Armando Consiglio

Curriculum Vitae

Personal information

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Google Scholar	Armando Consiglio
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Nationality	Italian
Date and place of birth	18.02.1995, Chieti

Academic studies

10/19 - today **Doctor of Philosophy, Physics**, *Julius-Maximilians-Universität Würzburg, Department of Theoretical Physics and Astrophysics*, Würzburg, Germany

10/17 - 07/19 **M.Sc. Physics**, *Alma Mater Studiorum - University of Bologna Department of Physics and Astronomy "Augusto Righi"*, Bologna, Italy,
Dissertation title: Molecular Dynamics Simulations of Conducting Polymer Nanocomposites
Supervisors: Prof. Tobias Cramer, Prof. Andrei V. Komolkin
Final degree mark: 110/110 $with\ honors$

10/13 - 07/17 **B.Sc. Physics**, *Alma Mater Studiorum - University of Bologna Department of Physics and Astronomy "Augusto Righi"*, Bologna, Italy,
Dissertation title: Time-fractional diffusion equation and its applications in physics
Supervisors: Prof. Francesco Mainardi, Dr.ssa Silvia Vitali
Final degree mark: 107/110

Employment

01/24 - today **Research fellow**, *Italian National Research Council (CNR) - Institute of materials (IOM)*, Trieste, Italy

Studies and experiences abroad

03/19 - 04/19 **Visiting Master Student**, *Saint Petersburg State University Department of Nuclear-Physics Research Methods*, Saint Petersburg, Russia

09/18 - 12/18 **Visiting Master Student**, *Saint Petersburg State University Department of Nuclear-Physics Research Methods*, Saint Petersburg, Russia

Teaching activities

09/24 - 02/25 **Data Science (Lab tutorials)**, *University of Bologna*, Bologna, Italy

10/23 - 04/24 **Computational Materials Science (Density Functional Theory module)**, *Julius Maximilians Universität Würzburg*, Würzburg, Germany

10/22 - 04/23 **Computational Materials Science (Density Functional Theory module)**, *Julius Maximilians Universität Würzburg*, Würzburg, Germany

04/22 - 10/22 **Quantum Mechanics 2 (exercises)**, *Julius Maximilians Universität Würzburg*, Würzburg, Germany

10/21 - 04/22 **Theoretical Mechanics (exercises)**, *Julius Maximilians Universität Würzburg*, Würzburg, Germany

05/21 - 10/21 **Quantum Mechanics 1 (exercises)**, *Julius Maximilians Universität Würzburg*, Würzburg, Germany

10/20 - 04/21 **Mathematics 3 for physicist and engineers (exercises)**, *Julius Maximilians Universität Würzburg*, Würzburg, Germany

Thesis supervision

04/24 - 09/24 **First principles calculations of electronic properties of CsV_3Sb_5 kagome metal under doping**, *Bachelor thesis*, Lorenzo Riguzzi, University of Bologna, (co-supervision)

02/22 - 10/22 **Topological and electrical properties of non-hermitian graphene**, *Master thesis*, Riccardo Sorbello, University of Catania, (co-supervision)

Awards

Best oral presentation of Section 2 - Physics of matter, *reported by the Scientific Committee of the 110th National Congress - Italian Physical Society, Bologna, Italy*, `https://www.sif.it/attivita/congresso/110/comunicazioni`, 11/09/2024

"Paolo Mazzoldi" Prize for Condensed Matter Physics, *Italian Physical Society*, `https://2024.congresso.sif.it/info/premiati-2024`, 02/08/2024

Communication with special mention of Section 2 - Physics of matter, *reported by the Scientific Committee of the 109th National Congress - Italian Physical Society, Salerno, Italy*, `https://www.sif.it/attivita/congresso/109/comunicazioni`, 13/09/2023

Peer review

European Physical Journal Plus
npj Computational Materials
Physical Review Research
Advanced physics research

Books and chapters

Fractional Diffusive Waves in the Cauchy and Signalling Problems (book chapter), *Nonlocal and Fractional Operators, SEMA SIMAI Springer Series, 2021*, A. Consiglio*, F. Mainardi, https://link.springer.com/chapter/10.1007/978-3-030-69236-0_8

Publications and preprints

Theory of unconventional magnetism in a Cu-based kagome metal, *Submitted to Physical Review Letters, 2024*, A. Wenger, A. Consiglio, H. Hohmann, M. Dürrnagel, F. O. von Rohr, H. D. Scammell, J. Ingham, D. Di Sante, R. Thomale, https://arxiv.org/pdf/2411.03563

