

Curriculum Vitae of Andrea Perali

Andrea Perali is an Associate Professor of Condensed Matter Physics at the University of Camerino (Italy), in the School of Pharmacy (Physics Unit and SuperNano Laboratory). In 2017 he got the national habilitation to Full Professor. He is the delegate of the Rector for e-learning. He started the e-learning project and online activities of the University of Camerino in 2004.

He has got the laurea (1995) and Ph.D. (2000) in Physics at the University of Roma "Sapienza" working in the group of Prof. C. Castellani and Prof. C. Di Castro. He has been a post doc fellow for one year (2001) at the Rutgers University (USA) working with Prof. G. Kotliar on numerical methods for high-T_c superconductivity.

He has won 3 prizes "Enrico Persico" from the "Accademia Nazionale dei Lincei" for the best physics students in the Rome universities and the prize of Italian Physics Society for young researchers. He has won the prize of "Fondazione Angelo della Riccia" to partially support the post doc in USA. In 2015 he has been nominated "Outstanding Referee" from APS and he has won the "Fibonacci" prize by RICMASS for pioneering studies on superconducting stripes.

Author of 86 scientific publications [2500 citations, Hirsch index $h=26$ (Web of Science source)]. He also authored 6 publications on e-learning and innovation of teaching journals and books.

He participated to the scientific and organizing committees of 12 international conferences and 1 summer school (co-director in six). He presented 52 talks at international conferences and universities and 18 posters. He works as a referee for the Physical Review Journals, EU-Horizon 2020, NSF of USA, FWO in Belgium, CNPq in Brazil, and for NSER Council of Canada. He is Editorial Board member of Scientific Reports – NPG, Guest Editor of Superconducting Science and Technology, and Editorial Board member of Condensed Matter, MDPI.

He participated to 5 national projects (PRIN). He is the Principal Investigator of the Ateneo Project on "Control and Enhancement of Superconductivity by Engineering Materials at the Nanoscale" (2014-2016) leading to the opening of the SuperNano laboratory of the University of Camerino, in collaboration with the Nanofabrication laboratory, INRIM, Turin.

Research interests include theory of superconductivity and superfluidity: BCS-BEC crossover, pseudogap and fluctuating phenomena in ultracold fermions and multiband superconductors and superfluids. Since 1996 he works in collaboration with Prof. Antonio Bianconi (RICMASS, Rome, Italy) on Superstripes and nanostructured superconductors to find amplification mechanisms of superconductivity. He has more than 20 years of experience in diagrammatic and numerical methods for strongly interacting fermions. He collaborates with Prof.s G.C. Strinati, P. Pieri and D. Neilson in Camerino, together with several graduate students. He has collaborated with the experimental group of Prof. D. Jin at the University of Colorado at Boulder (USA), contributing to the observation and characterization of the pseudogap in ultracold fermions.

In 2010, he started a large international collaborative effort with Prof. Arkady Shanenko and Prof. Albino Aguiar in Federal University of Pernambuco (Brasil), with Prof. Mauro M Doria in the Federal University of Rio de Janeiro (Brasil), and with Prof. Milorad Milosevic and Prof. Francois Peeters in University of Antwerp (Belgium) on multiband superconductivity and superfluidity and with A. R. Hamilton in University of New South Wales, Sydney, Australia on a new superfluid graphene-based device to observe and exploit high-temperature electron-hole superfluidity (locally in collaboration with David Neilson).

Recently Unicam joined the FLEET network of the Australian Research Council: Andrea Perali is the coordinator of the Camerino unit. He is the founder, together with Milorad Milosevic and Arkady Shanenko, of the International Network "MultiSuper", which runs the international conferences "MultiSuper". Next MultiSuper 2020 general conference will be in Natal, Brasil, 27-th September – 2nd October 2020.

List of Publications of Andrea Perali (2014-2019) [Total in this period: 34]

[1] Coexistence of giant Cooper pairs with a bosonic condensate and anomalous behavior of energy gaps in the BCS-BEC crossover of a two-band superfluid Fermi gas

Y Yerin, H Tajima, P Pieri, A Perali

Physical Review B 100 (10), 104528 (2019).

[2] Screening of pair fluctuations in superconductors with coupled shallow and deep bands: A route to higher-temperature superconductivity

L Salasnich, AA Shanenko, A Vagov, JA Aguiar, A Perali

Physical Review B 100 (6), 064510 (2019).

[3] Enhanced critical temperature, pairing fluctuation effects, and BCS-BEC crossover in a two-band Fermi gas

H Tajima, Y Yerin, A Perali, P Pieri

Physical Review B 99 (18), 180503 (2019).

[4] Multicomponent screening and superfluidity in gapped electron-hole double bilayer graphene with realistic bands

S Conti, A Perali, FM Peeters, D Neilson

Physical Review B 99 (14), 144517 (2019).

[5] Substrate-induced proximity effect in superconducting niobium nanofilms

SJ Rezvani, A Perali, M Fretto, N De Leo, L Flammia, M Milošević, ...

Condensed Matter 4 (1), 4 (2018).

[6] Electronic properties of curved few-layers graphene: a geometrical approach

M Cariglia, R Giambò, A Perali

Condensed Matter 3 (2), 11 (2018).

[7] High-temperature electron-hole superfluidity with strong anisotropic gaps in double phosphorene monolayers

S Saberi-Pouya, M Zarenia, A Perali, T Vazifeshenas, FM Peeters

Physical Review B 97 (17), 174503 (2018).

[8] Evidence from Quantum Monte Carlo Simulations of Large-Gap Superfluidity and BCS-BEC Crossover in Double Electron-Hole Layers

PL Ríos, A Perali, RJ Needs, D Neilson

Physical Review Letters 120 (17), 177701 (2018).

