

CURRICULUM VITÆ

Marco Grilli

Date of Birth	May 5th, 1961.
Place of Birth	Florence, Italy
Citizenship	Italian.
Languages	Italian (mother tongue), English, French, and German.
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Education

May 1985	<i>Laurea in Fisica cum Laude</i> , Università di Roma “La Sapienza”.
Oct 1986 - Jun 1987	Scholarship by the International School for Advanced Studies (ISAS) in Trieste (Italy).
1990	<i>Ph. D. in Physics</i> , Università di Roma “La Sapienza”

Appointments

Present position	Full Professor in Theoretical Condensed Matter Physics by the Physics Dept. of the University of Rome “Sapienza”
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2014	Qualified as a Full Professor in Theoretical Physics of Matter (02B2) and as Full Professor in Theoretical Physics (02A2)
June 2010	Idoneous as a Full Professor in Solid State Physics (FIS03-02B2)
October 98	Associate Professor (in Solid State Physics) by the Department of Physics of the University of Rome “La Sapienza”
October 91 - 98	Assistant Professor (in Solid State Physics) by the Department of Physics of the University of Rome “La Sapienza”
Nov. 90 - Oct. 91	Scholarship of the Consorzio Interuniversitario di Struttura della Materia (INFM) for a Project on High Temperature Superconductivity.

Scientific Activity

— *Bibliographical summary*

Author of more than 150 papers in international journals with referees (see attached list after p. 16). Number of ISI papers published in the last 10 years: 53; Hirsch index: 35; contemporary H-index: 16 Total citations: about 4000;

— *Conferences, Schools, mid-term visits*

I taught in several postgraduate and international schools of Physics (see list on p. 14).

I have been invited to deliver talks in about 50 international conferences (see list on p. 11).

I have been invited to spend several mid-term visits in important international laboratories like, e.g., MIT (Cambridge, USA), LEPES (Grenoble, France), and École Supérieure de Physique et Chimie Industrielles (ESPCI) (Paris, France) (see list on p. 11). For two times (in 2013 and 2016) I have been appointed the ‘Joliot Chair’ for a stay in Paris by the ESPCI.

Organization activity*— Scientific organization*

- Chairman and member of the Scientific Committee of the International Conference on “Quantum coherence in strongly correlated fermion systems”, July 22-26, 1996, Scuola Normale Superiore, Pisa, Italy;
- Scientific organizer and chairman of the parallel symposium on “Theoretical trends in high-temperature superconductivity: Problems and perspectives” within the INFMeeting, June 18-22, 2001, Rome, Italy.
- Coordinator of the Publication Committee for the “Strongly Correlated Electron Systems” part of the International Conference on Magnetism, ICM2003, held in Rome (Italy), July 27 -August 1, 2003.
- Scientific organizer and chairman of the parallel symposium on “New High-Tc and strongly correlated oxide materials” at the Meeting on “Matter, Materials and Devices” June 22-25, 2005, Genova, Italia.
- Chairman and organizer of the international conference “Coherence and incoherence in strongly correlated systems”, Rome, July 3-7, 2007.
- Chairman and organizer of the international conference “Disorder and correlations in quantum systems”, Rome, September 18-20, 2013.
- Member of the Program Committee of the International Conference “Materials and Mechanisms of Superconductivity 2015”, August 23-28, 2015, Geneva, Switzerland

— Academic organization

Member since 2008 and president (2009-2017) of the Committee of the Physics Department evaluating the admission to the Laurea Magistrale in Fisica and to the Laurea Magistrale in Astronomia e Astrofisica.

2017-2020, vice-president of the Didactic Area Council of the Physics Department of ‘Sapienza’ University of Rome.

Since 2019, President of the Teacher-Student Committee of the Science Faculty.

Funding Information

- Scientific director of the Advanced Project of INFM PAG-04-1 on “Strongly correlated electron-electron and electron-phonon systems” for the years 2001-2002.
- Scientific director of the Research Unit working on the Project “Strong correlations, superconductivity, and quantum coherence”, within the National Project COFIN 2003 (Year 2003 - prot. 2003020230_006 budget 170100 euros).

- National Scientific Coordinator and responsible of the Project of National Interest (PRIN 2005) “High-temperature superconductivity and strongly correlated systems” (2-year project, 5 research units involved, budget 591600 euros).
- 2005: Coordinator of the joint France-Italy project (36 months) [PROJET INTERNATIONAL DE COOPERATION SCIENTIFIQUE (PICS)] “Quantum orders in unconventional electronic systems” with the partner institution Laboratoire de Physique Quantique - UPR5-CNRS-ESPCI, Paris. (CNRS PICS Contract No. 3368)
- Scientific director of the Research Unit working on the Project “Anomalous behaviors of the metallic and superconducting states in strongly correlated systems” within the National Project PRIN 2007 (Year 2007 - prot. 2007FW3MJX_003, budget 103832 euros).
- Coordinator of the 2007-2008 Vigoni Project of the Ateneo Italo-Tedesco Deutsch-Italienisches Hochschulzentrum for the Project Based Personnel Exchange Programme. Partner institution: Brandenburgische Technische Universität, Cottbus, Germany.
- Coordinator of the Ateneo Project “SISTEMI COMPLESSI CLASSICI E QUANTISTICI” by the “Sapienza” University 2008 - prot. C26A08CME5 (80000 euros).
- Coordinator of the Ateneo Project “SISTEMI COMPLESSI CLASSICI E QUANTISTICI” by the “Sapienza” University 2009 - prot. C26A097F8H (83000 euros).
- Coordinator of the Ateneo Project “Superconductivity in soft electronic matter” by the “Sapienza” University 2016 - prot. RM116154AA0AB1F5 (15000 euros).
- Coordinator of the Ateneo Project “Inhomogeneous superconductivity in low-dimensional electron systems” by the “Sapienza” University 2017 - prot. RM11715C642E8370 (36000 euros).
- Coordinator of the Ateneo Project “Inhomogeneity, competing orders, and topological excitations in two-dimensional superconductors” by the “Sapienza” University 2018 - prot. RM11816431DBA5AF (14000 euros).

Referee Activity

I am referee of the following journals:

Nature, Nature Communications, Physical Review Letters, Physical Review B, Physical Review X, European Physical Journal B, Europhysics Letters, Journal of Physics: Condensed Matter, New Journal of Physics, Scientific Reports.

I reviewed several projects submitted to the Italian Ministry of the University, to the National Science Foundation (NSF) of the United States, to the Natu-

ral Sciences and Engineering Research Council of Canada (NSERC) and to the European Research Council (ERC)

SCIENTIFIC ACTIVITY

[The references refer to the papers in the List of publications (see below after p. 16)].

Most of my research has been devoted to the study of many-body electron systems, to the emergence of complex collective properties, to quantum phase transitions in electronic systems.

A large part of my scientific activity has been carried out in the field of high temperature superconductors (HTSC), where many different issues of theoretical, experimental and applicative interest arise. In particular these systems are remarkable because they display a strongly anomalous metallic behavior indicating a violation of the standard Landau Fermi Liquid paradigm of the metallic state. They also are anomalous superconductors both because they likely have an unconventional pairing mechanism and because they display a pseudogapped phase possibly indicating a violation of the standard paradigm of Bardeen-Cooper-Schrieffer superconductivity. In this regard I investigated the problem of strong correlations in electronic and in electron-phonon systems, of magnetism, of the possible violations of the Fermi-liquid paradigm of the metallic state, of unconventional mechanisms for superconducting pairing, of quantum critical charge instabilities in electron systems ...

In the last years I extended my research activity to the field of low-dimensional disordered superconductors, oxide interfaces, electron systems with strong spin-orbit coupling, and topological electronic states.

I. Disordered electronic systems

This is the research of first years, where I investigated the metal-insulator transition in disordered systems. For non-interacting electrons I studied the critical behavior of the thermoelectric power at the Anderson transition [A3]. In collaboration with S. Sorella, I presented a suitable parametrization for a non-linear- σ model field-theoretical description of disordered electrons in the presence of electron-electron (e-e) interactions [A1].

II. The Mott-Hubbard metal-insulator transition

This research was motivated by HTSC, where an anomalous metallic state (i.e. seemingly violating the Landau paradigm of Fermi liquid (FL) theory) arises by doping an antiferromagnetic Mott insulator, thereby raising fundamental issues about the nature of the metallic state and how this may be disrupted. Therefore, in collaboration with G. Kotliar (and partly with A. Millis) I studied a strongly correlated electron system by means of a non-perturbative field-theoretical approach (the slave boson technique). In particular I investigated the effects of short-range magnetic correlations in a weakly metallic system formed by doping a Mott insulator and I showed that also in this extreme case of metallicity challenged by strong correlations and magnetism, a Landau FL description is possible and that superconductivity (SC) may occur [A7].

