Enrico Rossi

Curriculum Vitae

Condensed Matter Theory Center	**Phone**	: 1-301-405-6175 (Office)
2120 Physics Building	**Fax**	: 1-301-314-9465 (Fax)
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EDUCATION

Ph.D. in Physics, August 2005.
University of Texas at Austin
Dissertation : *Fluctuations and Dissipation of Collective Dynamics in Spin and Pseudospin Ferromagnets*
Advisor : Professor Allan H. MacDonald.

Joint B.S. & M.S. in Engineering Physics, 1998.
Turin Polytechnic, Turin, Italy
Italian Laurea: *Summa Cum Laude*

RESEARCH EXPERIENCE

Postdoctoral Research Associate. September 2007-Present.
Condensed Matter Theory Center, University of Maryland
In collaboration with Prof. Sankar Das Sarma conducting research in theoretical condensed matter physics on:

- Quantum transport and disorder in graphene and semiconductor heterostructures;
- Collective states in 2D systems.

Visiting scientist. August 2007.
Aspen Center for Physics
Novel Aspects of Superconductivity program.

Postdoctoral Research Associate. 2005-2007.
University of Illinois at Chicago
In collaboration with Prof. Dirk Morr conducted research in theoretical condensed matter physics on:

- Kondo effect in nanostructures;
- Interplay of impurities and quantum fluctuations in strongly correlated systems;
- In collaboration with the experimental group of Prof. J.C. Campuzano derived formalism to calculate response functions from ARPES data.
- Study of magnetic resonance peak in the electron-doped cuprate superconductors

Visiting scientist. April 2005.
KITP, UC Santa Barbara.
Quantum Phase Transitions program.

Research Assistant. 2001-2005.
University of Texas at Austin
In collaboration with Prof. Allan MacDonald:

- Developed conceptually new model to describe transport in Quantum Hall Bilayers;
- Studied decoherence processes in solid state Quantum Dots;
- In collaboration with Dr. Olle G. Heinonen of Seagate developed theory for the magnetization damping and fluctuations in thin film ferromagnets.

Visiting scientist. January 2004.
California Institute of Technology.
Invited to visit Prof. James P. Eisenstein's group to collaborate on the study of the transport properties of Quantum Hall Bilayers.

Research Assistant. 1999-2001.
University of Texas at Austin
With Prof. Richard Fitzpatrick conducted theoretical research on nonlinear resistive magnetohydrodynamical instabilities in plasmas.

Visiting scientist. 1998-1999.
École Polytechnique Fédérale de Lausanne, EPFL
Lausanne, Switzerland.

Research Assistant. 1997-1998.
Turin Polytechnic, Turin, Italy.
Working with Prof. Franco Porcelli developed novel model to describe heat transport in magnetically confined plasmas in presence of macroscopic resistive instabilities.

AWARDS

- I2CAM/FAPERJ travel grant to participate to first I2CAM/FAPERJ Spring School on Emergent Matter, *New Phenomena in Highly Correlated Quantum Matter*, Rio de Janeiro, Brazil. (2007).
- I2CAM travel grant. *Miniworkshop on New States of Stable and Unstable Quantum Matter*, ICTP Trieste, Italy. (2006).
- ICAM travel grant. *International ICAM Workshop NMR/EPR of Correlated Electron Superconductors*, Dresden, Germany. (2005).
- Student travel Award. 49th MMM Conference, Jacksonville, FL (USA). (2004)
- Scholarship Awardee, *First International School and Conference on Nanoscale Molecular Mechanics*, Maui, HI (2002).

PROFESSIONAL SOCIETIES AND ACTIVITIES

- Referee for Physical Review Letters.
- Referre for Physical Review B.
- Referee for Nature Nanotechnology.
- Referee for Nano Letters.
- Referee for Physics Letters A.

- Referee for Journal of Physics A.
- Referee for IEEE Transactions on Magnetics.
- Member of the American Physical Society.

