Oliver Liebe

Master's Student in Quantum Physics

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Just graduated from Ferdinand Kuemmeth's Spin Qubit Group at the Center for Quantum Devices of the Niels Bohr Institute, under the supervision of Anasua Chatterjee. My research pertained to the efficacy of manufacturing extendable 2xN quantum dot arrays in Germanium, as a host platform for spin qubits.

Research Experience

Master's Thesis - Extensible 2×N Quantum Dot Arrays: Encoding Arrays of Spin Qubits Implemented Using Holes in a Germanium Heterostructure

- Used Phidl, a Python-based programmatic design platform, to build a library that automates the design process, irrespective of the number of qubits.
- Created an open-source Finite Element Method simulation to aid in the design process, by simulating the Poisson equation in the hetero-structure, via an input design file. It is expected to contain a self-consistent Poisson-Schrödinger solver for the 2-dimensional Hole Gas in the Germanium quantum well.
- Fabrication yielded promising initial results, and with further work functional devices are expected. Added complexity of my designs, required by the extensibility, compared to the industry-standard, have complicated the fabrication. Several failure modes have been identified and corrected for.

Bachelor's Thesis - Smectic Liquid Crystals as Light-Guides

- Discovered a novel method of producing self-assembled orientable smectic liquid crystal strands with a central defect, which is a highly efficient light-guide.

Internship - Cellulose-Ligning Coating on Porous Materials

- Laid the ground-work for producing an aerosolised cellulose-ligning coating with a high UV-blocking factor, with the goal of creating UV-protective cloths and clothing.

Work Experience

Teaching Assistant *Institute for Physics, Chemistry, and Pharmacy*

1st February, 2022 - 28th July, 2022 — Odense, Denmark

- Teaching Assistant in the course FY542 - Experimental Physics and Semi-Conductors under Professor Sven Tougaard (currently Professor Emeritus).
- Executing experiments as well as teaching bachelors' students in Physics.

Student Lab Assistant *FysikLab, University of Southern Denmark*

1st September, 2021 - 28th July, 2022 — Odense, Denmark

- Planning and execution of fitting experiments for visiting High School students, with a varying range of physics knowledge.
- Providing small seminars for High School students interested in Physics.

Student Coordinator *Library, University of Southern Denmark*

1st October, 2021 - 1st April, 2022 — Odense, Denmark

- Planning and execution of a local branch of the Citizen Science project named "Globe at Night", aimed at increasing public awareness of light pollution.
- Leading free, public seminars on light pollution, introductory astrophysics, and the famous Danish astronomer, Tycho Brahe.

Skills

Programming, Software, and Operating Systems

Python • C++ • Julia • MatLab • Typst • LaTeX • FreeFEM++ • Linux • Windows

Laboratory Skills

Spectroscopic Ellipsometry • Atomic Force Microscopy • Scanning Electron Microscopy • E-beam Lithography • E-beam Evaporation • Cleanroom Trained • Atomic Layer Depositioning • Hydroflouric acid experience • Energy-dispersive X-ray Spectroscopy

Languages

Danish - Native • English - Native • French - Elementary • Norwegian - Elementary • Swedish - Elementary

Education

MSc *Quantum Physics*

2022 - 2024 — University of Copenhagen

Internship *Soft Matter Physics*

July - August, 2022 — DESY, Hamburg

BSc *Physics*

2019 - 2022 — SDU, Odense