With my group in Rome I further studied the Hubbard model, the prototype of strongly correlated systems, to investigate the nature of the Mott insulating state and of the interaction-driven metal-insulator transition. Using the slave-boson approach we identified the nature of the coherent and incoherent excitations coexisting in the spectrum of system with strong e-e repulsion [A21],[A26].

III. Systems with electron-phonon (e-ph) interaction

I investigated the e-ph interaction in systems with strong e-e repulsion bridging for the first time the field of strongly correlated systems with the field of electrons coupled to the lattice [A27],[A74]. I found that strong correlations generically suppress the e-ph coupling. I also showed that a moderate e-ph coupling can drive a strongly correlated system unstable towards the formation of an electronic phase separation and inhomogeneous electronic states [A27], [A71].

I studied systems with strong short-range e-ph coupling (both with and without e-e interactions) to clarify the issue of polaron formation in these systems [A39],[A49]. The very nature of the polaron formation in the short-range e-ph case was definitively clarified by these works identifying the deep physical mechanisms underlying this phenomenon.

IV. High-Temperature Superconductivity: Charge inhomogeneities and quantum criticality

These systems are theoretically intriguing because they display anomalous metallic properties violating the Landau FL paradigm of the metallic state and they are unusual superconductors both because of a (likely unconventional) strong pairing mechanism and because the presence of a pseudogap at T^* larger than the superconducting T_c might indicate a violation of the Bardeen-Cooper-Schrieffer (BCS) paradigm.

The main question is: the anomalous metallic properties and the large T_c are due to an exotic electronic state merely arising from strong correlations or rather are they due to some instability of the electronic liquid, which would form some kind of order?

This is the field where I reached the highest impact and international visibility giving a strong contribution in favor of the second point of view. In particular I showed that a) strongly correlated systems are easily prone to charge instabilities with the formation of inhomogeneous or charge-ordered electronic states [A11],[A24],[A27]; b) charge ordering (that in cuprates may stay latent because of low dimensionality, of disorder and of the competition with superconductivity) arises with a second-order transition ending at zero temperature into a quantum critical point (QCP) [A34], [A36], [A41]. This is the ‘Ancient Romans’ theory initiated long ago by our group in Rome.

V. Quantum critical phenomena in cuprate superconductors

The proposal of a QCP related to the formation of CDW in the optimal doping region of cuprates is a very important achievement of my scientific activity and the one giving me international recognition and impact [A34]. The presence of quantum critical fluctuations at $T = 0$ affects and rules the physics of cuprates due to the induced abundance of strong quantum critical (i.e. intrinsically dynamical) charge fluctuations [A64], which mediate a strong effective interaction between the quasiparticles. The abundant charge fluctuations also leave specific signatures in the electronic spectra [A75,A95,A108]. This allows to rationalize and understand some specific and unusual features of the spectra and, conversely, strengthen the CDW-QCP scenario. The strong effective

interaction mediated by CDW depends strongly on doping, temperature, and on the transferred momentum and can account for the strong superconducting pairing [A36], [A56]. Recent resonant X-ray scattering experiments found very well-formed and long-ranged CDW to exist even in overdoped cuprates, indicating that the charge-order tendency can hardly arise from long-ranged magnetic excitations [137]. More recently, RXS experiments identified very short-ranged CDW (named charge density fluctuations, CDF), which pervade the phase diagram of cuprates: while they coexist with CDW in underdoped cuprates at low-intermediate temperatures, CDF persist and are robust even at the highest temperatures and doping [142]. They are therefore low-energy nearly local fluctuations that might account for the anomalous metallic properties [A145]. Thus the ‘Ancient Romans’ theory provides a single interpretation scheme to both the anomalous metallic and anomalous superconducting properties.

Another important issue regards the strongly underdoped region, where my group found that nematic electronic states (a quantum electronic analogous of the liquid-crystal nematic states occurring in some soft matter systems) can occur as precursors of the CDW order setting in at larger doping [A118]. A nematic state has also been recently identified in Raman experiments on pnictide superconductors [A126].

VII. Low-dimensional superconductors, oxide heterostructures, and systems with strong spin-orbit coupling

In the last few years there has been an increasing interest in low-dimensional electronic states in the presence of superconductivity, disorder, or/and strong spin-orbit, possibly forming topologically non-trivial electronic states. Thus in the last four years I devoted a good part of my research activity to the study of the two-dimensional electron gas formed in some oxide interfaces. Also in this case, like in cuprates, I strongly shaped the overall field of oxide interfaces presenting a general new point of view: these systems are strongly inhomogeneous and the superconducting state therein is either percolative or it has an unusual quantum critical character. This novel perspective is steadily gaining support from experiments and it has been elaborated following three main lines:

- a) a phenomenological analysis of transport properties (resistance, Hall, magnetoresistance,...) showing that these interfaces are a strongly inhomogeneous

mixture of regions with different electron densities [A107], [A109], [A110]; b) a microscopic study of possible realistic mechanisms, which could induce such highly inhomogeneous states [A105], [A111], [A125]; c) the inhomogeneities can give rise to a spatially non-uniform Rashba spin-orbit coupling, with unusual and intriguing physical consequences [A123].

MORE DETAILS ON THE SCIENTIFIC ACTIVITY**Mid-term visits to other laboratories**

Among various visits to other laboratories I mention the following ones:

1986-87: International School for Advanced Studies (ISAS) Trieste, Italy, 9 months;

1989: Massachusetts Institute of Technology (Cambridge-USA), 5 months;

Several times during the period 1988-92 I spent one month by the International Centre for Theoretical Physics in Trieste, Italy;

1992: Centre d'Etudes Nucléaires de Grenoble, Grenoble, France, 3 months.

1994: Istitute for the Scientific Interchange (ISI), Torino, 1 month.

1996,1997,1999: Laboratoire pour l'Etude des Proprietés Electroniques des Solides (LEPES), Grenoble, France, 1 month, 3 months, 1 month.

2001: CNRS and Institut Laue Langevin (ILL), Grenoble, France, 3 months

2003,2004,2013,2016: Laboratoire de Physique Quantique, Ecole Superieure de Physique et Chimie Industrielles, Paris, Francia, 1 month.

Schools, Conferences, and Workshops

I participated to more than 70 conferences and workshops and I have been invited to present talks in about 50 of them. Among these I mention:

- March Meeting of the "American Physical Society" in St. Louis (USA) (March 1989).
- International Conference on "Materials and Mechanisms of Superconductiity – High-Temperature Superconductors M^2S -HTSC IV, July 4-9, 1994, Grenoble, Francia.
- Euroconference on: "Cross-over phenomena in solid state physics: from weak to strong coupling in electronic systems", October 3-7, 1994, Torino, Italy.

- 3rd International Workshop on "Phase separation, electronic inhomogeneities and related mechanisms for high T_c superconductors", Erice (TP), Italy, July 9-15, 1995.
- International Euroconference on "Magnetic Correlations, Metal-Insulator Transitions and Superconductivity in Novel Materials", Groningen, The Netherlands, October 8-13, 1995.
- International NATO Conference on "Fluctuation Phenomena in High Critical Temperature Superconducting Ceramics", Trieste, Italy, August 6-9, 1996.
- Workshop on "High Temperature Superconductivity", presso l'Aspen Center for Physics, July 6 - August 9, 1998, Aspen, Colorado.
- International Workshop on "Electronic crystals, ECRYS-99", May 31 - June 5 1999, La Colle sur Loup (France)
- 18th General Conference of the Condensed Matter Division of the European Physical Society, 13-17 Marzo 2000, Montreux, Swiss.
- International Symposium on "Itinerant and Localized states in HTSC", April 6-10 2000, Klosters, Swiss.
- International Workshop on "Quantitative comparison of Fermi-liquid instabilities at magnetic-nonmagnetic transitions in terms of spin-fluctuation models and beyond", October 5-7 2000, Castelvecchio Pascoli, Italy.
- 19th General Conference of the European Physical Society Condensed Matter Division and Condensed Matter and Materials Physics, 7-11 April 2002, Brighton, UK.
- Workshop on "Emergent materials and highly correlated electrons", August 5-16, 2002, Trieste, Italy
- Workshop sponsored by the Institute for Complex Adaptive Matter (ICAM) on "Quantum Criticality in Condensed Matter", 20-23 Mar, 2003, Columbia University, New York, USA.
- International Conference on "Dynamical Properties of Solids" XXIX, September 22-25, 2003, Trieste (Italy).
- International Conference on "Spectroscopies in Novel Superconductors", Sitges, Spagna, 11-16 luglio 2004.

