Giovanni Scala

Curriculum Vitae

"Look up at the stars and not down at your feet.
Be curious." (S. Hawking)

Date of birth: 12/03/1993 |
Nationality: ITALIAN
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E giovanni.scala@ba.infn.it

Bachelor (2015) and Master in Theoretical Physics (2017) both degrees obtained with the highest honours. From 2017 to December 2020 a PhD student of the QUANTUM Group of University of Bari. Scientist visitor at the University of Toruń N. Copernicus. Independent Researcher at the International Center of Theory of Quantum Technologies in Gdańsk for the next six months.

Research of interest

Quantum Foundations, Quantum Information, Mathemathical Physics, Quantum Matter.

Education

- **PhD in Theoretical Physics**, Università di Bari. XI.2017–XII.2020
  Title of project: *Quantum Correlation and Applications*
  http://phdphysics.cloud.ba.infn.it/

- **Master degree in Theoretical Physics**, Università di Bari, *110|110 cum Laude*. XI.2015–X.2017
  Title of thesis: *Quantum Correlation and Plenoptic Imaging*
  http://cdlfbari.cloud.ba.infn.it/wp-content/uploads/file-manager/CIF/Magistrale/Tesi%20di%20laurea/16-17-SCALA%20Giovanni.pdf

- **Internship at INFN Sez. Bari**. II.2017–X.2017
  Topic of interest: *Correlation Plenoptic Imaging*
  https://www.ba.infn.it/index.php/it/9-categoria-it-it/73-correlation-plenoptic-imaging

- **Bachelor in Physics**, University of Bari, *110|110 cum Laude*. IX.2012–VII.2015
  Title of thesis: *Evoluzione temporale di Sistemi Quantistici*
  http://www.infn.it/thesis/thesis_dettaglio.php?tid=9963

- **High School Diploma**, IISS "L.Di Maggio", S. Giovanni Rot. (Italy), *100|100*, In these years I was selected to attend the olympic games for Math and Astronomy. IX.2007–VII.2012
  http://www.isdimaggio.it

Skills

- **Programming** Wolfram Mathematica, Matlab, JAVA, Python, Assembly, C++.
- **Languages** Italian (Mother tongue), English (fluent).
  Basic knowledge: French, Spanish.

Experience

- **Visiting PhD student**, University of Copernicus, Toruń, (Poland). 2018; 2020

I collaborated with prof. D. Chruściński prof. and G. Sarbicki in *theory of quantum entanglement* and K. Słowik in *Light-Matter interaction*.

- **Tutor for Physics**, University of Bari, Bari (Italy). **2018-19; 2019-20**
  Tutor for Bachelor in Physics.

- **Tutor for Physics**, University of Bari, Bari (Italy). **2016-17; 2018-19**
  Tutor for Physics I at the Department of Biotechnology.
- **Assistant**, University of Foggia, S. Giovanni Rot. (Italy). **from 2015 to 2020**
  Collaborator for the Physics exam in nursing science at the Department of Medical Science.

Publications

- G. Sarbicki, **G. Scala**, D. Chruściński, "Detection power of separability criteria based on a correlation tensor: a case study", (December 8, 2020) (submitted to PRA)
  `https://arxiv.org/abs/2012.04359`

- **G. Scala**, F. V. Pepe, P. Facchi, S. Pascazio, K. Słowik, "Light interaction with extended quantum systems in dispersive media", *New Journal Physics* (Accepted: December 9, 2020)
  `https://doi.org/10.1088/1367-2630/abd204`

- G. Sarbicki, **G. Scala**, D. Chruściński, "Enhanced realignment criterion vs. linear entanglement witnesses", *J. Phys. A: Math. Theor* (October 21, 2020) 53 455302
  `https://doi.org/10.1088/1751-8121/abba46`

- G. Sarbicki, **G. Scala**, D. Chruściński, "A family of multipartite separability criteria based on correlation tensor", *Phys. Rev. A* (January 27, 2020) 101, 012341.
  `https://doi.org/10.1103/PhysRevA.101.012341`

- F. V. Pepe, G. Chilleri, **G. Scala**, D. Triggiani, Y. Kims, V. Tamma, "Distance sensing with remote double slits" (Nov 10, 2020)
  `https://arxiv.org/abs/2011.05224`

- **G. Scala**, G. Massaro, M. D'Angelo, A. Garuccio, S. Pascazio, F. V. Pepe, "Signal-to-noise ratio in correlation plenoptic imaging", *Proc. SPIE 11347, Quantum Technologies* (April 14, 2020), 1134713,
  `https://doi.org/10.1117/12.2555701`

- **G. Scala**, M. D'Angelo, A. Garuccio, S. Pascazio, F. V. Pepe, "Signal-to-noise properties of correlation plenoptic imaging with chaotic light", *Phys. Rev. A* (May 7, 2019) 99, 053808
  `https://doi.org/10.1103/PhysRevA.99.053808`

- **G. Scala**, "Two-Level Systems with Broken Inversion Symmetry", Proceedings (November 20, 2019), 12, 49,
  `https://doi.org/10.3390/proceedings2019012049`

Academic background

My current academic career, overall is an attempt to better understand the underground structure of the quantum phenomena with the aim to implement an underpinning interpretation of physical manifestations.
I have started my research from quantum applications always with the philosophy to take care the fundamental questions, hence I have developed my knowledge in optical coherence theory finalizing for a new kind of microscope (patented by my group). During my periods abroad, firstly, I have broadened my academic competences in condensed matter and cavity QED expanding the theory of light-matter interactions to include the spatial extension of the system embedded in a dispersive environment, secondly, I have been involved in a project regards a new family of entanglement witnesses for Quantum Entanglement detection.

Recently, I am also extremely interesting in Quantum Foundations and I am studying how to generalize Bell's inequalities and separately, the Bohr's complementary principle via the notion of contextuality.

About Me

Curious, hardworking and ambitious student with a strong passion for physics, astronomy, literature and football. Always seeking opportunities to gain new knowledge. Founder of cultural associations since high-school time. An easygoing person that loves meeting people coming from various cultural backgrounds.