TEACHING EXPERIENCE

- Teaching part of the course *Electrodynamics II*, Phys 502, for graduate students at the University of Illinois Chicago (Spring 2007).
- Teaching part of the course *Electrodynamics I*, Phys 501, for graduate students at the University of Illinois Chicago (Fall 2006).
- Leading the discussions for the undergraduate course *Engineering Physics* on Classical Mechanics, PHY 301, PHY 303K, at the University of Texas at Austin (Fall 2002).
- Leading the discussions for the undergraduate course *Engineering Physics* on Electromagnetism and optics, PHY 302L, at the University of Texas at Austin (Spring 2002).
- Teaching Assistant for the upper division course for undergraduate students *Advanced Quantum Mechanics*, PHY 373, at the University of Texas at Austin(2001).
- Tutoring undergraduate and high school students.

LIST OF PUBLICATIONS

1. S. Das Sarma, S. Adam, M. S. Fuhrer, E. H. Hwang, M. P. Lilly, and E. Rossi
   Electronic transport in two dimensional semiconductors and graphene
   Invited article for "Reviews of Modern Physics", in preparation.
2. R. M. Lutchyn, E. Rossi, S. Das Sarma,
   Spontaneous interlayer superfluidity in bilayer systems of cold polar molecules Preprint `arXiv:0911.1378` (2009).
3. E. Rossi, J.H. Bardarson, P.W. Brouwer, S. Das Sarma
   Signatures of Klein tunneling in disordered graphene p-n-p junctions
   Preprint `arXiv:0908.3674` (2009)
4. J.-P. Ismer, Ilya Eremin, Enrico Rossi, Dirk K. Morr, G. Blumberg
   Multiband Superconductivity in Spin Density Wave Metals
   Preprint `arXiv:0907.1296` (2009)
5. E. Rossi, D. K. Morr
   Vertex corrections of impurity scattering at a ferromagnetic quantum critical point
   Preprint `arXiv:0904.0252` (2009)
6. E. H. Hwang, E. Rossi, S. Das Sarma
   Theory of thermopower in 2D graphene
   Preprint `arXiv:0902.1749v1` (2009).
7. S. Adam, E. H. Hwang, E. Rossi, S. Das Sarma
   Theory of charged impurity scattering in two dimensional graphene
   Invited review for the graphene special issue of Solid State Communications,
   Solid State Communications **149** 1072 (2009).
8. E. Rossi, S. Adam, S. Das Sarma
   Effective medium theory of disordered two-dimensional graphene
   Phys. Rev. B **79**, 245423 (2009).