Pomeranchuk instability from electronic correlations in $CsTi_3Bi_5$ kagome metal, *Submitted to Nat. Comm., 2024*, C. Bigi, M. Dürrnagel, L. Klebl, A. Consiglio, G. Pokharel, F. Bertran, P. Le Févre, T. Jaouen, H. C. Tchouekem, P. Turban, A. De Vita, J. A. Miwa, J. W. Wells, D. Oh, R. Comin, R. Thomale, I. Zeljkovic, B. R. Ortiz, S. D. Wilson, G. Sangiovanni, F. Mazzola, D. Di Sante, https://arxiv.org/pdf/2410.22929

Theory of excitonic order in kagome metal ScV_6Sn_6, *Submitted to Physical Review Letters, 2024*, J. Ingham, A. Consiglio, D. Di Sante, R. Thomale, H. D. Scammell, https://arxiv.org/pdf/2410.01994

Pomeranchuk Instability Induced by an Emergent Higher-Order van Hove Singularity on the Distorted Kagome Surface of $Co_3Sn_2S_2$, *Submitted to Nature Materials, 2024*, P. Nag, R. Batabyal, J. Ingham, N. Morali, H. Tan, J. Koo, A. Consiglio, E. Liu, N. Avraham, R. Queiroz, R. Thomale, B. Yan, C. Felser, https://arxiv.org/pdf/2410.01994

Orbital-Selective Spin-Triplet Superconductivity in Infinite-Layer Lanthanum Nickelates, *Submitted to Physical Review Letters, 2024*, F. Jakubczyk, A. Consiglio, D. Di Sante, R. Thomale, C. Timm, https://arxiv.org/abs/2403.19617

Strain-induced enhancement of the charge-density-wave in the kagome metal ScV_6Sn_6, *Submitted to Physical Review Letters, 2024*, M. Tuniz, A. Consiglio*, G. Pokharel, F. Parmigiani, T. Neupert, R. Thomale, G. Sangiovanni, S. D. Wilson, I. Vobornik, F. Salvador, F. Cilento, D. Di Sante, F. Mazzola, http://arxiv.org/abs/2403.18046

Giant Strain Response of Charge Modulation and Singularity in a Kagome Superconductor, *Submitted to Nature Communications, 2024*, C. Lin, A. Consiglio, O. K. Forslund, J. Küspert, M. M. Denner, H. Lei, A. Louat, M. D. Watson, T. K. Kim, C. Cacho, D. Carbone, M. Leandersson, C. Polley, T. Balasubranianian, D. Di Sante, R. Thomale, Z. Guguchia, G. Sangiovanni, T. Neupert, J. Chang, https://arxiv.org/abs/2402.16089

Emergent Coupling of Protected Edge States of 2D Topological Insulators in a Crystalline Multilayer Heterostructure with Ion Mobility, *Submitted, 2024*, E. Carrillo-Aravena, J. Heßdörfer, C. N. Saggau, A. Consiglio, S. Sharma, F. Reinert, G. Sangiovanni, D. Di Sante, O. Janson, K. Nielsch, N. Pérez, M. Ruck

Electron glass phase with resilient Zhang–Rice singlets in $LiCu_3O_3$, *Physical Review Letters, 2024*, A. Consiglio*, G. Gatti, E. Martino, L. Moreschini, J. C. Johannsen, K. Prša, P. G. Freeman, D. Sheptyakov, H. M. Rønnow, R. Scopelliti, A. Magrez, L. Forró, C. Schmitt, V. Jovic, C. Jozwiak, A. Bostwick, E. Rotenberg, T. Hofmann, R. Thomale, G. Sangiovanni, D. Di Sante, M. Greiter, M. Grioni, S. Moser, https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.132.126502

Excitons at room temperature in a two-dimensional quantum spin Hall insulator, *Il Nuovo Cimento C, 2024*, A. Consiglio* , https://www.sif.it/riviste/sif/ncc/econtents/2024/047/05/article/10

Dynamics and Resilience of the Charge Density Wave in a bilayer kagome metal, *Communications Materials, 2023*, M. Tuniz, A. Consiglio*, D. Puntel, C. Bigi, S. Enzner, G. Pokharel, P. Orgiani, W. Bronsch, F. Parmigiani, V. Polewczyk, P. D. C. King, J. W. Wells, I. Zeljkovic, P. Carrara, G. Rossi, J. Fujii, I. Vobornik, S. D. Wilson, R. Thomale, T. Wehling, G. Sangiovanni, G. Panaccione, F. Cilento, D. Di Sante, F. Mazzola, https://www.nature.com/articles/s43246-023-00430-y

