

# CURRICULUM VITAE

## PERSONAL INFORMATION

Name, Surname  
Address  
House number, street name,  
postcode, city, country  
Telephone  
E-mail  
Nationality  
Place and Date of birth

**Mario Cuoco**

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## WORK EXPERIENCE

CNR employee:	<b>N. 27803</b> <b>POSITION: SENIOR RESEARCHER AT THE INSTITUTE OF SUPERCONDUCTORS AND INNOVATIVE MATERIALS (SPIN)</b> <b>RESPONSIBLE OF THE CNR-SPIN RESEARCH UNIT OF SALERNO</b>
Dates (from – to)	April 2008- now
Name and address of employer	CNR, Via A. Moro Roma- CNR-SPIN UOS Salerno, Via Giovanni Paolo II, Fisciano, Italy
Type of business or sector	Science
Occupation or position held	Permanent staff
Main activities and responsibilities	Research
Dates (from – to)	November 2003-April 2008
Name and address of employer	Istituto Nazionale di Fisica per la Materia (INFM), C.so Perrone 12 Genova
Type of business or sector	Science
Occupation or position held	Temporary research position (Tenure Track)
Main activities and responsibilities	Research
Dates (from – to)	October 2002- October 2003
Name and address of employer	TMR-EU programme “Improving human potential” – CNRS Grenoble
Type of business or sector	Science
Occupation or position held	Marie Curie Fellow within the project “Inhomogeneous phases in correlated systems”
Main activities and responsibilities	Research

## EDUCATION AND TRAINING

Dates (from – to)	October 1996-February 2000
Name and type of organisation providing education and training	Dipartimento di Fisica E.R. Caianiello, Università di Salerno, Fisciano (SA) Italy
Principal subjects occupational skills	Computation and modeling of electronic and magnetic properties of novel transition metal oxides

covered	
Title of qualification awarded	PhD in Physics
Dates (from – to)	September 1991-March 1996
Name and type of organisation providing education and training	Università di Salerno, Fisciano (SA) Italy
Principal subjects occupational skills covered	On the symmetries of the Hubbard model: application to finite size systems
Title of qualification awarded	Diploma in Physics
Level in National classification	110/110 Cum Laude

## RESEARCH ACTIVITIES

### Research sectors

Theory of condensed matter physics. Strongly correlated electron systems. Topological quantum materials. Interplay of superconductivity and magnetism. Quantum materials with strong spin-orbit coupling. Geometrical design of spin transport, all-geometrical-spin-orbitronics. Superconducting orbitronics. Topological Hall effects in oxides and oxide interfaces. Driven quantum systems with non-trivial topological phases. Spectroscopy in correlated electron materials.

### Recent Scientific Topics

- Electronic and magneto-transport properties of correlated systems and transition metal oxides.
- Topological and transport properties of systems with interplay of superconductivity and magnetism.
- Stability of electronic ordering due to spin-orbital-charge-lattice competition.
- Interface states, transport properties and coherent phenomena in hybrids based on superconductors (conventional and unconventional) and magnets (ferromagnet, antiferromagnet, etc.)
- Generation and manipulation of topological phases in spin-triplet superconductors.
- Development and implementation of numerical techniques for correlated quantum systems.
- Superconducting behaviour in unconventional superconductors/superfluids.
- Spectroscopic studies of correlated systems (RIXS, XAS, etc). Study of elementary spin-orbital-charge elementary excitations.