- Workshop ”Ordering Phenomena in Cuprate Superconductors”, November 4-5, 2004, Munich, Germany.
- 30-th Conference of the Middle European Cooperation in Statistical Physics, 3 - 6 April 2005, Cortona, Italy
- International “De Gennes Days Symposium on Superconductivity and Magnetism”, May 14th, 2008, Ecole Normale Supérieure, Paris, France.
- International Conference on Strongly Correlated Electron Systems, SCES 2008, August 17-22nd, 2008, Armacao dos Buzios, Rio de Janeiro, Brazil.
- Workshop ”Properties of high temperature superconductors”, 13-16 Aprile 2010, Muenich, Germania
- International conference “Quantum in Complex Matter: Superconductivity, Magnetism and Ferroelectricity”, May 27th - June 1st 2013, Ischia, Italy.
- Italian National Conference on Condensed Matter Physics, Milan (Italy), 09-13 september 2013.
- International Conference “SUPERSTRIPES 2014”, July 25-31, 2014 Erice, Italy.
- International Workshop on “Probing and Understanding Exotic Superconductors and Superfluids” 27-31 October 2014, Trieste, Italy
- International workshop “Computational Many-Body physics in the era of artificial gauge fields”, April 8-10, 2015, Munich
- International Conference “Spin-orbit coupling in surface or interface states”, 8-12 June 2015, Spetses, Greece
- International Workshop “Superconductivity on the Verge”, July 27-31, 2015, Leiden, The Netherlands
- International Conference “Materials and Mechanisms of Superconductivity 2015”, August 23-28, 2015, Geneva, Switzerland
- “International Symposium on light scattering in superconductors”, September, 4th 2015, Dresden, Germany.
- 101° Congresso Nazionale SIF, Rome 21-25 September 21-25, 2015.
- “Ringberg-Symposium on HTSC”, 11-16 October 2015, Ringberg, Germany.

- “Strong Correlations and the Normal State of the High Temperature Superconductors” International Workshop and Seminar, 17 - 27 May 2016, Dresden, Germany
- Superstripes 2017, Quantum physics in Complex Matter: Superconductivity, Magnetism and Ferroelectricity Ischia (Naples) June, 4-10, 2017.
- POLIMI and Stanford RIXS/REXS workshop, Milan, Italy, 24-26 May 2017.
- Physics and chemistry of emerging superconductors and thermoelectric materials, September 13-15, 2017, Rome, Italy
- CIMTEC 2018, 8TH Forum on New Materials, June 10-14, 2018, Perugia, Italy
- LEES 2018, International Conference on Low-Energy Electrodynamcis in Solids, June 24 ? 29, 2018, Portonovo (AN), Italy
- 12th International Conference on Materials and Mechanisms of Superconductivity and High-Temperature Superconductors, August 19-24, 2018, Beijing, China

ACADEMIC ACTIVITIES

As an international expert I have been a member of “Jury de thèse” to confer the Ph.D. title in French Institutions (Université J. Fourier, in Grenoble and Ecole Supérieure de Physique et Chimie Industrielles in Paris) and to confer the title of ”Doktors der Naturwissenschaften” of the Brandenburgische Technische Universität Cottbus

International Schools

I was invited to give a short course during the following international Schools of Physics:

- ”Fifth International Petra School of Physics”, September 1989, Amman, Jordan, (ref. P3);
- ”XVI International School of Theoretical Physics”, Ustron-Jasnowiec, Katowice, Poland, September 16-22, 1992 (ref. P5);
- ”Superconductivity in Fullerenes, Oxides and Organic Materials”, Scuola Normale Superiore, Pisa, Italy, January 21-25, 1993.
- ”Physics and Chemistry of Unconventional Superconducting Materials”, Scuola Normale Superiore, Pisa, Italy, May 28-30, 1994.
- ”New Perspectives in Unconventional Superconducting Materials”, Scuola Normale Superiore, Pisa, Italia, January 18-26, 1996 (Introductory course on ”Strongly Correlated Electron Systems”).
- ”Parma School of theoretical Physics”, Parma, Italy, 31 August - 11 September 1998.
- ”International School of Physics and Technology of Matter”, Italy, Otranto 16-22 September 2012.
- XXI Training Course in the Physics of Strongly Correlated Systems, by The International Institute for Advanced Scientific Studies (IIASS), October 2- 13, 2017, Vietri (SA), Italy

Ph. D. Schools

Along the years I held the following courses at the Ph. D. School of Physics of the University of Rome ”La Sapienza”:

- “Traditional theory of superconductivity”
- “Strongly interacting electron systems”
- “Correlated electrons and scattering from dynamical impurities”
- “The Mott-Hubbard transition”

Courses held in Rome at the University ”La Sapienza”

(1991-1998) In the Corso di Laurea in Fisica of the University of Rome “La Sapienza”: Exercises in General Physics I and II, Experimental Physics I, Condensed Matter Physics;

in the Corso di Laurea in Biologia of the University of Rome “La Sapienza”: Exercises in Experimental Physics;

in the Corso di Laurea in Chemistry of the University of Rome “La Sapienza”: Exercises in General Physics II.

Nov. 1998 - June 2005: Course on General Physics of the Corso di Laurea in Natural Sciences and in the Corso di Laurea in Environmental Sciences of the University of Rome “La Sapienza”.

Sept 2005- now: in the Corso di laurea in Physics: Courses on “Analytical and relativistic Mechanics”, “Superconductivity and superfluidity”, ‘Condensed Matter’ “Statistical Mechanics”, “Many-Body physics”

Thesis supervisor

Along the years I have been supervisor of five Ph.D. thesis and of 15 Laurea thesis in Condensed Matter Physics.

Award

In November 19th, 2014 I was awarded the first edition of the prize “Riconoscimento di eccellente insegnamento universitario” for the teaching activity in the academic year 2012/13.

Media and educational activities

- Guest of the television program “Superconduttori” broadcasted by the Italian national network Rai Educational (presenter Luciano Onder) on January 20th, 2006 (<http://www.raiscuola.rai.it/categorie/scienze/110/1/default.aspx>).
 - Recorded some short spots related to physical concepts (field, electric chartge, conduction) for an educational program of the national network Rai Educational.
 - Public lecture “Superconduttori vecchi e nuovi: la storia centenaria di un fenomeno ancora giovane” by the Palazzo dei musei, Modena, May 22nd, 2007. Meeting patronized by the Comune and Provincia of Modena and by the University of Modena and Reggio Emilia
(<https://www.youtube.com/watch?v=PryiQPOiClE>).
 - Since several years held an educational lecture on superconductivity for high-school students organized by the Physics Department
(<http://server2.phys.uniroma1.it/gr/clc/MGrilli/SUPERCONDUTTIVITA-ROMA.pdf>).■
 - Following the recent publication of my results on electronic soft matter states on Nature Communications and on Nature Physics (see Ref. A118 and A126 in the List of publications), a note has been published by the press agency ANSA.
(http://www.ansa.it/scienza/notizie/rubriche/fisica/2016/02/25/dal-cuore-morbido-della-materia-i-futuri-dispositivi-hi-tech-_ab244278-e0c0-4b09-8afe-a543a5b8a977.html)■
- Interview by the Italian radio broadcast Radio3 Scienza to comment on the 2016 Nobel Prizes to Thouless, Kosterlitz, and Haldane.
- <http://www.radio3.rai.it/dl/portaleRadio/media/ContentItem-f9e2892d-862b-42c8-8219-3c3e2e0fc02d.html>
- Interviewed by several newspapers to comment on the 2016 Nobel Prizes to Thouless, Kosterlitz, and Haldane.
- http://www.ansa.it/scienza/notizie/rubriche/fisica/2016/10/04/nobel-fisica-a-thouless-haldane-e-kosterlitz_13e7554c-3484-423a-ab64-92bbc2b6bb0d.html
- <http://ns-game.com/2016/10/04/nobel-fisica-2016-agli-scienziati-thouless-duncan-haldane-e/>
- <http://www.swissinfo.ch/ita/tutte-le-notizie-in-breve/nobel-fisica-a-britannici-thouless-haldane-e-kosterlitz/42492956>
- http://www.laprovinciadicomio.it/stories/ansa/nobel-fisica-per-volto-esotico-materia_1204655_11/

http://www.tuttosport.com/news/notizia-ultima-ora/2016/10/04-16041777/nobel_fisica_per_volto_esotico.html

http://www.corrieredellosport.it/news/notizia-ultima-ora/2016/10/04-16041776/nobel_fisica_per_volto_esotico.html

http://www.affaritaliani.it/notiziario/nobel_fisica_per_volto_esotico_materia-42866.html

http://www.lettera43.it/fatti/nobel-per-la-fisica-a-thouless-haldane-e-kosterlitz_43675262619.html

<http://www.quotidiano.net/cronaca/nobel-fisica-per-volto-esotico-materia-1.2565859>

<http://www.ilfattoquotidiano.it/2016/10/04/premio-nobel-per-la-fisica-2016-a-thouless-haldane-e-kosterlitz-per-la-scoperta-del-volto-esotico-della-materia/3074115/>

<http://www.ilgiornaledivicenza.it/home/cultura/nobel-fisica-al-volto-esotico-della-materia-1.5180373>

LIST OF PUBLICATIONS

Marco Grilli

PAPERS

- A1. Disordered electron systems with Hubbard interaction
C. Castellani, C. Di Castro, and M. Grilli
Physical Review B **34**, 5907 (1986).
- A2. Matrix Field Theory for disordered electron systems
M. Grilli, and S. Sorella
Nuclear Physics B **295**, [FS21] (1988) 422-442..
- A3. Thermoelectric power in disordered electronic systems near the Anderson transition
C. Castellani, C. Di Castro, M. Grilli, and G. Strinati
Physical Review B **37**, 6663 (1988).
- A4. Possible occurrence of band interplay in high T_c superconductors
C. Castellani, C. Di Castro, and M. Grilli
Physica C **153-155**, 1659 (1988).
- A5. Kondo lattice Hamiltonian for high T_c superconductors
C. Castellani, C. Di Castro, and M. Grilli
International Journal of Modern Physics B, Vol. **1**, No.5 (1988) 659-665.
- A6. Exact Canonical Averages from Microcanonical Dynamics for Quantum Systems
M. Grilli, and E. Tosatti
Physical Review Letters **62**, 2889 (1989).
- A7. Fermi Liquid Parameters and Superconducting Instabilities of a Generalized t-J Model
M. Grilli, and G. Kotliar
Physical Review Letters **64**, 1170 (1990).

