

FELIPE TAHA SANT'ANA, Ph.D.

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INTRODUCTION

I am a theoretical physicist with experience in academia and background on interacting quantum systems, integrable models, quantum field theories, mathematical physics, and AMO physics in general. Currently, I am a Polonez Bis fellow at the Institute of Physics, Polish Academy of Sciences, working on integrable quantum field theories in one dimension under the project CIQS: Correlation aspects of Interacting Quantum Systems in reduced dimensionality.

EDUCATION

- **University of São Paulo** 04/2020
Ph.D. in Physics São Carlos, Brazil
 - Keywords: Bose gases, optical lattice, quantum phase transition, 1d interacting systems.
 - Thesis: A study on quantum gases: bosons in optical lattices and the one-dimensional interacting Bose gas.
[arXiv:2006.13100](#); [teses.usp](#)
- **University of São Paulo** 07/2015
M.Sc. in Electrical Engineering São Carlos, Brazil
 - Keywords: Autonomous robots, dynamical environments, collision probability estimation.
 - Dissertation: Estimação de probabilidade de colisão com obstáculos móveis para navegação autônoma. [teses.usp](#)
- **University of São Paulo** 07/2012
B.Sc. in Physics São Carlos, Brazil


EXPERIENCE

- **Institute of Physics, Polish Academy of Sciences**  11/2022 - 10/2024
Assistant Professor Warsaw, Poland
 - NCN Polonez Bis 1 Fellow
 - Principal Investigator of the project CIQS: Correlation aspects of Interacting Quantum Systems in reduced dimensionality
- **Faculty of Physics, University of Warsaw**  10/2020 - 09/2022
Assistant Professor Warsaw, Poland
 - Postdoctoral researcher within the NCN Sonata project "Dynamic correlation functions of quantum integrable models: in and beyond the equilibrium" headed by Miłosz Panfil.
- **Institut de Physique de Nice, Université Côte D'Azur**  06/2018 - 05/2019
Ph.D. Researcher Nice, France
 - Doctoral researcher under CAPES/COFECUB bilateral collaboration.
- **São Carlos Institute of Physics, University of São Paulo**  04/2016 - 04/2020
Ph.D. Researcher São Carlos, Brazil
 - Doctoral researcher within project "Bose gases in optical lattices" headed by F.E.A. dos Santos.
- **Luz Financial Solutions**  2015
Financial Analyst São Carlos, Brazil
- **São Carlos School of Engineering**  03/2013-07/2015
M.Sc. Researcher São Carlos, Brazil
 - Master student within the project "Dynamic environments in autonomous robotics" headed by Valdir Grassi Jr.
- **Warthog Robotics**  2012-2013
AI Developer São Carlos, Brazil

TEACHING

- **Quantum Field Theory** 2023-2024
Institute of Physics, Polish Academy of Sciences Warsaw, Poland
 - [Lecture notes](#)
- **Statistical Physics** 2021-2022
Faculty of Physics, University of Warsaw Warsaw, Poland
- **Quantum Mechanics** 2021-2022
Faculty of Physics, University of Warsaw Warsaw, Poland
- **Computational Physics** 2017
São Carlos Institute of Physics, University of São Paulo São Carlos, Brazil

PROJECTS

- **CIQS: Correlation aspects of Interacting Quantum Systems in reduced dimensionality** November 2022 - October 2024
Keywords: Quantum Field Theories, Integrable models, 1d interacting systems 
◦ Project No. 2021/43/P/ST2/02904 co-funded by the National Science Centre and the European Union Framework Programme for Research and Innovation Horizon 2020 under the Marie Skłodowska-Curie grant agreement no. 945339.

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

- [J.1] Oleksandr Gamayun, Miłosz Panfil, Felipe Taha Sant'Ana, Kubo-Martin-Schwinger relation for an interacting mobile impurity, *Phys. Rev. Research* 5, 043265, 2023. [arXiv:2308.06482](#)
- [J.2] Oleksandr Gamayun, Miłosz Panfil, Felipe Taha Sant'Ana, Mobile impurity in a one-dimensional gas at finite temperatures, *Phys. Rev. A* 106, 023305, 2022. [arXiv:2202.07657](#)
- [J.3] Miłosz Panfil, Felipe Taha Sant'Ana, The relevant excitations for the one-body function in the Lieb-Liniger model, *J. Stat. Mech.* (2021) 073103. [arXiv:2104.10491](#)
- [T.1] Felipe Taha Sant'Ana, A study on quantum gases: bosons in optical lattices and the one-dimensional interacting Bose gas, University of São Paulo thesis repository [arXiv:2006.13100](#)
- [J.4] F. T. Sant'Ana, F. Hébert, V. Rousseau, M. Albert, P. Vignolo, Scaling properties of Tan's contact: Embedding pairs and correlation effect in the Tonks-Girardeau limit, *Phys. Rev. A* **100**, 063608 (2019). [arXiv:1908.08714](#)
- [J.5] Felipe Taha Sant'Ana, Axel Pelster, and Francisco Ednilson Alves dos Santos, Finite-temperature degenerate perturbation theory for bosons in optical lattices, *Phys. Rev. A* **100**, 043609 (2019). [arXiv:1906.09661](#)
- [J.6] M. Kübler, F. T. Sant'Ana, F. E. A. dos Santos, and A. Pelster, Improving mean-field theory for bosons in optical lattices via degenerate perturbation theory, *Phys. Rev. A* **99**, 063603 (2019). [arXiv:1804.08689](#)
- [C.1] Felipe Taha Sant'Ana *et al.*, Warthog Robotics Team Description Paper 2012, *Latin American Robotics Competition Symposium* (2012).

TALKS AND POSTERS

- **Correlation aspects of interacting quantum systems in one dimension** 10-14 July 2023
International Conference on Statistical Physics - SIGMAPHI 2023, Chania, Greece
- **Correlation aspects of interacting quantum systems in reduced dimensionality** December 2022
BEC seminar, CFT PAN, Warsaw, Poland
- **The relevant excitations for the one-body function in the Lieb-Liniger model** 20/02 - 04/03, 2022
São Paulo School of Advanced Science on Quantum Fluids and Applications, São Carlos, Brazil
- **Correlation features of interacting bosons** October 2021
Condensed matter physics seminar, FIUW, Warsaw, Poland
- **Understanding the important excitations in the Lieb-Liniger model** April 2021
Student workshop on integrability, 2021, Hannover, Germany
- **A study on quantum gases: bosons in optical lattices and the interacting Bose gas** December 2020
Condensed matter physics seminar, FIUW, Warsaw, Poland
- **Bosons in optical lattices** 30/01 - 10/02, 2017
School on Interaction of Light with Cold Atoms, São Paulo, Brazil

SKILLS

- **Programming Languages:** Fortran, C++, Python, HTML, Julia
- **Systems and softwares:** Linux, LaTeX, Mathematica, MatLab
- **Languages:** Portuguese (Native), English (Professional Proficiency), Spanish (Intermediate), Polish (Basic)