## ADDITIONAL INFORMATION

### Projects

- Scientific Coordinator of the FP7-EU project “Unlocking research potential for multifunctional advanced materials and nanoscale phenomena (MAMA)”, September 2010- February 2014; Grant Agreement n. 24968 (Budget: 2.4 million euro) – More details at the link <http://mama.spin.cnr.it>
- Task Leader of the Workgroup “Fundamental Understanding” and member of the management committee of the EU project MP1308 COST Action “TO-BE: Towards Oxide Based Electronics”, coordinated by CNR-SPIN – [<http://tobe.spin.cnr.it/>]. Budget: about 700 keuro. Period: 2014-2018.
- Scientific supervisor of the Marie Curie Project “UFOX” -Unveiling Complexity in Functional hybrid Oxides- Grant-Agreement N. 655515, within the programme Horizon 2020-Marie Slodowska Curie Action-IF-2014. Budget: 180 keuro. PI: Dr. W. Brzezicki. Period: June 2015-June 2017.
- Team member CNR-SPIN of the EU project: “CNTQC: Curved Nanomembranes for Topological Quantum Computation”, Grant Agreement N.618083 (Budget: 1600 keuro) funded within the FET-OPEN [<http://www.nano2qc.eu/>]. Period: June 2014-May 2017.
- Team member CNR-SPIN of the EU project Quantox “QUANtum Technologies with 2D-OXides” funded by the QUANTERA EU program within Horizon2020 and coordinated by SPIN. Budget: about 1000 keuro. Period: 2018-2021.
- Leader of the theory group for SPIN within the National project TOPSPIN “Two-dimensional oxides Platform for SPIN-orbitronics nanotechnology” funded by the Italian Ministry of Education. Budget: about 1000 keuro. Period: 2019-2022.
- PI and responsible for SPIN within the OSS “Oxide superconducting spintronics” project.
- Team member SPIN group of the project “Topo-Q International Network” [<http://topo-mat-sci.jp/en/topoqetc/>] linked with “Topological Materials Science” coordinated by Prof. N. Kawakami University of Kyoto. Period: 2015-2019.
- PI Marie-Curie TMR project “Inhomogeneous phases in correlated systems” within the EU program “Improving Human Potential”. Period: September 2002-October 2003, at Centre de Recherches sur les Tres Basses Temperatures, CNRS Grenoble, France.
- Scientific Coordinator of the Regional Project of Campania (Italy): “Superconducting states in itinerant ferromagnets: mechanisms and topology of mixed phases”, 2004-2005 (*Funded: 40 keuro budget*)
- Leader of the theory group for CNR-SPIN within the project “Interface states and competition of ordered phases in eutectic oxides with perovskite structure”- Regione Campania. Period: April 2016-May 2017. Budget: 25 keuro.
- Team member and co-PI for CNR-SPIN in the Spoke 2 of the PNRR NQSTI project (National Quantum Science and Technology Institute).

**List of Recent Publications and  
Preprints  
(years: from 2023 to 2018)**

Authors	Article Title	Journal	Year	Volume	Issue
Lesne, E; Saglam, Y; Battilomo, R; Mercaldo, MT; van Thiel, TC; Filippozzi, U; Noce, C; Cuoco, M; Steele, GA; Ortix, C; Caviglia, AD	Designing spin and orbital sources of Berry curvature at oxide interfaces	NATURE MATERIALS			
Mercaldo, MT; Noce, C; Caviglia, AD; Cuoco, M; Ortix, C	Orbital design of Berry curvature: pinch points and giant dipoles induced by crystal fields	NPJ QUANTUM MATERIALS	2023	8	1