- A8. Mean Field Theories of Cuprate Superconductors: a Systematic Analysis
M. Grilli, G. Kotliar, and A. J. Millis
Physical Review B **42**, 329 (1990).
- A9. Renormalized Band Structure of CuO_2 Layers in Superconducting Compounds: a Mean Field Analysis
M. Grilli, C. Castellani, and C. Di Castro
Physical Review B **42**, 6233 (1990).
- A10. Mean Field Phase Diagram of a Two Band t-J Model for CuO_2 Layers
C. Castellani, M. Grilli, and G. Kotliar
Physical Review B **43**, 8000 (1991).
- A11. Superconductivity, Phase Separation and Charge Transfer Instability in the $U = \infty$ Limit of the Three Band Model of the CuO_2 Planes
M. Grilli, R. Raimondi, C. Castellani, C. Di Castro, and G. Kotliar
Physical Review Letters **67**, 259 (1991).
- A12. Phase Separation and Superconductivity in the $U = \infty$ Limit of the Extended Multiband Hubbard Model
M. Grilli, R. Raimondi, C. Castellani, C. Di Castro, and G. Kotliar
International Journal of Modern Physics B Vol. **5**, 309 (1991).
- A13. Phase separation and superconductivity in the Kondo-like spin-hole coupled model
N. Cancrini, S. Caprara, C. Castellani, C. Di Castro, M. Grilli and R. Raimondi
Europhysics Letters **14**, (6), 597 (1991).
- A14. Phase separation, charge transfer instability and superconductivity in the three band extended Hubbard model: weak coupling theory revised
Y. Bang, G. Kotliar, C. Castellani, M. Grilli and R. Raimondi
Physical Review B **43**, 13724 (1991).
- A15. Symmetry of hole states in superconducting oxides: correlation with T_c
C. Di Castro, L. F. Feiner, and M. Grilli
Physical Review Letters **66**, 3209 (1991).

- A16. Superconductivity, Phase Separation and Charge Transfer Instability in the $U = \infty$ Limit of the Three Band Model of the CuO_2 Planes
Y. Bang, C. Castellani, C. Di Castro, M. Grilli, G. Kotliar, and R. Raimondi
Physica C **185-189**, (1991) 1525.
- A17. Symmetry of hole states in superconducting oxides: correlation with T_c
C. Di Castro, L. F. Feiner, and M. Grilli
Physica C **185-189**, (1991) 1417.
- A18. Apical oxygen ions and the electronic structure of the high T_c cuprates
L. F. Feiner, M. Grilli, and C. Di Castro
Physical Review B **45**, 10647 (1992).
- A19. Phase separation in the large-N limit of the tJ model
M. Grilli, C. Castellani, and G. Kotliar
Physical Review B **45**, 10805 (1992).
- A20. Single Particle and Optical Gap in Charge-Transfer Insulators
Y. Bang, C. Castellani, M. Grilli, G. Kotliar, R. Raimondi, and Z. Wang
International Journal of Modern Physics B Vol. 6, 531 (1992).
- A21. Collective excitations, photoemission spectra and optical gaps in strongly correlated Fermi systems
C. Castellani, G. Kotliar, R. Raimondi, M. Grilli, Z. Wang, and M. Rozenberg
Physical Review Letters **69**, 2009 (1992).
- A22. Phase separation and superconductivity
C. Di Castro, and M. Grilli
Physica Scripta **T45**, 81 (1992).
- A23. Charge collective modes and dynamic pairing in the three band Hubbard model: weak coupling limit, I
Y. Bang, G. Kotliar, C. Castellani, M. Grilli, and R. Raimondi
Physical Review B **47**, 3323 (1993).
- A24. Charge collective modes and dynamic pairing in the three band Hubbard model: strong coupling limit, II

- R. Raimondi, C. Castellani, M. Grilli, Y. Bang, and G. Kotliar
Physical Review B **47**, 3331 (1993).
- A25. The Three Band t-J Model: a Systematic Large-N Analysis
S. Caprara and M. Grilli
Physical Review B **49**, 6971 (1994).
- A26. Functional integral formulation of the slave-boson approach: beyond the mean-field treatment with the correct continuum limit
E. Arrigoni, C. Castellani, M. Grilli, R. Raimondi, and G.C. Strinati
Physics Reports **241**, 291 (1994).
- A27. The electron-phonon interaction in the presence of strong correlations
M. Grilli, and C. Castellani
Physical Review B **50**, 16880 (1994).
- A28. Comment on "Electronic model for superconductivity"
C. Castellani, C. Di Castro, and M. Grilli
Physical Review Letters (Comment) **72**, 3626 (1994).
- A29. Phase separation and superconductivity in strongly interacting electron systems
S. Caprara, C. Castellani, C. Di Castro, and M. Grilli
Physica C **235-240**, 2155 (1994).
- A30. Comment on "Effects of Strong Coulomb Correlations on the Phonon-Mediated Superconductivity: a Model Inspired by Copper Oxides"
C. Castellani and M. Grilli
Physical Review Letters (Comment) **74**, 1488 (1995).
- A31. Magnetic and charge-transfer phase separation in the three band t-J model
S. Caprara, C. Di Castro, and M. Grilli
Physical Review B **51**, 9286 (1995).
- A32. Disorder effects in the t-J model
S. Caprara, S. De Palo, C. Castellani, C. Di Castro, and M. Grilli
Physical Review B **51**, 11996 (1995).

- A33. Charge fluctuations in the four-band Hubbard model
F. Bucci, C. Castellani, C. Di Castro, and M. Grilli
Physical Review B **52**, 6880 (1995).
- A34. Singular quasiparticle scattering in the proximity of charge instabilities
C. Castellani, C. Di Castro, and M. Grilli
Physical Review Letters **75**, 4650 (1995).
- A35. Charge-Density-Waves and superconductivity as an alternative to phase separation in the infinite-U Hubbard-Holstein model
F. Becca, M. Tarquini, M. Grilli, and C. Di Castro
Physical Review B **54**, 12443, (1996).
- A36. *d*-wave superconductivity near charge instabilities
A. Perali, C. Castellani, C. Di Castro, and M. Grilli,
Physical Review B **54**, 16216 (1996).
- A37. Phase separation and charge density waves: possible sources of non-Fermi liquid behavior and pairing in high temperature superconductors
C. Castellani, C. Di Castro, and M. Grilli
Journal of Superconductivity **9**, 413 (1996).
- A38. Influence of electron-phonon interaction on superexchange
W. Stephan, M. Capone, M. Grilli, and C. Castellani
Physics Letters A **227**, 120 (1997).
- A39. Small-polaron formation and optical absorption in Su-Schrieffer-Heeger and Holstein models
M. Capone, W. Stephan, and M. Grilli
Physical Review B **56**, 4484 (1997).
- A40. The charge-density-wave quantum-critical-point scenario
C. Castellani, C. Di Castro, and M. Grilli
Physica C **283-287**, 260 (1997).
- A41. Non-Fermi-liquid behavior and *d*-wave superconductivity near the charge-density-wave quantum critical point

