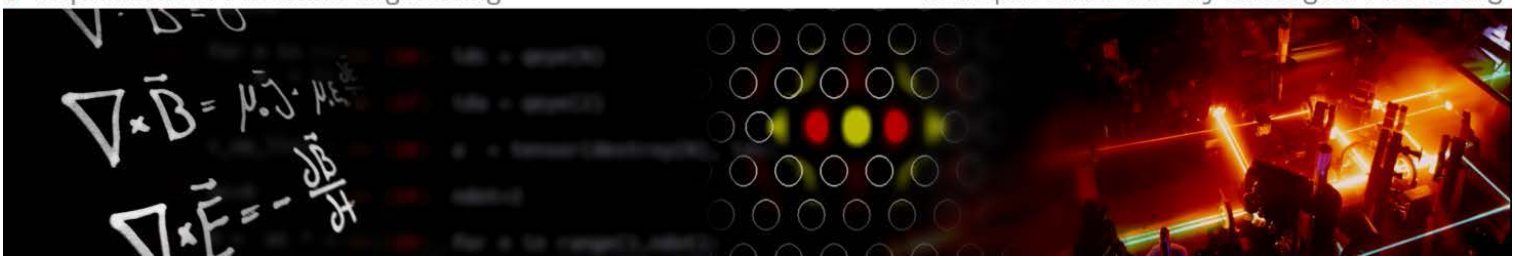
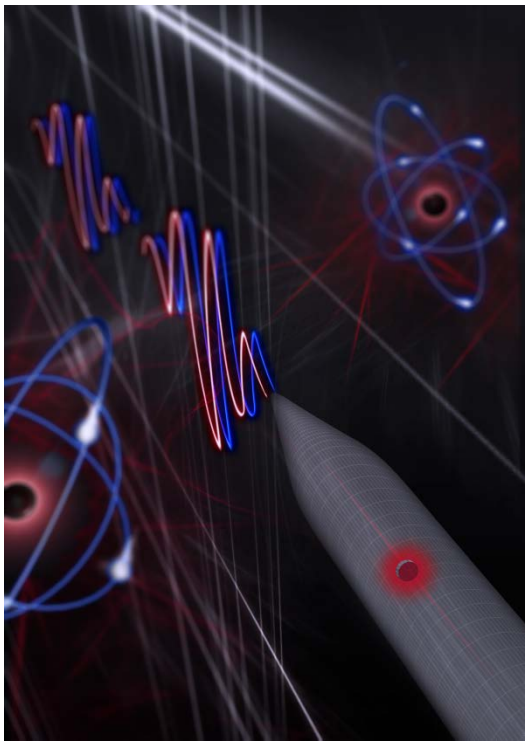


B.Sc. (including Fagprojekter) **or M.Sc. project**

the level of the project can be adapted to the study program



qLab towards the Quantum Internet

This combination of projects aim at making the first semiconductor-based Quantum Network prototype. We are looking for motivated students! Both experimental and theory projects are waiting ahead!

Modern communication networks, such as the Internet, are not 100% secure against eavesdropping nor are energy efficient.

Our **Vision** is to develop a solid ground from which to design a novel network based on quantum technologies. This **Quantum Network** will allow **secure** and **energy-efficient communication** and will make possible for quantum computers to communicate in their own quantum language. This will be done by implementing Quantum Cryptography through the use of Quantum Key Distribution protocols, proved to be 100% secure, and by reducing the number of photons required per bit of information transferred to an absolute minimum. Semiconductor structures like quantum dots in nanowires are one of the most promising technologies to achieve this, since they have the potential to be very flexible and reliable single photon sources. We already have single photon sources of this kind showing extremely promising results. We will now proceed in optimizing them, in making the first semiconductor-based prototype of a Quantum Network, and in demonstrating the implementation of QKD on such network. Once ready with the experimental setup, we will offer a number of projects for the students to join us in our journey.

Stay tuned!

Goals of the project:

The goals of the specific projects will be defined depending on the current status of research and modified according to the specific interests of the student.

Skills/knowledge acquired through the project:

Single photon sources, theory and experimental implementation and characterization; applications in Quantum Communication. More skills/knowledge will depend on the specifics of the project.

Background requirements:

Knowledge of quantum mechanics (e.g. from 10112 Advanced Quantum Mechanics).

Supervisor:

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