Rome
Room 127,
Piazzale Aldo Moro 2,
00185 Rome, Italy

riccardo.piombo@
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Riccardo Piombo

Condensed Matter Theory - Physics Researcher

About Me I obtained a Ph.D. in physics at Sapienza University of Rome. My research focuses on Phase-Change Materials focusing on their structural and electronic properties.

Work Experience

June 2022 - present, Sapienza Univ

Sapienza University of Rome Post doc position
Supervisor: prof. Riccardo Mazzarello (Sapienza)

- **Project**:
  NEuroMorPHic devices bASed on chalcogenIde heteroStructures (EMPHASIS) 2020 PRIN grant (P.I: R.Mazzarello)
- **Funds:**
  - Progetti per Avvio alla Ricerca - Tipo 2: 4000€
  NANO PCM - New Advanced NeurOmorphic Phase-Change Materials (AR2221816834DCFB)

Education

November 2018 - May 2022, Sapienza University of Rome PhD in Physics - mark: Excellent, session XXXIV

Phd exam	mark
Many Body Physics	28/30
Solid State Physics	30/30
Quantum Magnetism	passed

- **Thesis Project:**
  Correlation and Cuprate-like Physics in Silver Fluorides - Supervisor: Prof. J. Lorenzana (ISC-CNR-Sapienza)

- **Published papers:**
- N. Bachar, K. Koteras, J. Gawraczynski, W. Trzcinski, J. Paszula, *R. Piombo*, P. Barone, Z. Mazej, G. Ghiringhelli, A. Nag, K. Zhou, J. Lorenzana, D. van der Marel, W. Grochala, *Charge Transfer and dd excitations in AgF_2*, Phys. Rev. Research 4, 023108 9 May 2022.

- D. Betto, R.Fumagalli, L. Martinelli, M. Rossi, *R.Piombo*, K. Yoshimi, D. Di Castro, E. Di Gennaro, D. Bonn, G. A. Sawatzky, F. MilettoGranozio, L. Braicovich, N. B. Brookes, J. Lorenzana, and G. Ghiringhelli, *Multiple-magnonexcitationsshapethespinspectrumofcuprate parent compounds*, Phys. Rev. B 103 (14), L140409.

- *R. Piombo*, D. Jezierski, H. P. Martins, T. Jaron, M. N. Gastiasoro, P. Barone, K. Tokar, P. Piekarz, M. Derzsi, Z. Mazej, M. Abbate, W. Grochala, and J. Lorenzana, *Strength of Correlations in a Silver-based Cuprate Analogue* Phys. Rev. B 106, 035142 – July 2022.

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November 2018 - May 2022, Sapienza University of Rome

- **Schools:**
  - *Autumn School on Correlated Electrons: Simulating Correlations with Computers* 20-24 Sept 2021, Forschungszentrum Jülich

  - *Workshop of scientific evolutionary writing* 1-4 March 2021 Online, Sony CSL and Sapienza

  - *Autumn School on Correlated Electrons: Many-Body Methods for Real Materials* 21-25 Sept 2020, Forschungszentrum Jülich

  - *Autumn School on Correlated Electrons: Topology, Entanglement, and Strong Correlation* 16-20 Sept 2019, Forschungszentrum Jülich

- **Funds:**
  - *Progetti per Avvio alla Ricerca - Tipo 1: 1000€*
  Magnetism, charge instability and possible high-Tc superconductivity in Silver-based compounds (AR11916B88D1874A)

- **Computational Projects:** - *CINECA - ISCRA Class C:*
  SRTCA - HP10C72OM1 37.500 hours of computation on MARCON2 and 7.238 hours of computation on M100
  QSF - HP10CXOSO0 64.000 hours of computation on G100

- **Attended lectures:**
  - *SuperTop 2019 Emergent Phenomena at low dimensions*. Rome 4-6 Sept 2019 Department of Physics, Sapienza University of Rome

  - *Light and technology: the frontiers of emergent system, the scientific perspectives of Italy-India collaboration.* Rome March 18th 2019 Department of Physics, Sapienza University of Rome

  - *International Workshop on Electronic Structure of Superconductors and Novel Materials*. Rome May 23rd 2018 Sapienza University of Rome

2015 - 2018, Sapienza University of Rome

Master Degree in Theoretical Physics - mark: 109/110

- **Thesis title:** *Valence instabilities and electronic soft modes* Supervisor: Prof. J. Lorenzana (ISC-CNR)

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Exam	mark
Quantum Information and Quantum Computation	31/30
Theory of Stochastic Processes	31/30
Relativistic Quantum Mechanics	31/30
Statiscal Mechanics of Critical Phenomena	30/30
Non-Equilibrium Statistical Mechanics	30/30
Physics Lab	30/30
Atomic Simulations	28/30
Condensed Matter Physics	27/30
Computational Statistical Mechanics	27/30
Statiscal Mechanics of Disordered Systems	27/30
Mathematical Physics	27/30

2011 - 2015, Sapienza University of Rome

Bachelor Degree in Physics - mark: 104/110

- **Thesis title**: *Introduction to Density Functional Theory* Supervisor: Prof. G. B. Bachelet (La Sapienza)

Exam	mark
Geometry	30/30
Introduction to Astrophysics	29/30
General Relativity	28/30
Computational Physics	28/30
Chemistry	28/30
Structure of Matter	27/30
Electromagnetism	27/30
Electromagnetism Lab	27/30
Thermodynamics	27/30
Optics	27/30
Classical Mechanics	27/30
Calculus Lab	27/30
Signal Lab	26/30
Nuclear and Subnuclear Physics	26/30
Mechanics Lab	25/30
Rational and Relativistic Mechanics	25/30
Mathematical analysis II	25/30
Mathematical analysis I	24/30
Quantum Mechanics	24/30
Statistical Mechanics	24/30
Mathematical Analysis III & IV	22/30

Until 2011, Liceo Scientifico A. Avogadro (Rome)

Scientific High School Diploma - mark: 92/100

Computer Skills

- **Programming Languages:**
  - Python, C, Lua, Bash, AWK, LaTeX
- **Libraries:**

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- NumPy, Scipy, Matplotlib, Gnuplot, ASE

- **Softwares:**

  - HΦ, Quanty, VESTA, VASP, Mathematica,

  Quantum Espresso, Phonopy, CP2K

Spoken languages

Language	Speaking	Writing	Listening	Text Comprhension
Italian	MT	MT	MT	MT
English	B2	B2	B2	B2

MT = mother tongue

Interests

Professional

Chemical Bonding, Numerical Analysis, Strongly Correlated Systems, Green's Functions Theory, Magnetism, Exact Diagonalization, Spectroscopy, Density Functional Theory, Crystal Field Theory, Ligand Field Theory, Multiplet Theory, Many-Body Physics.

Personal

Politics and science policy

- October 2017- June 2018

  Student at Scuola di Politiche

  ***Innovation* course**

  Focused on new technological frontiers, on digitalization, on robotics and on the impact of artificial intelligence in industry, in socio-cultural processes, in public policies and in ethical-philosophical issues

  - *Andreatta Lecture 2018*

  C. Cottarelli - *La buona gestione della finanza pubblica come valore politico.* 19th April 2018, Sala Igea dell'Istituto dell'Enciclopedia italiana

- **Supporter of:**

- *Emergency*
- *Médecins Sans Frontières* (MSF)