- C. Castellani, C. Di Castro, and M. Grilli
Zeitschrift für Physik B **103**, 137 (1997).
- A42. The incommensurate charge-density-wave instability in the extended three-band Hubbard model
F. Becca, F. Bucci, and M. Grilli
Physical Review B **57**, 4382 (1998).
- A43. Stripe formation: A quantum critical point for cuprate superconductors
C. Castellani, C. Di Castro, and M. Grilli
Journal of Physics and Chemistry of Solids **59**, 1694 (1998).
- A44. Joint superexchange–Jahn-Teller mechanism for layered antiferromagnetism in LaMnO₃
D. Feinberg, P. Germain, M. Grilli, and G. Seibold
Physical Review B (Rap. Commun.) **57**, 5583 (1998).
- A45. Striped phases in the two-dimensional Hubbard model with long-range Coulomb interaction
G. Seibold, C. Castellani, C. Di Castro, and M. Grilli
Physical Review B **58**, 13506 (1998). .
- A46. Renormalization group analysis of the quantum non-linear sigma model with a damping term
A. Gamba, M. Grilli, and C. Castellani
Nuclear Physics B [FTSS] **556**, 463 (1999).
- A47. Single-particle properties of a model for coexisting charge and spin quasi-critical fluctuations coupled to electrons
S. Caprara, M. Sulpizi, A. Bianconi, C. Di Castro, and M. Grilli
Physical Review B **59**, 14980 (1999).
- A48. Small polaron formation in strongly correlated electron systems
M. Capone, M. Grilli, and W. Stephan
Journal of Superconductivity **12**, 75 (1999).
- A49. Small polaron formation in many-particle states of the Hubbard-Holstein model: The one-dimensional case

- M. Capone, M. Grilli, and W. Stephan
European Physical Journal B **11**, 551 (1999).
- A50. Fermi Surface and gap parameter in high-T_c superconductors: the Stripe Quantum Critical Point scenario
S. Caprara, C. Di Castro, M. Grilli, A. Perali, M. Sulpizi
Physica C **317-318**, 230 (1999).
- A51. Spectral properties of incommensurate charge-density wave systems
G. Seibold, F. Becca, F. Bucci, C. Castellani, C. Di Castro, and M. Grilli
European Physical Journal B **13**, 87 (2000).
- A52. Charge and spin inhomogeneity as a key to the physics of the high T_c cuprates
S. Caprara, C. Castellani, C. Di Castro, M. Grilli, and A. Perali
Physica B **280**, 196 (2000).
- A53. Single-particle spectra near a stripe instability
S. Caprara, C. Di Castro, and M. Grilli
Physica B **284-288**, 983 (2000).
- A54. Kosterlitz-Thouless vs Ginzburg-Landau description of 2D superconducting fluctuations
L. Benfatto, A. Perali, C. Castellani, and M. Grilli
European Physical Journal B (Rapid Note) **13**, 6-9 (2000).
- A55. Stripe formation in electron-doped cuprates
A. Sadori, and M. Grilli
Physical Review Letters **84**, 5375 (2000).
- A56. Two-gap model for underdoped cuprate superconductors
A. Perali, C. Castellani, C. Di Castro, M. Grilli, E. Piegari, and A. Varlamov
Physical Review B **62**, R9295 (2000).
- A57. Stripe ordering and two-gap model for underdoped cuprates
C. Castellani, C. Di Castro, M. Grilli, and A. Perali
Physica C **341-348**, 1739 (2000).

- A58. The physics of the stripe quantum critical point in superconducting cuprates
C. Di Castro, L. Benfatto, S. Caprara, C. Castellani, and M. Grilli
Physica C **341-348**, 1715 (2000).
- A59. Stabilization of A-type layered antiferromagnetic phase in LaMnO₃ by co-operative Jahn-Teller deformations
M. Capone, D. Feinberg, M. Grilli
European Physical Journal B **17**, 103 (2000).
- A60. Fermi surface and electronic structure of incommensurate charge-density wave systems
G. Seibold, C. Castellani, C. Di Castro, M. Grilli
Journal of Superconductivity **13**, 911 (2000).
- A61. Fermi surface and photoemission lineshape of incommensurate CDW systems
G. Seibold, C. Castellani, C. Di Castro, M. Grilli
International Journal of modern Physics B **14**, 29 (2000).
- A62. Influence of incommensurate dynamic charge-density-wave scattering on the photoemission line shape of superconducting high- T_c cuprates
G. Seibold and M. Grilli
Physical Review B **63**, 224505 (2001).
- A63. Jahn-Teller, Charge and Magnetic Ordering in half-doped Manganese Oxides
S. Fratini, D. Feinberg, M. Grilli
European Physical Journal B **22**, 157 (2001).
- A64. Anomalous isotopic effect near the charge-ordering quantum criticality
S. Andergassen, S. Caprara, C. Di Castro, M. Grilli
Physical Review Letters **87**, 056401 (2001).
- A65. Strong correlation, electron-phonon interaction and critical fluctuations: isotope effect, pseudogap formation, and phase diagram of the cuprates
C. Di Castro, M. Grilli, S. Caprara
Journal of Physics and Chemistry of Solids, (2001).

- A66. Anomalous optical absorption in overdoped cuprates near the charge-ordering instability
S. Caprara, C. Di Castro, S. Fratini, and M. Grilli
Physical Review Letters **88**, 147001 (2002).
- A67. First-order pairing transition and single-particle spectral function in the attractive Hubbard model
M. Capone, C. Castellani, and M. Grilli
Physical Review Letters **88**, 126403 (2002).
- A68. Doping-driven transition to a time-reversal breaking state in the phase diagram of the cuprates
G. Sangiovanni, M. Capone, S. Caprara, C. Castellani, C. Di Castro, and M. Grilli
Physical Review B **67**, 174507 (2003).
- A69. A large- \mathcal{N} analysis of the local quantum critical point and the spin-liquid phase
S. Burdin, M. Grilli, and D. Grempel
Physical Review B **67**, 121104(R) (2003).
- A70. First-Order Pairing Transition and Phase Separation in the Attractive Hubbard model
M. Capone, C. Castellani, and M. Grilli
International Journal of Modern Physics B **17**, 590 (2003).
- A71. Phase separation close to the density-driven Mott transition in the Hubbard-Holstein model
M. Capone, G. Sangiovanni, C. Castellani, C. Di Castro, and M. Grilli
Physical Review Letters **92**, 106401 (2004).
- A72. Collective transport and optical absorption near the stripe criticality
S. Caprara, C. Di Castro, and M. Grilli
Journal of Magnetism and Magnetic Materials **272**, 134 (2004).
- A73. Electron-phonon interaction in proximity of a Mott transition
M. Capone, G. Sangiovanni, C. Castellani, and M. Grilli
Physica B **359-361**, 636 (2005).

- A74. Electron-phonon Interaction close to a Mott transition
G. Sangiovanni, M. Capone, C. Castellani, M. Grilli
Physical Review Letters **94**, 026401 (2005).
- A75. Charge-fluctuation contribution to the Raman response in superconducting cuprates
S. Caprara, C. Di Castro, M. Grilli, D. Suppa
Physical Review Letters **95**, 117004 (2005) and cond-mat/0501671.
- A76. Effect of mesoscopic inhomogeneities on local tunnelling density of states
L. Dell'Anna, J. Lorenzana, M. Capone, C. Castellani, M. Grilli
Physical Review B **71**, 064518 (2005).
- A77. Theory of isotope dependence of photoemission spectra of high- T_c superconducting cuprates
G. Seibold, M. Grilli
Physical Review B **72**, 104519 (2005).
- A78. Extended paraconductivity regime in underdoped cuprates
S. Caprara, M. Grilli, B. Leridon, and J. Lesueur
Physical Review B **72**, 104509 (2005).
- A79. Charge critical fluctuations in cuprates: Isotope effect, pseudogap, conductivity, and Raman spectroscopy
C. Di Castro, M. Grilli, S. Caprara, and D. Suppa
Journal of Physics and Chemistry of Solids **67**, 160 (2006).
- A80. Effective electron-electron and electron-phonon interactions in the Hubbard-Holstein model
G. Aprea, C. Di Castro, M. Grilli, and J. Lorenzana
Nuclear Physics B **744**, [FS] 277 (2006).
- A81. Optical conductivity near finite-wavelength quantum criticality
S. Caprara, M. Grilli, C. Di Castro, and T. Enss
Physical Review B **75**, 140505 2007.