Autieri, C; Cuoco, M; Cuono, G; Picozzi, S; Noce, C	Orbital order and ferromagnetism in LaMn1-xGaO3	PHYSICA B-CONDENSED MATTER	2023	648	
Yananose, K; Radaelli, PG; Cuoco, M; Yu, JJ; Stroppa, A	Activating magnetoelectric optical properties by twisting antiferromagnetic bilayers	PHYSICAL REVIEW B	2022	106	18
Fukaya, Y; Tanaka, Y; Gentile, P; Yada, K; Cuoco, M	Anomalous Josephson coupling and high-harmonics in non-centrosymmetric superconductors with S-wave spin-triplet pairing	NPJ QUANTUM MATERIALS	2022	7	1
Gentile, P; Cuoco, M; Volkov, OM; Ying, ZJ; Vera-Marun, IJ; Makarov, D; Ortix, C	Electronic materials with nanoscale curved geometries	NATURE ELECTRONICS	2022	5	9
Cuoco, M; Di Bernardo, A	Materials challenges for SrRuO3: From conventional to quantum electronics	APL MATERIALS	2022	10	9
Yerin, Y; Drechsler, SL; Cuoco, M; Petrillo, C; Porter, DG; Forte, F; Granata, V; Cannavacciuolo, M; Fittipaldi, R; Cuoco, M; Bombardi, A; Vecchione, A	Magneto-topological transitions in multicomponent superconductors	PHYSICAL REVIEW B	2022	106	5
	Guiding antiferromagnetic transitions in Ca2RuO4	SCIENTIFIC REPORTS	2022	12	1
Takagi, D; Mercaldo, MT; Tanaka, Y; Cuoco, M	Odd-frequency pairing in a nonunitary p-wave superconductor with multiple Majorana fermions	PHYSICAL REVIEW B	2022	105	22
Gentile, P; Catapano, M; De Vivo, N; Cuoco, M; Romano, A; Noce, C	Spin and charge transport in ferromagnet-superconductor-ferromagnet heterostructures: Stoner versus spin mass mismatch mechanism	PHYSICAL REVIEW B	2022	105	21
Chirolli, L; Mercaldo, MT; Guarcello, C; Giazotto, F; Cuoco, M	Colossal Orbital Edelstein Effect in Noncentrosymmetric Superconductors	PHYSICAL REVIEW LETTERS	2022	128	21
Mercaldo, MT; Ortix, C; Giazotto, F; Cuoco, M	Orbital vortices in s-wave spin-singlet superconductors in zero magnetic field	PHYSICAL REVIEW B	2022	105	14
Kimbell, G; Kim, C; Wu, WD; Cuoco, M; Robinson, JWA	Challenges in identifying chiral spin textures via the topological Hall effect	COMMUNICATIONS MATERIALS	2022	3	1
Guarcello, C; Chirolli, L; Mercaldo, MT; Giazotto, F; Cuoco, M	Frustration-driven Josephson phase dynamics	PHYSICAL REVIEW B	2022	105	13
Singh, G; Guarcello, C; Lesne, E; Winkler, D; Claeson, T; Bauch, T; Lombardi, F; Caviglia, AD; Citro, R; Cuoco, M; Kalaboukhov, A	Gate-tunable pairing channels in superconducting non-centrosymmetric oxides nanowires	NPJ QUANTUM MATERIALS	2022	7	1
Mercaldo, MT; Giazotto, F; Cuoco, M	Spectroscopic signatures of gate-controlled superconducting phases	PHYSICAL REVIEW RESEARCH	2021	3	4
Brzezicki, W; Avella, A; Cuoco, M; Oles, AM; Fittipaldi, R; Hartmann, R; Mercaldo, MT; Komori, S; Bjorlig, A; Kyung, W; Yasui, Y; Miyoshi, T; Olthof, LABO; Garcia, CMP; Granata, V; Keren, I; Higemoto, W; Suter, A; Prokscha, T; Romano, A; Noce, C; Kim, C; Maeno, Y; Scheer, E; Kalisky, B; Robinson, JWA; Cuoco, M; Salman, Z; Vecchione, A; Di Bernardo, A	Doped spin-orbital Mott insulators: Orbital dilution versus spin-orbital polarons	JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS	2022	543	
	Unveiling unconventional magnetism at the surface of Sr2RuO4	NATURE COMMUNICATIONS	2021	12	1

