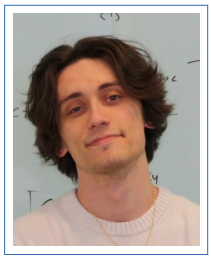

Luca Leoni

Curriculum Vitae – October 19, 2024

Personal details

Birth	1999, August the 16th, Faenza (Italy)
Languages	**Italian** (mothertongue), **English** (fluent)
Website	www.unibo.it/sitoweb/luca.leoni12
ORCiD	0009-0007-5648-0719
Scholar	Google Scholar

Education

2023–present **Doctorate in physics**, *University of Bologna (Italy)*.

2021–2023 **Master degree in condensed matter physics**, *University of Bologna (Italy)*.
110/110 cum laude

2018–2021 **Bachelor degree in physics**, *University of Bologna (Italy)*.
110/110 cum laude

Academic internships

2022–2023 **Research internship**, *University of Vienna (Austria)*.
Master thesis development

2022–2022 **Summer school**, *University of Vienna (Austria)*.
Machine learning for materials hard and soft

Master Thesis

Title *Enhancing diagrammatic Monte Carlo via machine learning*

Supervisor Cesare Franchini

Description Study on the possible strategies to enhance the statistical properties of the diagrammatic Monte Carlo algorithm. Two approaches have been found successful to achieve such task: an analytical one that grants the minimum correlation possible in the Markov Chain, and a more general neural network protocol based on the Normalizing Flow architecture.

Teaching activities

2024–present Supervisor of bachelor students (University of Bologna, Italy)

2023–present Teaching assistant of statistical mechanics (University of Bologna, Italy)

2022–2023 Teaching assistant of Computational Material physics (University of Bologna, Italy)

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Pubblications and Preprint

1. *Leoni, L. & Franchini, C. Global sampling of Feynman's diagrams through normalizing flow. *Phys. Rev. Res.* **6,** 033041. https://link.aps.org/doi/10.1103/PhysRevResearch.6.033041 (3 July 2024).
2. Angeletti, A., Luca Leoni, Massa, D., Pasquini, L., Papanikolaou, S. & Franchini, C. *Hydrogen Diffusion in Magnesium Using Machine Learning Potentials,* in review 2024. arXiv: 2407.21088 [cond-mat.mtrl-sci]. https://arxiv.org/abs/2407.21088.
3. Birschitzky, V. C., Luca Leoni, Reticcioli, M. & Franchini, C. *Machine Learning Small Polaron Dynamics,* in review 2024. arXiv: 2409.16179 [cond-mat.mtrl-sci]. https://arxiv.org/abs/2409.16179.

Conferences and Workshops

Sep 2024 **NIS Colloquia: EX-MACHINA**, *University of Torino (Italy)*, presentation.
Hydrogen Diffusion in Magnesium Using Machine Learning Potentials

July 2024 **CECAM workshop: Frontiers in many-body excited-state dynamics from first principles**, *CECAM-HQ-EPFL, Lausanne (Switzerland)*, presentation.
Machine learning small polaron dynamics

July 2024 **CECAM workshop: Machine Learning of First Principles Observables**, *Zuse Institute Berlin (Germany)*, contributed talk.
Machine learning small polaron dynamics

May 2024 **CECAM workshop: MLM4MS**, *Jožef Stefan Institute (Slovenia)*, poster.
Global sampling of Feynamn digrams through Normalizing flows

May 2022 **MANO Spring workshop**, *University of Bologna (italy)*, presentation.
Multiscale simulation of phenomena governed by rare events: kinetic Monte Carlo combined with first-principles calculation

Dec 2021 **MANO Winter workshop**, *University of Bologna (italy)*, poster.
Application of Machine Learning to force flied based molecular dynamics

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