[9] Superconducting nanoribbon with a constriction: A quantum-confined Josephson junction

L Flammia, LF Zhang, L Covaci, A Perali, MV Milošević

Physical Review B 97 (13), 134514 (2018).

[10] Dimensional crossover and incipient quantum size effects in superconducting niobium nanofilms

N Pinto, SJ Rezvani, A Perali, L Flammia, MV Milošević, M Fretto, Cristina Cassiago, Natascia De Leo

Scientific reports 8 (1), 1-12 (2018).

[11] Entanglement between pairing and screening in the Gorkov-Melik-Barkhudarov correction to the critical temperature throughout the BCS-BEC crossover

L Pisani, A Perali, P Pieri, GC Strinati

Physical Review B 97 (1), 014528 (2018).

[12] Multicomponent electron-hole superfluidity and the BCS-BEC crossover in double bilayer graphene

S Conti, A Perali, FM Peeters, D Neilson

Physical review letters 119 (25), 257002 (2018).

[13] Multifaceted impact of a surface step on superconductivity in atomically thin films

LF Zhang, L Flammia, L Covaci, A Perali, MV Milošević

Physical Review B 96 (10), 104509 (2017).

[14] The road map toward Room-Temperature superconductivity: Manipulating different pairing channels in systems composed of multiple electronic components

A Bussmann-Holder, J Köhler, A Simon, MH Whangbo, A Bianconi, A Perali

Condensed Matter 2 (3), 24

[15] Possible Fano resonance for high-T_c multi-gap superconductivity in p-Terphenyl doped by K at the Lifshitz transition

MV Mazziotti, A Valletta, G Campi, D Innocenti, A Perali, A Bianconi

EPL (Europhysics Letters) 118 (3), 37003 (2017).

[16] Curvature-tuned electronic properties of bilayer graphene in an effective four-dimensional spacetime

M Cariglia, R Giambò, A Perali

Physical Review B 95 (24), 245426

[17] BCS-BEC crossover induced by a shallow band: Pushing standard superconductivity types apart

S Wolf, A Vagov, AA Shanenko, VM Axt, A Perali, JA Aguiar

Physical Review B 95 (9), 094521 (2017).

[18] Zero Helicity States in the LaAlO-SrTiO Interface: The Origin of the Mass Anisotropy.

M Doria, A Vargas-Paredes, M Cariglia, A Perali, E Rodrigues

Journal of Superconductivity & Novel Magnetism 30 (1) (2017).

[19] Multigap superconductivity and barrier-driven resonances in superconducting nanofilms with an inner potential barrier

MM Doria, M Cariglia, A Perali

Physical Review B 94 (22), 224513 (2016).

[20] Shape-resonant superconductivity in nanofilms: from weak to strong coupling

M Cariglia, A Vargas-Paredes, MM Doria, A Bianconi, MV Milošević, A Perali

Journal of Superconductivity and Novel Magnetism 29 (12), 3081-3086 (2016).

[21] Large gap electron-hole superfluidity and shape resonances in coupled graphene nanoribbons

M Zarenia, A Perali, FM Peeters, D Neilson

Scientific reports 6 (1), 1-9 (2016).

[22] Many-body electron correlations in graphene

D Neilson, A Perali, M Zarenia

Journal of Physics: Conference Series 702 (1), 012008 (2016).

[23] BCS-BEC crossover in quantum confined superconductors

A Guidini, L Flammia, MV Milošević, A Perali

Journal of Superconductivity and Novel Magnetism 29 (3), 711-715 (2016).

[24] Using magnetic stripes to stabilize superfluidity in electron-hole double monolayer graphene

L Dell'Anna, A Perali, L Covaci, D Neilson

Physical Review B 92 (22), 220502 (2015).

[25] Emergent phenomena in multicomponent superconductivity: an introduction to the focus issue

MV Milošević, A Perali

Superconducting Science and Technologies (SUST) 28, 060201 (2015).

[26] On the Compton clock and the undulatory nature of particle mass in graphene systems

D Dolce, A Perali

The European Physical Journal Plus 130 (3), 41 (2015).

[27] Pairing effects in the normal phase of a two-dimensional Fermi gas

F Marsiglio, P Pieri, A Perali, F Palestini, GC Strinati

Physical Review B 91 (5), 054509 (2015).

[28] Testing cellular automata interpretation of quantum mechanics in carbon nanotubes and superconductivity

D Dolce, A Perali

Journal of Physics: Conference Series 626 (1), 012062 (2015).

[29] Enhancement of electron-hole superfluidity in double few-layer graphene

M Zarenia, A Perali, D Neilson, FM Peeters

Scientific reports 4, 7319 (2014)

[30] Band-edge BCS–BEC crossover in a two-band superconductor: physical properties and detection parameters

A Guidini, A Perali

Superconductor Science and Technology 27 (12), 124002 (2014).

[31] The role of quantum recurrence in superconductivity, carbon nanotubes and related gauge symmetry breaking

D Dolce, A Perali

Foundations of Physics 44 (9), 905-922 (2014).

[32] High temperature superfluidity system

AR Hamilton, A Perali, D Neilson

US Patent App. 14/073,938 (2014).

[33] Excitonic superfluidity and screening in electron-hole bilayer systems

D Neilson, A Perali, AR Hamilton

Physical Review B 89 (6), 060502 (2014).

[34] Shape Resonances in superconducting gaps in a 2DEG at oxide-oxide interface

A Bianconi, D Innocenti, A Valletta, A Perali

Journal of Physics: Conference Series 529 (1), 012007 (2014).