9. E. Rossi, S. Das Sarma
Ground-state of graphene in the presence of random charged impurities
Phys. Rev. Lett. **101** 166803 (2008);
featured in the 'Virtual Journal of Nanoscale Science & Technology', **18**, Issue 17, October 27, 2008.
10. R. H. Nyberg, E. Rossi, D. K. Morr
Identifying Collective Modes in $d_{x^2-y^2}$-wave superconductors via Impurities
Phys. Rev. B **78**, 054504 (2008).
11. J.-P. Ismer, I. Eremin, E. Rossi, Dirk K. Morr
Dynamical spin susceptibility and the resonance peak in the electron-doped cuprate superconductors
Phys. Rev. Lett. **99**, 047005 (2007).
12. U. Chatterjee, D. K. Morr, M. R. Norman, M. Randeria, A. Kanigel, M. Shi, E. Rossi, A. Kaminski, H. M. Fretwell, S. Rosenkranz, K. Kadowaki, J. C. Campuzano
Dynamic Response Functions from Angle Resolved Photoemission Spectra
Phys. Rev. B **75**, 172504 (2007).
13. E. Rossi, D. K. Morr
Spatially dependent Kondo-effect in quantum corrals
Phys. Rev. Lett. **97**, 236602 (2006);
featured in the 'Virtual Journal of Nanoscale Science & Technology', **14**, Issue 25, December 8, 2006.
14. E. Rossi, A. S. Nunez, A. H. MacDonald
Interlayer Transport in Bilayer Quantum Hall Systems
Phys. Rev. Lett. **95**, 266804 (2005).
15. E. Rossi, O. G. Heinonen, A. H. MacDonald
Dynamics of magnetization coupled to a thermal bath of elastic modes
Phys. Rev. B, **72**, 174412 (2005).
16. Q. Q. Wang, A. Muller, P. Bianucci, E. Rossi, Q. K. Xue, T. Takagahara, C. Piermarocchi, A. H. MacDonald, C. K. Shih
Decoherence processes during active manipulation of excitonic qubits in semiconductor quantum dots
Phys. Rev. B, **72**, 035306 (2005);
featured in the 'Virtual Journal of Nanoscale Science & Technology'. **12**, Issue 3, July 18, 2005.
17. A. A. Burkov, Y. N. Joglekar, E. Rossi, A. H. MacDonald
Collective transport in bilayer quantum Hall systems
Physica E **22**, 19 (2004);
18. A. H. MacDonald, A. A. Burkov, Y. N. Joglekar, E. Rossi
Collective transport properties of bilayer-quantum-Hall excitonic condensates
Physics of Semiconductors **171**, 29, (2002);
19. R. Fitzpatrick, E. Rossi, and E.P. Yu
Improved evolution equations for magnetic island chains in toroidal pinch plasmas subject to externally applied resonant magnetic perturbations
Physics of Plasmas **8** 4489 (2001).
20. R. Fitzpatrick and E. Rossi
Control of tearing modes in toroidal fusion experiments using "designer" error-fields
Physics of Plasmas **8**, 2760 (2001).

21. I. Furno, C. Angioni, F. Porcelli, H. Weisen, R. Behn, T.P. Goodman, M.A. Henderson, Z.A. Pietrzyk, A. Pochelon, H. Reimerdes, E. Rossi
Understanding sawtooth activity during intense electron cyclotron heating experiments on TCV
Nuclear Fusion **41** (4), 403, (2001).
22. F. Porcelli, A. Airoldi, C. Angioni, A. Bruschi, P. Buratti, F. Califano, S. Cirant, I. Furno, D. Grasso, E. Lazzaro, A.A. Martynov, M. Ottaviani, F. Pegoraro, G.Ramponi, E. Rossi, O. Sauter, C. Tebaldi, O. Tudisco
Modeling of macroscopic magnetic islands in tokamaks
Nuclear Fusion **41** (9), 1207, (2001).
23. F. Porcelli, C. Angioni, R. Behn, I. Furno, T. Goodman, M.A. Henderson, Z.A. Pietrzyk, A. Pochelon, H. Reimerdes, E. Rossi, O. Sauter
Model for humpback relaxation oscillations
Nuclear Fusion **40** (10), 1691, (2000).
24. A. Pochelon *et al.*
Energy confinement and MHD activity in shaped TCV plasmas with localized electron cyclotron heating
Nuclear Fusion **39** (11Y), 1807, (1999).
25. F. Porcelli, E. Rossi, G. Cima, and A. Wootton
Macroscopic magnetic islands and plasma energy transport
Phys. Rev. Lett. **82**, 1458, (1999).

