

Curriculum vitæ

Federico Becca

Date and place of Birth: 14 January 1972, Roma (Italy)
Nationality: Italian
Address: DEMOCRITOS – Istituto Officina dei Materiali – Consiglio Nazionale delle Ricerche
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Education and Degrees

- October 1990 - December 1995: Undergraduate studies in Physics at the University “La Sapienza”, Roma (Italy).
- January 1996: Degree in Physics 110/110 *cum laude*, University “La Sapienza”, Roma (Italy). Title of the thesis: *Charge instabilities in strongly correlated electron systems*, Supervisor: Prof. C. di Castro.
- October 1997: “Magister Philosophiæ”, Scuola Internazionale Superiore di Studi Avanzati, Trieste (Italy). Title of the thesis: *Charge-density waves in semiconductor surfaces*, Supervisor: Dr G. Santoro.
- November 1998 - September 1999: Military service.
- October 2000: “Doctor Philosophiæ” *cum laude*, Scuola Internazionale Superiore di Studi Avanzati, Trieste (Italy). Title of the thesis: *Electronic properties from strong correlation*, Supervisor: Prof. S. Sorella.

Employments

- From November 2000 to August 2002: Post-doctoral research assistant at Institut de Physique Théorique, University of Lausanne (Switzerland), in the group of Prof. F. Mila.
- From September 2002 to October 2004: Research associate position at Istituto Nazionale per la Fisica per la Materia (INFN), Trieste (Italy).
- From November 2004 to March 2008: Tenure Track position at the INFN DEMOCRITOS National Simulation Center, Trieste (Italy).
- Since April 2008: Researcher for Consiglio Nazionale delle Ricerche (CNR) at the DEMOCRITOS National Simulation Center, Trieste (Italy).

Academic Habilitations

- October 2014: Habilitation for associate professor in theoretical condensed matter (02/B2) at the Italian national level.
- October 2014: Habilitation for full professor in theoretical condensed matter (02/B2) at the Italian national level.

Other Professional Services

- Since April 2010: Member of the Council of the Istituto Officina dei Materiali (IOM), Consiglio Nazionale delle Ricerche (CNR).
- From January 2013 to December 2016: Member of the Board of Directors for the Centre European de Calcul Atomique et Moleculaire (CECAM).
- Since January 2011: Adjunct professor (teaching position) at Scuola Internazionale Superiore di Studi Avanzati, Trieste (Italy).
- Referee for Physical Review Letters, Physical Review A, B, E, and X, Nature Physics and Nature Communications, Scientific Reports, European Journal of Physics B, Europhysics Letters, New Journal of Physics, and others. Outstanding Referee of the American Physical Society (2015).
- Referee for the American National Science Foundation (NSF), the Department of Energy (DoE), and the European Research Council (ERC) for grant proposals.

Research appointments and visitng positions

- Several long visits as invited scientist.

Teaching experience

- Ph.D. courses on “Introduction to Monte Carlo methods” and “Numerical methods for strongly correlated systems”.
- Lecturer at international schools.

Supervision of Master and Ph.D. students

- 10 Ph.D. and 5 Master students supervised.

Organization of schools and workshops

- 12 Workshops and school organized, including 6 editions of the CECAM summer school on “Atomistic Simulation Techniques for Material Science, Nanotechnology, and Biophysics”.

Invited talks, seminars, and lectures

- About 40 invited talks and 40 seminars.

Publications

- About 100 papers in international referred journals (including conference proceedings), among which 1 Science, 1 Scientific Report (Nature Publishing), 16 Physical Review Letters, 1 Physical Review X, and 67 Physical Review A, B, and E (among which 16 Rapid Communications).
- One book (of about 300 pages), to be published by Cambridge University Press.

Research Interests

I am a condensed matter theorist and my main research interests lie in the study of strongly correlated electronic systems. These are materials where the interactions between electrons play a crucial role and lead to novel phenomena not explainable by single electron band structure effects. Examples include the Mott insulators, spin liquids, and topological phases. Current efforts are devoted to the identification of spin-liquid phases with gapless excitations or topological degeneracy in Mott insulators with magnetic frustration and superconducting phases emerging from strong electron-electron correlations in d orbitals. By using numerical methods, like classical and quantum Monte Carlo, exact diagonalization, density-matrix renormalization group, and analytic approaches (slave particles, Gutzwiller approximation, and spin waves), I worked on:

- Charge and spin instabilities in strongly correlated systems.
- Frustrated magnetic systems.
- Metal-insulator and superfluid-insulator transitions.
- Correlated systems in presence of disorder.
- Thermalization and real-time dynamics for quantum systems
- Classical and quantum Monte Carlo methods.
- Lanczos and exact diagonalizations.

Citations indexed on Web of Science: about 2700.

H-index: 31.

Source: <http://www.researcherid.com/rid/K-3915-2013>

Citations indexed on Google Scholar: about 3600.

H-index: 35.

Source: <http://scholar.google.com/citations?user=3u-o5PQAAAAJ>



