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.

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

Medical Degree 10/2017 – 02/2018
LMU Munich, Germany
- GPA: N/A. Not completed.

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. Analyzing 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.
- Designed and simulated trapping potentials and experimental testing of the found potentials.
- Skills: Python, ion trapping hardware.
- Supervisor: 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.
- Investigated 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
- Teached 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
- Teached 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
- Supervised the physics electrodynamic laboratory course for five groups of 20 medicine students.

Work Experience

IP Law Intern 04/2022
Bardehle Pagenberg, Munich, Germany
- Drafted argumentations for ongoing patent lawsuits. Familiarized 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

ETH Quantum Hackathon 05/2024
ETH Zurich, Switzerland
Project Repo
- Won 1st Prize of the NVIDIA challenge with my team.
- Won overall 1st Prize for the best presentation competing against the other challenge winners.
- Topic: Hardware-accelerated classical-quantum hybrid optimization algorithms for the Max-Cut problem.

Quandela Hackathon: LOQCathon 2.0 11/2023
Sorbonne Université, Paris, France
Project Repo
- Won overall 1st Prize of the competetion with my team (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.

ETH Quantum Hackathon 05/2023
ETH Zurich, Switzerland
Project Repo
- Won 2nd Prize of the IQM challenge with my team.
- Topic: Using symmetry-informed quantum machine learning.

Technical Skills and Interests

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

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