Maurice D. Hanisch

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Education

M.Sc. Physics 09/2022 – Present

ETH Zurich, Switzerland

- Current GPA: 5.61/6.00 (CH)
- Focus: Q. Error Correction, Q. Information Processing, Machine Learning
- Selected past & current coursework: Advanced Q. Algorithms, Probabilistic Artificial Intelligence, Q. Error Correction, Q. Information Processing 1 & 2, Trapped Ions.

— *Partly financed by the Rayer scholarship — Dr. Mas-Fraissinet, France.*

B.Sc. Physics 10/2018 – 09/2022

LMU Munich, Germany

- GPA: 1.28/1.00 (DE). Theoretical physics electives: Foundations of quantum mechanics — Seminar on Bell's inequality, Essay on decoherence.

— *Mainly financed by the Rayer scholarship — Dr. Mas-Fraissinet, France.*

Medical Degree 10/2017 – 02/2018

LMU Munich, Germany

- GPA: N/A. Not completed.

Baccalauréat 09/2014 – 07/2017

Lycée Sud des Landes, St-Vincent-de-Tyrosse, France

- GPA 16.00/20.00 (FR). Graduated with the highest possible honors at the age of 16.

Research Experience

Master's Thesis 09/2023 – Present

IBM Quantum, Zurich, Switzerland

Project Repo (still private)

- "Quantum error correction with analog measurement information decoders."
- Writing soft information decoders in C++ & Python. Analyse performance on real hardware.
- Future work: Analyzing performance-information trade-off of soft-information decoders. Working on decoders for ArcCircuits.
- Skills: C++ , Python, IBM Quantum hardware.
- Supervisors: Dr. James Wootton, Dr. Joseph Renes, Prof. Renato Renner.

Semester Project 06/2023 – 08/2022

ETH Zurich, Switzerland

Report Link

- "Towards a tunable beamsplitter interaction between two GKP-encoded qubits."
- Experimental project on the motional interaction of GKP-encoded qubits in trapped ions.
- Designing and simulation of trapping potentials and then experimental testing of the found potentials.
- Skills: Python, ion trapping hardware.
- Supervisor: Dr. Stephan Welte, Moritz Fontboté-Schmidt, Prof. Jonathan Home.

Bachelor's Thesis 04/2022 – 09/2022

Max-Planck-Institute for Quantum Optics, Munich, Germany

Report Link

- "Space-efficient quantum computation of fermionic and bosonic Gaussian systems."
- Introduction to various theoretical research areas (entanglement simulation with Python, entropic uncertainty principles, tensor networks) by Dr. Adrian Rubio.
- Investigating the time and space complexity of fermionic and bosonic Gaussian circuits.
- Skills: Python, complexity theory, bosonic quantum computation.
- Supervisors: Dr. Adrian Rubio, Prof. Ignacio Cirac.

Teaching

Teaching Assistant in Linear Algebra I 09/2023 – Present

ETH Zurich, Switzerland

- Teaching Linear Algebra for 1st year B.Sc. CS students in a weekly in-person class.
- Lecturer: Prof. Bernd Gärtner, Prof. Afonso Bandeira.

Teaching Assistant in Physics II 02/2023 – 07/2023

ETH Zurich, Switzerland

- Teaching Continuum Mechanics and Thermodynamics for 1st year B.Sc. EE students in a weekly in-person class.
- Lecturer: Prof. Atac Imamoglu.

Laboratory Supervisor 10/2021 – 02/2022

LMU Munich, Germany

- Supervising the physics electrodynamic laboratory course for five groups of 20 medicine students.

Work Experience

IP Law Intern 04/2022

Bardehle Pagenberg, Munich, Germany

- Drafting argumentations for ongoing patent lawsuits. Familiriazition with litigation examples. Supervisor: Sebastian H.-E. Müller.

Assistance Coordinator 02/2018 – 10/2018

IMA, Munich, Germany

- Accident and breakdown assistance coordinator in regions including DE, CH, FR, and UK.

Competitions

Quandela Hackathon: LOQCathon 2.0 11/2023

Sorbonne Université, Paris, France

Project Repo

- Won 1st Prize of the competetion (3000€). Topic: Quantum reservoir computing using only linear optical elements.

Qiskit Hackathon 06/2023

World of Photonics, Munich, Germany

- Topic: Graph theory-based approach to encode highly entangled states on IBM hardware.

Quantum Engineering Hackathon 05/2023

ETH Zurich, Switzerland

- Won 2nd Prize of the IQM challenge. Topic: Using symmetry-informed quantum machine learning.

Extracurricular Acitivities

Student Mentor 09/2023 – 02/2024

ETH Physics Department Student Mentoring

- Mentor for a group of seven first-year BSc students. Weekly meetings to discuss the student's progress and problems.

Residence House Speaker 10/2021 – 10/2022

Studentenwerk Munich, Germany

- Performed actively as one of two house speakers for a 300-student residence.

Student Mentor 10/2021

LMU Physics Department

- Mentor 40 new LMU physics students to assist them in commencing their studies in the first months of their studies.

Technical Skills and Interests

Technical:

- Python: qiskit, pymatching, stim, scikit-learn.
- C++: pybind11, eigen.
- Docker
- LaTeX

Languages: German (native), French (native), English (C1: IELTS 8/9)
Interests: Calisthenics, Weightlifting, Volleyball, Chess.