INVITED TALKS

1. *Klein tunneling in p-n-p graphene junctions* Nanoelectronics Research Initiative annual review, Gaithersburg, MD (October 2009).
2. *Signatures of Klein tunneling in disordered graphene p-n-p junctions* CMTC symposium, University of Maryland, College Park, MD (September 2009).
3. *Disorder and quantum transport in graphene* Condensed Matter Seminar, Texas A&M University (September 2009)
4. *Klein tunneling in disordered graphene p-n-p junctions* Condensed Matter Seminar, University of Texas at Austin (September 2009)
5. *Disorder and quantum transport in graphene* SouthWest Academy of Nanoelectronics Annual review (September 2009).
6. *Theory of thermopower in 2D graphene*, Invited talk at the Scuola Normale Superiore, Pisa, Italy (June 2009).
7. **APS Invited talk**
Ground-state of Two-dimensional Graphene in the Presence of Random Charged Impurities, 2009 March Meeting in Pittsburgh.
8. *Graphene: massless electrons in the ultimate flatland*, Colloquium at the Department of Physics at Virginia Tech, Blacksburg, VA (February 2009).
9. *Electronic structure and transport of disordered graphene*, Center for Nanoscale Science and Technology, National Institute of Standards and Technology, Gaithersburg, MD (November 2008).
10. *Graphene: massless electrons in flatland*, Colloquium at the University of Chile, Santiago, Chile (October 2008).

11. *Effective medium theory of disordered two-dimensional graphene*, CMTC symposium, University of Maryland, College Park, MD (October 2008).
12. *Impurity-Induced States in 2DEG and d-wave superconductors*, CMTC symposium, University of Maryland, College Park, MD (September 2007).
13. *Pseudospintronics*, NRI-SRC Annual review, Santa Clara, CA (November 2007).
14. *Neutron resonance in electron-doped cuprates*, Aspen Center for Physics, CO, Novel Aspects of Superconductivity program, (August 2007).
15. *Kondo Effect in Nanostructures*, Argonne National Laboratory, IL (May 2007)
16. *Spatially dependent Kondo-effect in quantum corrals*, University of Illinois at Chicago, Chicago, IL (February 2007).
17. *Effect of Disorder and Thermal Fluctuations on the Transport properties of Quantum Hall Bilayers*, University of Illinois at Chicago, Chicago, IL (February 2006).

CONFERENCE PRESENTATIONS

1. *Ground-state carrier density in graphene*, Graphene Week, Trieste (August 2008).
2. *Ground-state carrier density in graphene*, APS March Meeting 2008, New Orleans, LA, (March 2008).
3. *Spatially dependent Kondo effect in quantum corrals*, APS March Meeting 2007, Denver, CO, (March 2007).
4. *Spatially dependent Kondo effect inside quantum corrals*, Miniworkshop on New States of Stable and Unstable Quantum Matter, ICTP Trieste, Italy, (August 2006).
5. *Position dependent Kondo-effect in quantum corrals*, International ICAM Workshop NMR/EPR of Correlated Electron Superconductors, Dresden, Germany, (October 2005).
6. *Influence of Disorder on Spontaneous Coherence and Collective Transport in Bilayer Quantum Hall Systems*, APS March Meeting 2005, Los Angeles, CA (USA), (March 2005).
7. *Dynamics of magnetization coupled to a thermal bath of elastic modes*, 49th MMM Conference, Jacksonville, FL, (November 2004).
8. *Effect of Disorder and Thermal Fluctuations on the Transport Properties of Quantum Hall Bilayers*, 12th International Conference on Recent Progress in Many-Body Theories Santa Fe, (August 2004).
9. *Effect of Disorder and Thermal Fluctuations on the Transport properties of Quantum Hall Bilayers* APS March Meeting 2004, Montreal, Canada, (March 2004).
10. *Dynamics of Coupled Cantilever-Nanomagnet System*, SPRING $\mathbf{1^{st}}$ Annual Meeting, Austin, TX, (August 2003).
11. *Spin-transport in magnetic multilayers*, Boulder Summer School in Condensed Matter and Materials Physics: Frontiers of Magnetism, Boulder, CO, (June-July 2003).
12. *Collective and Quasiparticle Transport in Quantum Hall Bilayers*, APS March Meeting 2003, Austin, TX, (March 2003).
13. *Dynamics of Coupled Cantilever-Nanomagnet System*, First International School and Conference on Nanoscale Molecular Mechanics, Maui, HI, (May 2002).

REFERENCES

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