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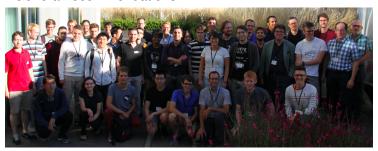


Figure: Group Picture of the QE Master Program with steering committee

Backgrounds

Marco's background:

- Physics Bachelor at ETHZ
- General physics knowledge (e.g. astro/- particle physics)
- Quantum Mechanics II too theoretical for my taste

Moritz' background:

- Physics Bachelor from EPF Lausanne
- Exchange in third year at ETH Zürich (solid Quantum Mechanics grounding)
- Statistical Physics already taken

Theoretically inclined student, classes taken:

Fall Semester:

- Physics: Quantum Information Theory
- Engineering: Optical Communication
 Fundamentals, Information
 Theory
- Case Studies: Applications of Quantum Technology

Spring Semester:

- Physics: Advanced Topics on Quantum Information Theory, Quantum Information Processing I
- Engineering: Applied Cryptography, Algebra and Error-correcting codes
- Quantech Workshop: Quantum Communication (12 ECTS)

Experimentally inclined student (Marco), classes taken:

Fall Semester:

- Physics: Quantum Optics, Quantum Science with Superconducting Circuits
- Engineering: VLSI, Control Systems, Solid State Electronics & Optics
- Case Studies: Applications of Quantum Technology

Spring Semester:

- Physics: Quantum Information Processing I, Quantum Acoustics and Optomechanics, Advanced Quantum Optics
- a GESS Course
- Quantech Workshop: Trapped lons (12 ECTS)

Quantum Engineering vs a regular master

- 25 people from all over the world (8 swiss) with different backgrounds →"class" feeling
- Paper Club
- Quantech workshops
- Football team
- Freshly founded student association
- Tutor system
- Case Studies (IBM visit, ETH labs, ID Quantique)
- Close contact with professors
- Hang out with driven, motivated and somewhat crazy people.

Why ETH

- Long-term engagement of ETH to Quantum Physics and ETH is world leader (Renner, Wallraff, Home, etc.)
- Unique program worldwide: between D-ITET and D-PHYS
- · Exceeding expectations already in the first year
- Integrate a crazy Network of students

General Recommendations: Electrical Engineers

How deep should one go in catching up on the physics depends on your interest - but you should know mechanics before building a car

Be flexible in thinking - abstract like physicist

Solid State Electronics & Physics II not sufficient \to QM1 and or Introduction to Solid State Physics in first master semester recommended

General Recommendations: Physicists

Main difference w.r.t. Physics Bachelor: closely confronted with the experimental aspects.

Still possible to take very theoretical classes

Expect a change of mentality in the engineering classes: learn the vocabulary and how to think like an engineer

General Recommendations

The subject is ridiculously deep and vast

Don't specialize too early

If not from EE or Physics Bachelor:

- complex analysis
- electrodynamics
- Analysis (DGL) & Linear Algebra
- \rightarrow maybe one semester more?

Don't skip on the basics

Podcast

If you want to hear something from one of our former electrical engineers Anja ... (ETH Podcast)





Backup Slides

Experimentally inclined student (Moritz), classes taken:

Fall Semester:

- Physics classes: Quantum Optics, Quantum Information Theory, Quantum Science with Superconducting Circuits
- Engineering classes: VLSI and Control Systems
- Case Studies: Applications of Quantum Technology

Spring Semester:

- Advanced Quantum Optics, Quantum Information Processing
- Quantech Workshop: Superconducting Qubits (12 ECTS)
- Data Science in Techno-Economic Systems
- Machine Learning