- A82. Checkerboard and stripe inhomogeneities in cuprates
G. Seibold, J. Lorenzana, and M. Grilli
Physical Review B **75**, 100505 (2007).
- A83. Spectroscopic evidences of quantum critical charge fluctuations in cuprates
M. Grilli, S. Caprara, C. Di Castro, and D. Suppa
cond-mat/0611679 and Physica C **460**, 1103 (2007).
- A84. Charge inhomogeneity coexisting with large Fermi surfaces
A. Di Ciolo, M. Grilli, J. Lorenzana, G. Seibold
cond-mat/0701269 and Physica C **460**, 1176 (2007).
- A85. Disorder effects in the quantum Heisenberg model: An Extended Dynamical mean-field theory analysis
S. Burdin, D. R. Grempel, M. Grilli
Physical Review B **75**, 224423 (2007).
- A86. Disordered loops in the two-dimensional antiferromagnetic spin-fermion model
T. Enss, S. Caprara, C. Castellani, C. Di Castro, and M. Grilli
Nuclear Physics B **795**, 578-595 (2008).
- A87. Competing orders in FeAs layers
G. Seibold, C. Ortix, M. Grilli, and J. Lorenzana
arXiv:0807.2412 and Physical Review Letters **101**, 186402 (2008).
- A88. Low-energy signatures of charge and spin fluctuations in Raman and optical spectra of the cuprates
S. Caprara, C. Di Castro, T. Enss, and M. Grilli
Journal of Physics and Chemistry of Solids **69**, 2155 (2008).
- A89. Paraconductivity in layered cuprates behaves as if due to pairing of nearly free quasiparticles
S. Caprara, M. Grilli, B. Leridon, and J. Vanhacken
arXiv:0705.3520 and Physical Review B **79**, 024506 (2009).
- A90. Charge instabilities and electron-phonon interaction in the Hubbard-Holstein model

- A. Di Ciolo, J. Lorenzana, M. Grilli, and G. Seibold
ArXiv:08063385 and Physical Review B **79**, 085101 (2009).
- A91. On the contribution of nearly-critical spin and charge collective modes to the Raman spectra of high- T_c cuprates
S. Caprara, C. Di Castro, T. Enss, and M. Grilli
arXiv:0805.4291 and Journal of Magnetism and Magnetic Materials **321**, 686 (2009).
- A92. Fermi surface dichotomy in systems with fluctuating order
M. Grilli, G. Seibold, A. Di Ciolo, and J. Lorenzana
ArXiv:0809.2197v2 and Physical Review B **79**, 125111 (2009).
- A93. Spectral signatures of critical charge and spin fluctuations in cuprates
M. Grilli, S. Caprara, C. Di Castro, T. Enss, R. Hackl, B. Muschler, and W. Prestel
arXiv:0903.2588v1, Physica B **404**, 3070 (2009).
- A94. Theory of fluctuation conductivity from interband pairing in pnictide superconductors
L. Fanfarillo, L. Benfatto, S. Caprara, C. Castellani, and M. Grilli
Physical Review B **79**, 172508 (2009).
- A95. Model of quasiparticles coupled to a frequency-dependent charge-density-wave order parameter in cuprate superconductors
G. Seibold, M. Grilli, and J. Lorenzana
Physical Review Letters **103**, 217005 (2009).
- A96. Phonon renormalization from local and transitive electron-lattice couplings in strongly correlated systems
E. von Oelsen, A. Di Ciolo, J. Lorenzana, G. Seibold, and M. Grilli
arXiv:0910.5618v1, Physical Review B **81**, 155116 (2010).
- A97. Electron-phonon interaction in strongly correlated systems
M. Capone, C. Castellani, and M. Grilli
arXiv:1003:1042v1 and Advances in Condensed Matter Physics Volume 2010, (2010), Article ID 920860, doi:10.1155/2010/920860.

- A98. Dynamical charge and spin density wave scattering in cuprate superconductors
G Seibold , M Grilli and J Lorenzana
arXiv:1011.2396 and New Journal of Physics **12**, 105010 (2010).
- A99. Dynamics of Electronic Inhomogeneities in Cuprates
G. Seibold, M. Grilli, and J. Lorenzana
Journal of Superconductivity and Novel Magnetism **24**, 1177 (2011).
- A100. Influence of correlations on transitive electron-phonon couplings in cuprate superconductors
G. Seibold, M. Grilli, and J. Lorenzana
arXiv:1103.2320 and Physical Review B **83**, 174522 (2011).
- A101. Effective medium theory for superconducting layers: A systematic analysis including space correlation effects
S. Caprara, M. Grilli, L. Benfatto, and C. Castellani
arXiv:1104.3430 and Physical Review B **84**, 014514 (2011).
- A102. Extracting the dynamical effective interaction and competing order from an analysis of Raman spectra of the high-temperature $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ superconductor
S. Caprara, C. Di Castro, B. Muschler, R. Hackl, M. Lambacher, A. Erb, S. Komiya, Y. Ando, M. Grilli
arXiv:1010.0180 and Physical Review B **84**, 054508 (2011).
- A103. Nematic phase without Heisenberg physics in FeAs planes
M. Capati, M. Grilli, and J. Lorenzana
arXiv:1106.3238 and Physical Review B **84**, 214520 (2011).
- A104. Stripes in cuprate superconductors: Excitations and dynamic dichotomy
G. Seibold, M. Grilli, and J. Lorenzana
arXiv:1202.1615, Physica C **481**, 132 (2012).
- A105. Intrinsic instability of electronic interfaces with strong Rashba coupling
S. Caprara, F. Peronaci, and M. Grilli
arXiv:1204.0962 and Physical Review Letters **109**, 196401 (2012).

- A106. Hidden Ferronematic Order in Underdoped Cuprates
G. Seibold, M. Capati, C. Di Castro, M. Grilli, and J. Lorenzana
arXiv:1204.2119 and Physical Review B **87**, 035138 (2013).
- A107. Metal-to-superconductor transition in low-dimensional superconducting clusters embedded in two-dimensional electron systems
D. Bucheli, S. Caprara, C. Castellani, and M. Grilli
arXiv:1205.0454 and New Journal of Physics **15**, 023014 (2013).
- A108. Evidence for phonon-like charge and spin fluctuations from an analysis of angle-resolved photoemission spectra of $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ superconductors
G. Mazza, M. Grilli, C. Di Castro and S. Caprara
Physical Review B **87**, 014511 (2013).
- A109. Multiple quantum criticality in a two-dimensional superconductor
J. Biscaras, N. Bergeal, S. Hurand, C. Feuillet-Palma, A. Rastogi, R. C. Budhani, M. Grilli, S. Caprara, J. Lesueur
arXiv:1209.6464 and Nature Materials **12**, 542 (2013).
- A110. Multi-band superconductivity and nanoscale inhomogeneity at oxide interfaces
S. Caprara, J. Biscaras, N. Bergeal, D. Bucheli, S. Hurand, C. Feuillet-Palma, A. Rastogi, R. C. Budhani, J. Lesueur, and M. Grilli
arXiv:1304.2970 and Physical Review B (Rapid Communications) **88**, 020504(R) (2013).
- A111. Phase diagrams of voltage-gated oxide interfaces with strong Rashba coupling
D. Bucheli, M. Grilli, F. Peronaci, G. Seibold, and S. Caprara
arXiv:1307.5427 and Physical Review B **89**, 195448 (2014).
- A112. Spin excitations of ferronematic order in underdoped cuprate superconductors
G. Seibold, C. Di Castro, M. Grilli, and J. Lorenzana
Scientific Reports **4**, 5319 (2014).
- A113. Possible mechanisms of electronic phase separation in oxide interfaces
N. Bovenzi, F. Finocchiaro, N. Scopigno, D. Bucheli, S. Caprara, G. Seibold

- and M. Grilli
Journal of Superconductivity and Novel Magnetism **28**, 1273 (2015), DOI 10.1007/s10948-014-2903-7, 2014.
- A114. Inhomogeneous electron gas at oxide interfaces with strong Rashba spin-orbit coupling
S. Caprara, D. Bucheli, M. Grilli, J. Biscaras, N. Bergeal, S. Hurand, C. Feulliet-Palma, J. Lesueur, A. Rastogi, and R. C. Budhani
arXiv:1405.4666 and SPIN **4**, 1440004 (2014).
- A115. Phase separation and long wave-length charge instabilities in spin-orbit coupled systems
G. Seibold, D. Bucheli, S. Caprara, and M. Grilli
EPL **109**, 17006 (2015).
- A116. Inhomogeneous multi-carrier superconductivity at $\text{LaXO}_3/\text{SrTiO}_3$ (X=Al or Ti) oxide interfaces
S. Caprara, D. Bucheli, N. Scopigno, N. Bergeal, J. Biscaras, S. Hurand, J. Lesueur, and M. Grilli
Superconductor Science and Technology **28**, 014002 (2015).
- A117. Pseudo-gap in tunneling spectra as a signature of inhomogeneous superconductivity in oxide interfaces
D. Bucheli, S. Caprara, and M. Grilli
Superconductor Science and Technology **28**, 045004 (2015).
- A118. Electronic polymers and soft-matter-like broken symmetries in underdoped cuprates
M. Capati, S. Caprara, C. Di Castro, M. Grilli, G. Seibold, and J. Lorenzana
Nature Communications **6**, 7691 (2015).
- A119. Signatures of nematic quantum critical fluctuations in Raman spectra of lightly doped $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$.
S. Caprara, M. Colonna, C. Di Castro, R. Hackl, B. Muschler, L. Tassini and M. Grilli
Physical Review B **91**, 205115 (2015).