Authors	Article Title	Journal	Year	Volume	Issue
van Thiel, TC; Brzezicki, W; Autieri, C; Hortensius, JR; Afanasiev, D; Gauquelin, N; Jannis, D; Janssen, N; Groenendijk, DJ; Fatermans, J; Van Aert, S; Verbeeck, J; Cuoco, M; Caviglia, AD	Coupling Charge and Topological Reconstructions at Polar Oxide Interfaces	PHYSICAL REVIEW LETTERS	2021	127	12
De Simoni, G; Battisti, S; Ligato, N; Mercaldo, MT; Cuoco, M; Giazotto, F	Gate Control of the Current-Flux Relation of a Josephson Quantum Interferometer Based on Proximitized Metallic Nanojunctions	ACS APPLIED ELECTRONIC MATERIALS	2021	3	9
Maistrenko, O; Autieri, C; Livanas, G; Gentile, P; Romano, A; Noce, C; Manske, D; Cuoco, M	Inverse proximity effects at spin-triplet superconductor-ferromagnet interface	PHYSICAL REVIEW RESEARCH	2021	3	3
Barthelemy, A; Bergeal, N; Bibes, M; Caviglia, A; Citro, R; Cuoco, M; Kalaboukhov, A; Kalisky, B; Perroni, CA; Santamaria, J; Stornauiuolo, D; Salluzzo, M	Quasi-two-dimensional electron gas at the oxide interfaces for topological quantum physics	EPL	2021	133	1
Asa, M; Autieri, C; Pazzocco, R; Rinaldi, C; Brzezicki, W; Stroppa, A; Cuoco, M; Varvaro, G; Picozzi, S; Cantoni, M	Anomalous Hall effect in antiferromagnetic/nonmagnetic interfaces	PHYSICAL REVIEW RESEARCH	2020	2	4
Settino, J; Forte, F; Perroni, CA; Cataudella, V; Cuoco, M; Citro, R	Spin-orbital polarization of Majorana edge states in oxide nanowires	PHYSICAL REVIEW B	2020	102	22
Ngabonziza, P; Carleschi, E; Zabolotny, V; Taleb-Ibrahimi, A; Bertran, F; Fittipaldi, R; Granata, V; Cuoco, M; Vecchione, A; Doyle, BP	Fermi surface and kink structures in Sr4Ru3O10 revealed by synchrotron-based ARPES	SCIENTIFIC REPORTS	2020	10	1
von Arx, K; Forte, F; Horio, M; Granata, V; Wang, Q; Das, L; Sassa, Y; Fittipaldi, R; Fatuzzo, CG; Ivashko, O; Tseng, Y; Paris, E; Vecchione, A; Schmitt, T; Cuoco, M; Chang, J	Resonant inelastic x-ray scattering study of Ca3Ru2O7	PHYSICAL REVIEW B	2020	102	23
Fukaya, Y; Yada, K; Tanaka, Y; Gentile, P; Cuoco, M	Orbital tunable 0- $\pi$ transitions in Josephson junctions with noncentrosymmetric topological superconductors	PHYSICAL REVIEW B	2020	102	14
Mercaldo, MT; Solinas, P; Giazotto, F; Cuoco, M	Electrically Tunable Superconductivity Through Surface Orbital Polarization	PHYSICAL REVIEW APPLIED	2020	14	3
Bours, L; Mercaldo, MT; Cuoco, M; Strambini, E; Giazotto, F	Unveiling mechanisms of electric field effects on superconductors by a magnetic field response	PHYSICAL REVIEW RESEARCH	2020	2	3
Groenendijk, DJ; Autieri, C; van Thiel, TC; Brzezicki, W; Hortensius, JR; Afanasiev, D; Gauquelin, N; Barone, P; van den Bos, KHW; van Aert, S; Verbeeck, J; Filippetti, A; Picozzi, S; Cuoco, M; Caviglia, AD	Berry phase engineering at oxide interfaces	PHYSICAL REVIEW RESEARCH	2020	2	2
Ying, ZJ; Gentile, P; Baltanas, JP; Frustaglia, D; Ortix, C; Cuoco, M	Geometric driving of two-level quantum systems	PHYSICAL REVIEW RESEARCH	2020	2	2
Sakurai, K; Mercaldo, MT; Kobayashi, S; Yamakage, A; Ikegaya, S; Habe, T; Kotetes, P; Cuoco, M; Asano, Y	Nodal Andreev spectra in multi-Majorana three-terminal Josephson junctions	PHYSICAL REVIEW B	2020	101	17
Francica, G; Cuoco, M; Gentile, P	Topological superconducting phases and Josephson effect in curved superconductors with time reversal invariance	PHYSICAL REVIEW B	2020	101	9
Brzezicki, W; Forte, F; Noce, C; Cuoco, M; Oles, AM	Tuning Crystal Field Potential by Orbital Dilution in Strongly Correlated d(4) Oxides	JOURNAL OF SUPERCONDUCTIVITY AND NOVEL MAGNETISM	2020	33	8
Di Bernardo, A; Komori, S; Livanas, G; Divitini, G; Gentile, P; Cuoco, M; Robinson, JWA	Nodal superconducting exchange coupling	NATURE MATERIALS	2019	18	11
Das, KS; Makarov, D; Gentile, P; Cuoco, M; van Wees, BJ; Ortix, C; Vera-Marun, IJ	Independent Geometrical Control of Spin and Charge Resistances in Curved Spintronics	NANO LETTERS	2019	19	10
Forte, F; Capogna, L; Granata, V; Fittipaldi, R; Vecchione, A; Cuoco, M	Suppression of the orbital magnetic moment driven by electronic correlations in Sr4Ru3O10	PHYSICAL REVIEW B	2019	100	10
Fukaya, Y; Tamura, S; Yada, K; Tanaka, Y; Gentile, P; Cuoco, M	Spin-orbital hallmarks of unconventional superconductors without inversion symmetry	PHYSICAL REVIEW B	2019	100	10
Cuono, G; Forte, F; Cuoco, M; Islam, R; Luo, JL; Noce, C; Autieri, C	Multiple band crossings and Fermi surface topology: Role of double nonsymmorphic symmetries in MnP-type crystal structures	PHYSICAL REVIEW MATERIALS	2019	3	9

