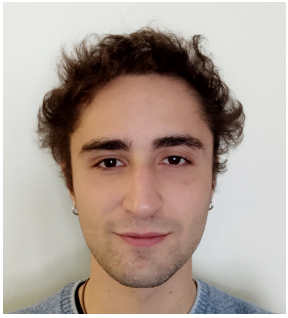

Luigi Ranalli

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Research Experience

University of Vienna - Computational Materials Physics *Vienna, Austria*
Advisor: Prof. Cesare Franchini *2021 - present*
- Thesis: "Phonon Anharmonicity and Electronic Transport in in the quantum paraelectrics $KTaO_3$ and $SrTiO_3$"

University of Texas, Oden Institute *Austin, United State*
Host: Prof. Feliciano Giustino *2023 June - 2023 July*
- Topic: Carriers mobility in STO mediated by machine learning predicted phonons

University of Bologna - Dept of Physics and Astronomy *Bologna, Italy*
Advisors: Prof. Cesare Franchini, Prof. Matteo Calandra *2018 - 2021*
- Thesis: "Computational study of the role of anharmonic phonon effects in the quantum paraelectric perovskite $KTaO_3$"
- score: 110/110

University of Bologna - Dept of Physics and Astronomy *Bologna, Italy*
Advisor: Dr. Tobias Cramer *2015 - 2018*
- Thesis: "Characterization of elastic bio-electrodes based on nanostructured semiconductor polymer"
- score: 110/110

Publications

Published

Cesare Tresca, Pietro Maria Forcella, Andrea Angeletti, **Luigi Ranalli**, Cesare Franchini, Michele Reticcioli, Gianni Profeta. "Evidence of Molecular Hydrogen in the N-doped LuH3 System: a Possible Path to Superconductivity?". 10.48550/arXiv.2308.03619 (2023) - now accepted in Nature Communications

C. Verdi, **L. Ranalli**, C. Franchini, G. Kresse. "Quantum paraelectricity and structural phase transitions in strontium titanate beyond density functional theory". Physical Review Materials, 7, L030801 (2023)

L. Ranalli, C. Verdi, L. Monacelli, M. Calandra, G. Kresse, C. Franchini. "Temperature Dependent Anharmonic Phonons in Quantum Paraelectric $KTaO_3$ by First Principles and Machine Learned Force-Fields". Advanced Quantum Technologies, 10.1002/QUTE.202200131 (2023)

In preparation

L. Ranalli, C. Verdi, M. Zacharias, J. Even, F. Giustino, C. Franchini "Electron Mobilities in $SrTiO_3$ and $KTaO_3$: Role of Phonon Anharmonicity, Mass Renormalization and Disorder". https://arxiv.org/abs/2407.18771 (2024) . - under revision in Physical Review Materials

Presentations

Contributed Presentations and Posters

L. Ranalli. 2024. Talk: "Mobility in $SrTiO_3$ Mediated by Machine Learning Predicted Anharmonic Phonons". Presented at: Deutsche Physikalische Gesellschaft (DPG), Technical University (TU), Berlin. (2024)

L. Ranalli, C. Verdi, L. Monacelli, M. Calandra, G. Kresse, C. Franchini. Poster: "Anharmonic phonons in quantum paraelectric $KTaO_3$ by machine learning assisted first principles calculations". Presented at: Psi-k Conference, Losanne, Switzerland. (2022)

L. Ranalli, C. Verdi, L. Monacelli, M. Calandra, G. Kresse, C. Franchini. Talk: ”Machine Learning aided Phonon Anarmonicity: the Soft Mode in the Quantum Paraelectric KTaO3”. Presented at: APS March Meeting, Chicago, Illinois. (2022)

Awards, Fellowships, & Grants

2022 - .. **Doctoral Fellowship**, Vienna Doctoral School in Physics *Vienna*

Teaching Experience

Summer Semester 2024 **Advanced Electronic Structure**, Teaching Assistant *University of Vienna*

Professional Development

2023 **EPW Summer School**, Electron-Phonon Physics from first principles *Austin*
2022 **Machine Learning Summer School**, Focus on molecules and materials *Vienna*

Mentoring

2024 **Zhu Yu**, as phd internship Co-supervisor *University of Vienna*
2023-2024 **Markus Schwarz**, as MS thesis Co-supervisor *University of Vienna*
2022 **Matteo Costa**, as BS thesis Co-supervisor *University of Bologna*

Service

2023 - 2024 **Vienna Doctoral School of Physics**, Student Representative *Vienna*
2024 **Seminars on Computational Quantum Materials/University of Vienna**, Chair *Vienna*
2023 **Seminars on Computational Quantum Materials/University of Vienna**, Chair *Vienna*

Outreach

2023 **European Researchers Night**, VR for surface catalysis *Vienna*

Skills

Programming Languages

Intensive use : **PYTHON**, **SHELL SCRIPTING**

Moderate Use : **FORTRAN**, **C++**, **MATLAB**