Luca Scala, M.Sc.

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Employment History

2022 – **PhD student at University of Wrocław**, Wrocław, Poland.
Currently working on generalized geometry and double field theory approaches to dualities in string theory, searching for hints of hidden noncommutative structures. PhD supervisors: Professor Jerzy Kowalski-Glikman (University of Wrocław, NCBJ Swierk), Doctor Falk Hassler (University of Wrocław).

2022 – 2022 **Three-month junior fellowship at University of Naples "Federico II"**, Naples, Italy.
Three-month junior fellowship awarded on a competitive basis under the project "agency-dependent spacetime and spacetime-dependent agency", funded by the Silicon Valley Community Foundation.

2019 – 2021 **Private Student Tutor in Physics and Mathematics**, Naples, Italy.
Experience with both high school and undergraduate level private mathematics and physics tutoring activities.

Education

2018 – 2021 **Master's Degree**, Università degli Studi di Napoli "Federico II", Naples, Italy.
Graduated in October 2021, with a thesis on localizability in noncommutative spacetimes, dealing in particular with κ-Minkowski and ϱ-Minkowski deformations, under the supervision of Professor Patrizia Vitale (Università di Napoli Federico II, Dipartimento di Fisica "E. Pancini") and Professor Fedele Lizzi (Università di Napoli Federico II, Dipartimento di Fisica "E. Pancini"). Degree grade 110/110.

2015 – 2018 **Bachelor's Degree**, Università degli Studi di Napoli "Federico II", Naples, Italy.
Graduated with a grade of 110/110 with a thesis on wave propagation in continuum mechanics under the supervision of Professor Addolorata Marasco (Università degli Studi di Napoli "Federico II", Dipartimento di Matematica e Applicazioni "Renato Caccioppoli").

2010 – 2015 **High School Diploma**, Liceo Classico "Umberto I", Naples, Italy.

Research Publications

Journal Articles

1. F. Hassler, Y. Sakatani, and **L. Scala**, "Generalized dualities for heterotic and type I strings," *JHEP*, vol. 08, p. 059, 2024. DOI: 10.1007/JHEP08(2024)059. arXiv: 2312.16283 [hep-th].
2. **L. Scala**, "ϱ-Poincaré: bicrossproduct structure, $\star$-products and quantum Lie algebra," *PoS*, vol. CORFU2023, p. 255, 2024. DOI: 10.22323/1.463.0255. arXiv: 2408.09837 [hep-th].
3. G. Fabiano, G. Gubitosi, F. Lizzi, **L. Scala**, and P. Vitale, "Bicrossproduct vs. twist quantum symmetries in noncommutative geometries: the case of ϱ-Minkowski," *JHEP*, vol. 08, p. 220, Apr. 2023. DOI: 10.1007/JHEP08(2023)220. arXiv: 2305.00526 [hep-th].

4 F. Lizzi, **L. Scala**, and P. Vitale, "Localization and observers in ϱ-Minkowski spacetime," *Phys. Rev. D*, vol. 106, no. 2, p. 025 023, 2022. DOI: 10.1103/PhysRevD.106.025023. arXiv: 2205.10862 [hep-th].

Conferences and Talks

2024
- "**XX Avogadro meeting on strings, supergravity and gauge theories**", Complesso dei Santi Marcellino e Festo, Naples, Italy.
  Talk with title: "Generalised dualities for Heterotic/Type I string theories from heterotic Double Field Theory".
- **Institute seminar**, Wrocław University, Wrocław, Poland.
  Talk with title: "Generalised dualities and double field theory".
- "**Workshop on Noncommutative and Generalized Geometry in String theory, Gauge theory and Related Physical Models**", Corfu Summer Institute, Corfu, Greece.
  Talk with title: "Half-maximal gauged supergravities from 10d heterotic DFT".
- "**Integrability, dualities and deformations**", Swansea University, Swansea, Wales.
  Poster with title: "Half-maximal gauged supergravities from 10d heterotic DFT".
- "**stingtheory.pl/2024**", Jagiellonian University, Krakov, Poland.
  Talk with title: "Half-maximal gauged supergravities from 10d heterotic DFT".

2023
- "**Workshop on Noncommutative and Generalized Geometry in String theory, Gauge theory and Related Physical Models**", Corfu Summer Institute, Corfu, Greece.
  Talk with title: "Bicrossproduct structure of ϱ-Poincaré and the associated $\star$-product".
- **Hybrid Conference "Integrability in Gauge and String Theory 2023"**, Zurich, Switzerland.
  Online participation.

2019
- **Workshop "Observers in Quantum Gravity II"**, Foundational Questions Institute (FQXi), INFN Sezione di Napoli, Università degli Studi di Napoli "Federico II", Naples, Italy.

Teaching Duties

2025
- **Advanced General Relativity**, tutorials, University of Wrocław, Wrocław, Poland.

2024
- **Gauge/gravity duality (AdS/CFT correspondence)**, tutorials, University of Wrocław, Wrocław, Poland.
- **Introduction to quantum gravity**, lectures, University of Wrocław, Wrocław, Poland.

2023
- **Quantum mechanics II**, tutorials, University of Wrocław, Wrocław, Poland.
- **Black holes, Hawking radiation, and the information paradox**, tutorials, University of Wrocław, Wrocław, Poland.

2022
- **Introduction to String Theory**, tutorials, University of Wrocław, Wrocław, Poland.

Funding and Awards

2025
- Travel grant awarded from **COST Action CA21109**, **CaLISTA**, to participate in the 2025 edition of the "Integrability, Dualities and Deformations" conference.
- Awarded the scholarship "**Nagroda Santander dla studentów i doktorantów UWr 2025**", for scientific, artistic and social merits.

2024
- Travel grant awarded from **COST Action CA21109**, **CaLISTA**, to participate in the 2024 edition of the "Workshop on Noncommutative and Generalized Geometry in String theory, Gauge theory and Related Physical Models".

Complementary Formation

2024 **Online minicourse "Supersymmetry"**, Physics Latam.
Seven-lecture minicourse on supersymmetry. Lecturer Professor Silvia Penati (Università degli studi di Milano Bicocca).

2022 **Workshop "Majorana Lectures 2022: Consistent Effective Field Theories"**, Università degli Studi di Napoli "Federico II", Naples, Italy.
Three-day workshop on consistency constraints on effective field theories. Lecturer Professor Ferruccio Feruglio (Università degli Studi di Padova).

2020 **Foundations of General Relativity**, Naples, Italy.
Extra curricular discussion group on the foundations of General Relativity with an emphasis on generally neglected foundational problems with the supervision of Professor Emeritus Antonio Romano (Università degli Studi di Napoli "Federico II").

Skills

Languages
- Italian: Native.
- English: C1.

IT
- LaTeX, Wolfram Mathematica.

Misc.
- Academic research, teaching, creative writing.