Authors	Article Title	Journal	Year	Volume	Issue
Perroni, CA; Cataudella, V; Salluzzo, M; Cuoco, M; Citro, R	Evolution of topological superconductivity by orbital-selective confinement in oxide nanowires	PHYSICAL REVIEW B	2019	100	9
Kotetes, P; Mercaldo, MT; Cuoco, M	Synthetic Weyl Points and Chiral Anomaly in Majorana Devices with Nonstandard Andreev-Bound-State Spectra	PHYSICAL REVIEW LETTERS	2019	123	12
Mercaldo, MT; Kotetes, P; Cuoco, M	Magnetoelectrically tunable Andreev bound state spectra and spin polarization in p-wave Josephson junctions	PHYSICAL REVIEW B	2019	100	10
Francica, G; Gentile, P; Cuoco, M	Effects of geometry on spin-orbit Kramers states in semiconducting nanorings	EPL	2019	127	3
Coll, M; Fontcuberta, J; Althammer, M; Bibes, M; Boschker, H; Calleja, A; Cheng, G; Cuoco, M, et al.	Towards Oxide Electronics: a Roadmap	APPLIED SURFACE SCIENCE	2019	482	
Cuoco, G; Autieri, C; Guarnaccia, G; Avella, A; Cuoco, M; Forte, F; Noce, C	Spin-orbit coupling effects on the electronic properties of the pressure-induced superconductor CrAs	EUROPEAN PHYSICAL JOURNAL-SPECIAL TOPICS	2019	228	3
Forte, F; Guerra, D; Noce, C; Brzezicki, W; Cuoco, M	Tuning nodal line semimetals in trilayered systems	EUROPEAN PHYSICAL JOURNAL-SPECIAL TOPICS	2019	228	3
Gentile, P; Benvenuto, V; Ortix, C; Noce, C; Cuoco, M	Engineering Topological Nodal Line Semimetals in Rashba Spin-Orbit Coupled Atomic Chains	CONDENSED MATTER	2019	4	1
Pincini, D; Veiga, LSI; Dashwood, CD; Forte, F; Cuoco, M; Perry, RS; Bencok, P; Boothroyd, AT; McMorrow, DF	Tuning of the Ru4+ ground-state orbital population in the 4d(4) Mott insulator Ca2RuO4 achieved by La doping	PHYSICAL REVIEW B	2019	99	7
Mercaldo, MT; Kotetes, P; Cuoco, M	Topological signatures of the coexistence of antiferromagnetism and odd-parity spin-triplet superconductivity	AIP ADVANCES	2018	8	10
Porter, DG; Granata, V; Forte, F; Di Matteo, S; Cuoco, M; Fittipaldi, R; Vecchione, A; Bombardi, A	Magnetic anisotropy and orbital ordering in Ca2RuO4	PHYSICAL REVIEW B	2018	98	12
Pandey, S; Scopigno, N; Gentile, P; Cuoco, M; Ortix, C	Topological quantum pump in serpentine-shaped semiconducting narrow channels	PHYSICAL REVIEW B	2018	97	24
Fukaya, Y; Tamura, S; Yada, K; Tanaka, Y; Gentile, P; Cuoco, M	Interorbital topological superconductivity in spin-orbit coupled superconductors with inversion symmetry breaking	PHYSICAL REVIEW B	2018	97	17
Mercaldo, MT; Cuoco, M; Kotetes, P	Magnetic manipulation of topological states in p-wave superconductors	PHYSICA B-CONDENSED MATTER	2018	536	
Das, L; Forte, F; Fittipaldi, R; Fatuzzo, CG; Granata, V; Ivashko, O; Horio, M; Schindler, F; Dantz, M; Tseng, Y; McNally, DE; Ronnow, HM; Wan, W; Christensen, NB; Pellicciari, J; Olalde-Velasco, P; Kikugawa, N; Neupert, T; Vecchione, A; Schmitt, T; Cuoco, M; Chang, J	Spin-Orbital Excitations in Ca2RuO4 Revealed by Resonant Inelastic X-Ray Scattering	PHYSICAL REVIEW X	2018	8	1
Brzezicki, W; Cuoco, M; Forte, F; Oles, AM	Topological Phases Emerging from Spin-Orbital Physics	JOURNAL OF SUPERCONDUCTIVITY AND NOVEL MAGNETISM	2018	31	3
Brzezicki, W; Cuoco, M	Nodal s-wave superconductivity in antiferromagnetic semimetals	PHYSICAL REVIEW B	2018	97	6

*Place and date*  
Fisciano, 10 April 2023

Signature