


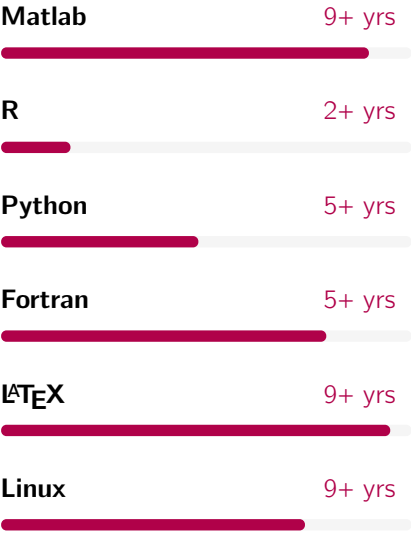




## CONTACT

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## TECH SKILLS



# Gabriele Bellomia

PhD · Quantum Information of Strongly Correlated Electrons

## EDUCATION

<b>Ph.D. - Condensed Matter Theory</b> <b>SISSA - Trieste (Italy)</b>	<b>2019 - 2024</b>
Thesis title: Quantum information insights into strongly correlated electrons Supervisors: Massimo Capone and Adriano Amaricci	
<b>M.Sci. - Condensed Matter Physics</b> <b>Università degli Studi di Milano Bicocca - Italy</b>	<b>2016 - 2019</b>
Thesis title: Modern approach to the Drude weight: metallic and insulating systems within open boundary conditions Supervisors: Marco Bernasconi and Raffaele Resta	
<b>B.Sci. - Engineering Physics</b> <b>Politecnico di Milano - Italy</b>	<b>2013 - 2016</b>
Thesis title: Studio degli stati elettronici non occupati in superfici e film sottili per mezzo di misure di fotoemissione inversa: applicazione alla crescita epitassiale di Fe su Ir(111) Supervisor: Alberto Calloni	

## WORK EXPERIENCE

<b>Postdoctoral research position</b> <b>SISSA - Trieste (Italy)</b>	<b>Since May 2024</b>
Quantum and classical correlations in interacting topological insulators, multi-component Hubbard systems and strongly correlated superconductors.	

## PUBLICATIONS

<b>Drude weight in systems with open boundary conditions</b> <b>Physical Review B 102 (20), 205123</b>	<b>PRB 102, 205123</b>
Authors: <b>GB</b> , Raffaele Resta	
<b>Quasilocl entanglement across the Mott-Hubbard transition</b> <b>Physical Review B 109 (11), 115104</b>	<b>PRB 109, 115104</b>
Authors: <b>GB</b> , Carlos Mejuto-Zaera, Massimo Capone, Adriano Amaricci	

## PREPRINTS

# CODEBASES

## OBCsDRUDE

Implementation of the new OBCs formulation for the Drude weight in one-dimensional systems.

→ code repository

## HoneyTools

Ergonomic generation of bounded honeycomb nanostructures, such as sheets, ribbons, flakes, etc.

→ code repository

## MOTTlab

Blazing fast DMFT/IPT code for the Hubbard model at half-filling.

→ code repository

## CDMFT/ED Solver

Exact Diagonalization solver for Quantum Cluster Problems, tailored to the evaluation of quasilocal entanglement in CDMFT solutions of the 2d Hubbard model.

→ code repository

**Local classical correlations between physical electrons in the Hubbard model**

<https://arxiv.org/abs/2506.18709>

arXiv:2506.18709

Authors: **GB**, Adriano Amaricci, Massimo Capone

**A flexible and interoperable high-performance Lanczos-based solver for generic quantum impurity problems: upgrading EDIpack**

<https://arxiv.org/abs/2506.01363>

arXiv:2506.01363

Authors: L. Crippa, I. Krivenko, S. Giuli, **GB**, A. Kowalski, *et al.*

**Enhanced coherence and layer-selective charge order in a trilayer cuprate superconductor**

<https://arxiv.org/abs/2506.01448>

arXiv:2506.01448

Authors: S. Smit, M. Bluschke, P. Moen, N. Heinsdorf, E. Zavatti, **GB**, *et al.*

**Tuning the correlations of SU(N) Fermi-Hubbard systems via controlled symmetry breaking**  
(in preparation)

in preparation

Authors: Edoardo Zavatti, **GB**, Matteo Ferraretto, Samuele Giuli, M. Capone

**Mottness, magnetism and topology of interacting Dirac fermions: a dynamical mean-field theory study of intra-orbital correlations**  
(in preparation)

in preparation

Authors: **GB**, Karla Baumann, Adriano Amaricci, Massimo Capone

# SCHOOLS

**Trieste Junior Quantum Days 2019**  
**Università di Trieste and ICTP**

Jul 2019

24 – 26 July 2019

**Autumn School on Correlated Electrons 2020**  
**Forschungszentrum Jülich**

Sep 2020

21 – 25 September 2020

# POSTER SESSIONS AND TALKS

**CMT@BRIXEN 2023**  
**UniPD, UniTN, UnivAQ and SISSA**

Poster Session

5 – 7 June 2023, Bressanone (Italy)

Nearest-neighbor entanglement across the Mott-Hubbard transition

**NGSCES 2023**

Poster Session

**Elettra-Sincrotrone Trieste, Stockholm University, Università di Pisa and Max-Planck-Institute Halle**

28 August – 1 September 2023, Lido di Fermo (Italy)

Quasilocal entanglement across the Mott-Hubbard transition

**NGSCES 2024****Contributed Talk**

**ICFO, Donostia International Physics Center, Freie Universität Berlin, Radboud University**

30 September – 4 October 2024, Platja D'Aro (Spain)

Mottness, magnetism and topology of interacting Dirac fermions:

a DMFT study of intra-orbital correlations in the Kane-Mele-Hubbard model

**SuperFOx 2025****Contributed Talk**

**Universita' degli Studi dell'Aquila, CNR-SPIN**

19 – 21 February 2025, L'Aquila (Italy)

Engineering strongly correlated magnetic states in a quantum spin-Hall insulator

with the help of quantum information theory

**Alpe Adria Condensed Matter Theory Seminar Series****Invited Talk**

**TU Graz**

25 February 2025, Graz (Austria)

Intra-orbital mutual information as a simple, clear-cut marker for strong electronic correlations

**Computational Material Science Group Seminar****Invited Talk**

**TU Wien**

30 April 2025, Wien (Austria)

Local classical correlations between physical electrons from local natural orbitals

**Physics Department Seminar****Invited Talk**

**Università di Pisa**

15 May 2025, Pisa (Italy)

Entanglement characterization of strongly correlated electron systems

**YRM 2025****Contributed Talk**

**ETSF, CECAM, FERMI, NanoX, SISSA**

26 – 30 May 2025, Trieste (Italy)

Local classical correlations between physical electrons

**FisMat 2025****Contributed Talk**

**CNISM, Università Ca' Foscari**

7 – 11 July 2025, Venezia (Italy)

Symmetry-resolved entanglement in the two-dimensional Hubbard model