 2012: Talk (invited) at "XVII Convegno Nazionale di Fisica Statistica e dei Sistemi Complessi", Parma, Italy.

June 2012: "Non-equilibrium fluctuation-response relations", Isola del Giglio (Gr), Italy.

June 2012: "Frontiers in Statistical Physics and Complex Systems", Catania, Italy.

January 2012: Seminar at LPTHE, Université Pierre et Marie Curie Paris VI, France.

January 2012: Talk at "Journées de Physique Statistique", Paris, France.

October 2011: "Foundations and Applications of Non-Equilibrium Statistical Mechanics", Stockholm, Sweden.

September 2011: Talk at the "ZCAM conference on Granular and Active Fluids", Zaragoza, Spain.

March 2011: Poster at "Workshop on Dynamics in Viscous Liquids III", Roma, Italy.

September 2010: Poster at "Anomalous Transport: from Billiards to Nanosystems", Sperlonga, Italy.

July 2010: Talk at the "XXIV IUPAP International Conference on Statistical Physics", Cairns, Australia.

June 2010: Talk (invited) at the "XV Convegno di Fisica Statistica", Parma, Italy.

September 2009: Poster at the International Summer School "Fundamental Problems in Statistical Physics XII", Leuven, Belgium.

May 2009: Seminar at ISC-CNR, University Sapienza Roma, Italy

August -September 2007: "Les Houches Predoctoral School in Statistical Physics"

September 2006: "IV Workshop on non equilibrium phenomena in supercooled fluids, glasses and amorphous materials", Pisa, Italy.

Skills and Qualifications

Known languages: Italian, English, French

Programming ability in C, Mathematica, LaTeX, FORTRAN