Flat band separation and resilient spin-Berry curvature in bilayer kagome metals, *Nature Phyics, 2023*, D. Di Sante, C. Bigi, P. Eck, S. Enzner, A. Consiglio, G. Pokharel, P. Carrara, P. Orgiani, V. Polewczyk, J. Fujii, P. D. C. King, I. Vobornik, G. Rossi, I. Zeljkovic, S. D. Wilson, R. Thomale, G. Sangiovanni, G. Panaccione, F. Mazzola, https://www.nature.com/articles/s41567-023-02053-z

Theory of nematic charge orders in kagome metals, *Physical Review B, 2023*, F. Grandi, A. Consiglio, M. A. Sentef, R. Thomale, D. M. Kennes, https://journals.aps.org/prb/abstract/10.1103/PhysRevB.107.155131

Role of electronic correlations in the Kagome lattice superconductor $LaRh_3B_2$, *Physical Review B, 2023*, S. Chaudhary, Shama, J. Singh, A. Consiglio, D. Di Sante, R. Thomale, Y. Singh, https://journals.aps.org/prb/abstract/10.1103/PhysRevB.107.085103

Real-space Obstruction in Quantum Spin Hall Insulators, *Physical Review B, 2022*, P. Eck, C. Ortix, A. Consiglio, J. Erhardt, M. Bauernfeind, S. Moser, R. Claessen, D. Di Sante, G. Sangiovanni, https://journals.aps.org/prb/abstract/10.1103/PhysRevB.106.195143

Observation of room temperature excitons in an atomically thin topological insulator, *Nature Communications, 2022*, M. Syperek, R. Stühler, A. Consiglio*, P. Holewa, P. Wyborski, Ł. Dusanowski, F. Reis, S. Höfling, R. Thomale, W. Hanke, R. Claessen, D. Di Sante, C. Schneider, https://www.nature.com/articles/s41467-022-33822-8

A note on a modified fractional Maxwell model, *Chaos, Solitons & Fractals, 2022*, R. Garra, A. Consiglio, F. Mainardi, https://doi.org/10.1016/j.chaos.2022.112544

Wright functions of the second kind and Whittaker functions, *Fractional Calculus and Applied Analysis, Springer Nature, 2022*, F. Mainardi, R. B. Paris, A. Consiglio, https://doi.org/10.1007/s13540-022-00042-2

Van Hove tuning of $A\mathbf{V_3Sb_5}$ kagome metals under pressure and strain, *Physical Review B, 2022*, A. Consiglio*, T. Schwemmer, X. Wu, W. Hanke, T. Neupert, R. Thomale, G. Sangiovanni, D. Di Sante, https://link.aps.org/doi/10.1103/PhysRevB.105.165146

Nature of Unconventional Pairing in the Kagome Superconductors $A\mathbf{V_3Sb_5}$ (A = K, Rb, Cs), *Physical Review Letters, 2021*, X. Wu, T. Schwemmer, T. Müller, A. Consiglio, G. Sangiovanni, D. Di Sante, Y. Iqbal, W. Hanke, A. P. Schnyder, M. M. Denner, M. H. Fischer, T. Neupert, R. Thomale, https://link.aps.org/doi/10.1103/PhysRevLett.127.177001

The Bateman Functions Revisited after 90 Years — A Survey of Old and New Results, *Mathematics, 2021*, A. Apelblat, A. Consiglio, F. Mainardi, https://doi.org/10.3390/math9111273

On the asymptotics of Wright functions of the second kind, *Fractional Calculus and Applied Analysis, Springer, 2021*, R. B. Paris, A. Consiglio, F. Mainardi, https://link.springer.com/article/10.1515/fca-2021-0003

Momentum for Catalysis: How Surface Reactions Shape the RuO_2 Flat Surface State, *American Chemical Society - Catalysis, 2021*, V. Jovic, A. Consiglio, K. E. Smith, C. Jozwiak, A. Bostwick, E. Rotenberg, D. Di Sante, S. Moser, https://pubs.acs.org/doi/10.1021/acscatal.0c04871

The Pioneers of the Mittag-Leffler Functions in Dielectrical and Mechanical Relaxation Processes, *WSEAS Transactions on Mathematics, 2020*, F. Mainardi, A. Consiglio, https://wseas.com/journals/mathematics/2020/a585106-051.pdf

The Wright Functions of the Second Kind in Mathematical Physics, *Mathematics, 2020*, F. Mainardi, A. Consiglio, https://www.mdpi.com/2227-7390/8/6/884

Some Notes on the Wright Functions in Probability Theory, *WSEAS Transactions on Mathematics, 2019*, A. Consiglio, Y. Luchko, F. Mainardi, https://wseas.com/journals/articles.php?id=1719

On the evolution of fractional diffusive waves, *Ricerche di Matematica, Springer, 2019*, A. Consiglio*, F. Mainardi, https://link.springer.com/article/10.1007/s11587-019-00476-6