- A120. High resolution X-ray techniques as new tool to investigate the 3D vascularization of engineered-bone tissue
Bukreeva I., Fratini M., Campi G., Pelliccia D., Span R., Tromba G., Brun F., Burghammer M., Grilli M., Cancedda R., Cedola A. and Mastrogiacomo M.
Frontiers in Bioengineering and Biotechnology **3**, 133 (2015).
- A121. Field-effect control of superconductivity and Rashba spin-orbit coupling in top-gated $\text{LaAlO}_3/\text{SrTiO}_3$ devices
S. Hurand, A. Jouan, C. Feuillet-Palma, G. Singh, J. Biscaras, E. Lesne, N. Reyen, Thales, C. Ulysse, X. Lafosse, M. Pannetier-Lecoeur, S. Caprara, M. Grilli, J. Lesueur, N. Bergeal
arXiv:1503.00967, Scientific Reports **5**, 12751 (2015).
- A122. Interplay between density and superconducting quantum critical fluctuations
S. Caprara, N. Bergeal, J. Lesueur, M. Grilli
arxiv:1503.05997, Journal of Physics Condensed Matter **27**, 425701 (2015).
- A123. Intrinsic spin Hall effect in systems with striped spin-orbit coupling
G. Seibold, S. Caprara, M. Grilli, and R. Raimondi
arXiv:1505.07667v1, EPL **112**, 17004 (2015).
- A124. The Archimedes Experiment
E. Calloni, S. Caprara, M. De Laurentis, G. Esposito, M. Grilli, E. Majorana, G.P. Pepe, S. Petrarca, P. Puppo, P. Rapagnani, F. Ricci, L. Rosa, C. Rovelli, P. Ruggi, N.L. Saini, C. Stornaiolo and F. Tafuri
DOI: 10.1016/j.nima.2015.09.071, Nuclear Inst. and Methods in Physics Research A **824**, 646 (2016).
- A125. Electronic phase separation from electron confinement at oxide interfaces
N. Scopigno, D. Bucheli, S. Caprara, J. Biscaras, N. Bergeal, J. Lesueur, and M. Grilli
arXiv:1506.04777, Physical Review Letters **116**, 026804 (2016).
- A126. Nematic fluctuations and the magneto-structural phase transition in $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$
F. Kretzschmar, T. Böhm, U. Karahasnović, B. Muschler, A. Baum, D.

- Jost, J. Schmalian, S. Caprara, M. Grilli, C. Di Castro, J. G. Analytis, J.-H. Chu, I. R. Fisher, and R. Hackl
Nature Physics **12**, 560 (2016).
- A127. Glue function of optimally and overdoped cuprates by inversion of the Raman spectra
L. Fanfarillo, M. Mori, M. Campetella, M. Grilli, and S. Caprara
arXiv:1507.02441, Journal of Physics: Condensed Matter **28**, 065701 (2016). ■
- A128. Density driven fluctuations in a two-dimensional superconductor
S. Hurand, J. Biscaras, N. Bergeal, C. Feuillet-Palma, G. Singh, A. Jouan, A. Rastogi, A. Dogra, R. C. Budhani, S. Caprara, M. Grilli, J. Lesueur
arxiv:1506.06874, . .
- A129. Confinement of superconducting fluctuations due to emergent electronic inhomogeneities
C. Carobillet, S. Caprara, M. Grilli, C. Brun, T. Cren, F. Debontridder, B. Vignolle, D. Demaille, L. Largeau, K. Ilin, M. Siegler, D. Roditchev, and B. Leridon
arXiv:1507.08955, Physical Review B **93**, 144509 (2016).
- A130. Inhomogeneous Rashba spin-orbit coupling and intrinsic spin-Hall effect
G. Seibold, S. Caprara, M. Grilli, and R. Raimondi
Journal of Magnetism and Magnetic Materials **440**, 63 (2017). DOI 10.1016/j.jmmm.2016.12.066
- A131. Dynamical charge density waves rule the phase diagram of cuprates
S. Caprara, C. Di Castro, G. Seibold, and M. Grilli
arXiv:1604.07852, Physical Review B **95**, 224511 (2017).
- A132. Non-equilibrium spin currents in systems with striped Rashba spin-orbit coupling
G. Seibold, S. Caprara, M. Grilli, and R. Raimondi
Journal of Superconductivity and Novel Magnetism **30**, 123 (2017).
- A133. Pseudogap and (an)isotropic scattering in the fluctuating charge-density wave phase of cuprate

- S. Caprara, M. Grilli, C. Di Castro, and G. Seibold
Journal of Superconductivity and Novel Magnetism **30**, 25 (2017).
- A134. Casimir energy for two and three superconducting coupled cavities: numerical calculations
L. Rosa, S. Avino, E. Calloni, S. Caprara, M. De Laurentis, R. De Rosa, G. Esposito, M. Grilli, E. Majorana, G. P. Pepe, S. Petrarca, P. Puppo, P. Rappagnani, F. Ricci, C. Rovelli, P. Ruggi, N. L. Saini, C. Stornaiolo, F. Tafuri
The European Physical Journal Plus **132**, 478 (2017).
- A135. Theory of the spin galvanic effect at oxide interfaces
G. Seibold, S. Caprara, M. Grilli, and R. Raimondi
Physical Review Letters **119**, 256801 (2017).
- A136. Competition between electron pairing and phase coherence in superconducting interfaces
G. Singh, A. Jouan, L. Benfatto, F. Couedo, P. Kumar, A. Dogra, R. Budhani, S. Caprara, M. Grilli, E. Lesne, A. Barthélémy, M. Bibes, C. Feuillet-Palma, J. Lesueur, N. Bergeal
arXiv:1704.03365, Nature Communications **9**, 407 (2018).
- A137. Re-entrant charge order in overdoped $(\text{Bi},\text{Pb})_{2.12}\text{Sr}_{1.88}\text{CuO}_{6+\delta}$ outside the pseudogap regime
Y. Y. Peng, R. Fumagalli, Y. Ding, M. Minola, S. Caprara, D. Betto, M. Bluschke, G. M. De Luca, K. Kummer, E. Lefrancois, M. Salluzzo, E. Schierle, H. Suzuki, M. Le Tacon, X. J. Zhou, N. B. Brookes, B. Keimer, L. Braicovich, M. Grilli, and G. Ghiringhelli
doi:10.1038/s41563-018-0108-3, Nature Materials **17**, 697 (2018).
- A138. On the evaluation of the spin galvanic effect in lattice models with Rashba spin-orbit coupling
Götz Seibold, Sergio Caprara, Marco Grilli, Roberto Raimondi
Condensed Matter **3**, 22 (2018), DOI: 10.3390/condmat3030022.
- A139. Majorana fermions in one-dimensional structures at $\text{LaAlO}_3/\text{SrTiO}_3$ oxide interfaces
Maria Vittoria Mazziotti, Niccolò Scopigno, Marco Grilli, Sergio Caprara
Condensed Matter **3**, 37 (2018).

- A140. Negative electronic compressibility and nanoscale inhomogeneity in ionic-liquid gated two-dimensional superconductors
G. Dezi, N. Scopigno, S. Caprara, and M. Grilli
Physical Review B **98**, 214507 (2018), arXiv:1706.01274.
- A141. Gap suppression at a Lifshitz transition in a multi-condensate superconductor
G. Singh, A. Jouan, G. Herranz, M. Sciga, F. Sanchez, L. Benfatto, S. Caprara, M. Grilli, G. Saiz, F. Couedo, C. Feuillet-Palma, J. Lesueur, N. Bergeal
Nature Materials **18**, 948 (2019), arXiv:1806.02212.
- A142. Dynamical charge density fluctuations pervading the phase diagram of a Cu-based high- T_c superconductor
R. Arpaia, S. Caprara, R. Fumagalli, G. De Vecchi, Y.Y. Peng, E. Andersson, D. Betto, G. M. De Luca, N. B. Brookes, F. Lombardi, M. Salluzzo, L. Braicovich, C. Di Castro, M. Grilli, G. Ghiringhelli
Science **365**, 906 (2019), arxiv:1809.04949.
- A143. Density inhomogeneities and Rashba spin-orbit coupling interplay in oxide interfaces
N. Bovenzi, S. Caprara, M. Grilli, R. Raimondi, N. Scopigno, and G. Seibold
Journal of Physics and Chemistry of Solids **128**, 118 (2019), arxiv:1704.01852. ■
- A144. Effect of anomalous diffusion of fluctuating Cooper pairs on the density of states of superconducting NbN thin films
Pietro Brighi, Marco Grilli, Brigitte Leridon, and Sergio Caprara
Physical Review B **100**, 174518 (2019), arXiv:1907.13579.
- A145. Protected superconductivity at the boundaries of charge-density-wave domains
B. Leridon, J. Vanacken, V.V. Moshchalkov, R.C. Budhani, R. Porwal, S. Caprara, A. Attanasi, M. Grilli, and J. Lorenzana
New Journal of Physics **22**, 073025 (2020), arXiv:1905.05606, doi:10.1088/1367-2630/ab976e. ■