Conferences and workshops

09/09/24 - 13/09/24 **110^{th} National Congress - Italian Physical Society**, *Bologna, Italy*, Oral presentation: 'Electron glass phase with resilient Zhang-Rice singlets in $LiCu_3O_3$'

17/07/24 - 22/07/24 **International School of Physics "Enrico Fermi Italian Physical Society**, *Varenna, Italy*, Poster presentation: 'Excitons at room temperature in a two-dimensional quantum spin Hall insulator'

17/03/24 - 22/03/24 **DPG conference - German Physical Society** , *Berlin, Germany*, Oral presentation: 'Electron glass phase with resilient Zhang-Rice singlets in $LiCu_3O_3$'

27/09/23 - 29/09/23 **Second Fall School 'Topological Quantum Matter'**, *Leipzig, Germany*

25/09/23 - 27/09/23 **Fourth QMA Retreat**, *Leipzig, Germany*, Chair of Session 4: Topology

11/09/23 - 15/09/23 **109th National Congress - Italian Physical Society**, *Salerno, Italy*, Oral presentation: 'Excitons at room temperature in a two-dimensional quantum spin Hall insulator'

04/09/23 - 08/09/23 **CMD30 FisMat 2023**, *Milano, Italy*, Oral presentation: 'Dynamics and Resilience of the Charge Density Wave in a bilayer kagome metal'

13/07/23 - 14/07/23 **International Workshop on Complexity and Topology in Quantum Matter (ct.qmat23)**, *Würzburg, Germany*

20/03/23 - 22/03/23 **ct.qmat Cluster Retreat**, *Bayreuth, Germany*

05/03/23 - 10/03/23 **American Physical Society March Meeting 2023**, *Las Vegas, Nevada, USA*, Oral presentation: 'Room temperature excitons in the atomically thin topological insulator Bi:SiC'

15/11/22 - 18/11/22 **VASP workshop "Electronic correlations from first principles"**, *online edition*

10/10/22 - 14/10/22 **Hands on spectroscopy calculations of quantum materials**, *Heidelberg, Germany*

20/08/22 - 09/09/22 **School on UV and X-ray Spectroscopies of Correlated Electron Systems**, *Les Houches, France*, Poster presentation: 'Evidence of excitons in an atomically thin topological insulator'

25/07/22 - 29/07/22 **International Conference on Complexity and Topology in Quantum Matter**, *Würzburg, Germany*, Poster presentation: 'Pressure and strain tuning in $A\mathrm{V}_3\mathrm{Sb}_5$ (A = Cs, Rb, K) kagome metals'

13/10/21 - 15/10/21 **First Fall School 'Topological Quantum Matter'**, *Erfurt, Germany*

11/10/21 - 13/10/21 **Second QMA retreat meeting**, *Erfurt, Germany*, Poster presentation: 'Adsorption of Small Molecules on the (110) surface of the Dirac Semimetal RuO_2'

07/06/21 - 10/06/21 **New Generation in Strongly Correlated Electron Systems 2021**, *online edition*, Oral presentation: 'Electronic Properties and Competing Zhang-Rice Singlets in a Stochastically Hole Doped Mixed Valence Cuprate with Glassy Behavior: the Case of $\mathrm{LiCu}_3\mathrm{O}_3$'

21/09/20 - 25/09/20 **Autumn School on Correlated Electrons: Topology, Entanglement, and Strong Correlations**, *Jülich, Germany*

02/09/19 - 06/09/19 **New Generation in Strongly Correlated Electron Systems 2019**, *Silvi Marina, Italy*

22/07/19 - 26/07/19 **Computational Methods for Fractional-Order Problems**, *Bari, Italy*

12/07/19 - 13/07/19 **Nonlocal and Fractional Operators**, *Rome, Italy*, Poster presentation: 'Evolution of a Box-Signal in the Time-Fractional Diffusion-Wave Equation'

31/03/19 - 05/04/19 **16-th International School-Conference Spinus 2019 "Magnetic resonance and its applications"**, *Saint Petersburg, Russia*, Poster presentation: 'Computer Simulations of PEDOT:PSS/solid interface'

12/11/18 - 14/11/18 **International Student Conference 'Science and Progress 2018'**, *Saint Petersburg, Russia*, Poster presentation: 'Molecular Dynamics Simulations of Conducting Polymer Blend PEDOT:PSS'

18/06/18 - 23/06/18 **Bologna International School on NANOmaterials physics NANO-BIS**, *Bologna, Italy*

Miscellaneous

Hobbies: Coffee, Cycling, Kayaking, Photography
Erdős number: 4 https://mathscinet.ams.org/mathscinet/freetools/collab-dist

Trieste, 25.11.2024, Armando Consiglio