- A146. Doping-dependent competition between superconductivity and polycrystalline charge density waves
S. Caprara, M. Grilli, J. Lorenzana, B. Leridon
SciPost Phys. **8**, 003 (2020), arxiv:1908.03408v2 .
- A147. Progress in a Vacuum Weight Search Experiment
Saverio Avino, Enrico Calloni, Sergio Caprara, Martina De Laurentis, Rosario De Rosa, Tristano Di Girolamo, Luciano Errico, Gianluca Gagliardi, Marco Grilli, Valentina Mangano, Maria Antonietta Marsella, Luca Naticchioni, Giovanni Piero Pepe, Maurizio Perciballi, Gabriel Pillant, Paola Puppo, Piero Rapagnani, Fulvio Ricci, Luigi Rosa, Carlo Rovelli, Paolo Ruggi, Naufrag L. Saini, Daniela Stornaiuolo, Francesco Tafuri, and Arturo Tagliacozzo
Physics **2**, 1 (2020), DOI: 10.3390/physics2010001.
- A148. Raman response in the nematic phase of FeSe
Mattia Udina, Marco Grilli, Lara Benfatto, and Andrey V. Chubukov
Physical Review Letters **124**, 197602 (2020), doi:10.1103/PhysRevLett.124.197602.
- A149. Superfluid properties of superconductors with disorder at the nonoscale: a random impedance model
Giulia Venditti, Ilaria Maccari, Marco Grilli, and Sergio Caprara
Condensed Matter **5**, 36 (2020), doi:10.3390/condmat5020036.
- A150. Strange metal behaviour from charge density fluctuations in cuprates
G. Seibold, R. Arpaia, Y. Y. Peng, R. Fumagalli, L. Braicovich, C. Di Castro, M. Grilli, G. Ghiringhelli, and S. Caprara
arxiv:1905.10232, *Communications Physics* **4**, 7 (2021). doi: 10.1038/s42005-020-00505-z.
- A151. High-bandwidth beam balance for vacuum-weight experiment and Newtonian noise subtraction
Calloni, E., Archimedes Collaboration. & Virgo Collaboration
European Physical Journal Plus **136**, 335 (2021). doi: 10.1140/epjp/s13360-021-01214-4.
- A152. Sub-picoradian tiltmeter and direct ground tilt measurements at the Sos-Enattos site

A. Allocca, S. Avino, E. Calloni, S. Caprara, M. Carpinelli, D. D'Urso, M. De Laurentis, R. De Rosa, L. Errico, G. Gagliardi, M. Grilli, V. Mangano, M. Marsella, L. Naticchioni, A. Pasqualetti, G. Pepe, M. Perciballi, P. Puppo, P. Rapagnani, F. Ricci, L. Rosa, C. Rovelli, D. Rozza, P. Ruggi, N. L. Saini, V. Sipala, D. Stornaiuolo, F. Tafuri
, preprint, Archimedes collaboration.

PROCEEDINGS

- P1. $\text{Bi}_2\text{Sr}_2\text{Ca}_n\text{Cu}_{n+1}\text{O}_{2n+6}$ Optical Conductivity
P. Calvani, M. Capizzi, A. Fabrizi, M. Grilli, S. Lupi, P. Maselli, D. Peschiaroli, ■ and M. Pompa, and Katayama-Yoshida
Proceedings of the 3rd National Meeting "High Temperature Superconductivity", Genoa, Italy 12-14 February 1990, edited by C. Ferdeghini and A. S. Siri, (World Scientific), .
- P2. A Mean Field Theory of CuO_2 Layers in Superconducting Compounds
C. Castellani, C. Di Castro, and M. Grilli
Proceedings of the 3rd National Meeting "High Temperature Superconductivity", Genoa, Italy 12-14 February 1990, edited by C. Ferdeghini and A. S. Siri, (World Scientific), .
- P3. Electronic structure and phase separation in superconducting cuprates
C. Di Castro, and M. Grilli
Workshop "Phase Separation in Cuprate Superconductors",, 6-13 May 1992, Erice (TP), Italy, ed. K. A. Müller and G. Benedek, World Scientific.
- P4. Quasiparticles and collective Excitations in Strongly Correlated Fermi Systems
M. Grilli and R. Raimondi
Proceedings of the 16th International School of Theoretical Physics, 16-22 September 1992, Ustroń-Jasszowiec, Poland, ed. J. Aksamit and M. Matlak.
- P5. Phase separation as a possible scenario for high T_c superconductors: a particular overview
C. Di Castro, and M. Grilli
Proceedings of the Conference on "Phase separation in cuprate superconductors", 4-10 September 1993, Cottbus, Germany, Eds. K. A. Müller and E. Sigmund, World Scientific.
- P6. The electron-phonon interaction in strongly correlated systems
C. Castellani and M. Grilli
Proceedings of the International Workshop on "Anharmonic properties of high- T_c cuprates", September 1-6, 1994, Bled, Slovenia.

- P7. Stato della teoria per la supercondutività ad alta temperatura critica
C. Castellani e M. Grilli
Proceedings of the conference organized by the “Istituto Lombardo Accademia delle Scienze” di Milano, 10 ottobre 1996, Milano, (1998).
- P8. The stripe-phase Quantum-Critical-Point scenario for high- T_c superconductors
S. Caprara, C. Castellani, C. Di Castro, M. Grilli, A. Perali, and M. Sulpizi
Proceedings of the International Conference “Stripes 98”, June 4-7 1998, Rome, Italy,, “Stripes and related phenomena” (Kluwer Academics - Plenum Publisher) Edited by A. Bianconi and N. L. Saini.
- P9. On localization effects in underdoped cuprates
C. Castellani, P. Schwab, M. Grilli
Proceedings of the International Conference “Stripes 98”, June 4-7 1998, Rome, Italy,, “Stripes and related phenomena” (Kluwer Academics - Plenum Publisher) Edited by A. Bianconi and N. L. Saini.
- P10. The stripe Quantum-Critical-Point as a key to the physics of cuprates
S. Caprara, C. Castellani, C. Di Castro, M. Grilli, A. Sadori
Journal de Physique IV **9**, 329 (1999).
- P11. Role of electron-lattice interactions in determining the magnetic structure of insulating manganites
M. Capone, D. Feinberg, and M. Grilli
Journal de Physique IV **9**, 335 (1999).
- P12. Single-particle spectra and Fermi surface near a stripe instability
S. Caprara and M. Grilli
Journal de Physique IV **9**, 337 (1999).
- P13. Crucial role of Jahn-Teller distortions in stabilizing magnetic ordering in insulating manganite phases
S. Fratini, M. Capone, M. Grilli, D. Feinberg
International Symposium on Physics in Local Lattice Distortions (LLD2K), July 20-26, Tsukuba, Japan, AIP CONFERENCE PROCEEDINGS Volume: 554 Pages: 371-378 Published: 2001.

- P14. Crucial role of Jahn-Teller distortions in LaMnO₃
M. Capone, D. Feinberg, M. Grilli
International Symposium on Physics in Local Lattice Distortions (LLD2K), July 20-26, Tsukuba, Japan, AIP CONFERENCE PROCEEDINGS Volume: 554 Pages: 395-398 Published: 2001.
- P15. Magnetic field induced transition in superconducting LaTiO₃/SrTiO₃ interfaces
J. Biscaras, N. Bergeal, S. Hurand, C. Feuillet-Palma, A. Rastogi, R. C. Budhani, M. Grilli, S. Caprara, J. Lesueur
Journal of Physics: Conference Series **449**, 012035 (2013), DOI: 10.1088/1742-6596/449/1/012035.
- P16. The Archimedes project: a feasibility study for weighing the vacuum energy
E. Calloni, S. Caprara, M. De Laurentis, G. Esposito, M. Grilli, E. Majorana, G. P. Pepe, S. Petrarca, P. Puppo, F. Ricci, L. Rosa, C. Rovelli, P. Ruggi, N. L. Saini, C. Stornaiolo, F. Tafuri
Proceedings of Science, Frontiers of Fundamental Physics 14 - FFP14, 15-18 July 2014 Aix Marseille University (AMU) Saint-Charles Campus, Marseille, (2014).

MISCELLANEA OF PUBLICATIONS

- M1. Modelli di elettroni fortemente correlati nei superconduttori ad alta temperatura critica (Models of strongly correlated electrons in high temperature superconductors)
M. Grilli
Ph. D. Thesis, Oct. 1990.
- M2. High Temperature Superconductivity: the Fermi Liquid vs. non-Fermi Liquid Dilemma
M. Grilli
Lectures held during the "Fifth International Petra School of Physics", (3-10 September 1989) Proceedings of the School.
- M3. Comment on “Insulator-to-Metal Crossover in the Normal State of $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ Near Optimum Doping”
C. Castellani, C. Di Castro, and M. Grilli
cond-mat/, 9709278.
- M4. Charge-ordering quantum criticality in the phase diagram of the cuprates
C. Di Castro, M. Grilli, S. Caprara
cond-mat/, 0101231.
- M5. Superconduttività e superfluidità
C. Di Castro, S. Caprara, e M. Grilli,
Voce dell' Enciclopedia della Scienza e della Tecnica Treccani , (2008).
- M6. Superconductivity and quantum criticality
M. Grilli and S. Caprara
Il Nuovo Saggiatore **30**, 5 (2014).