

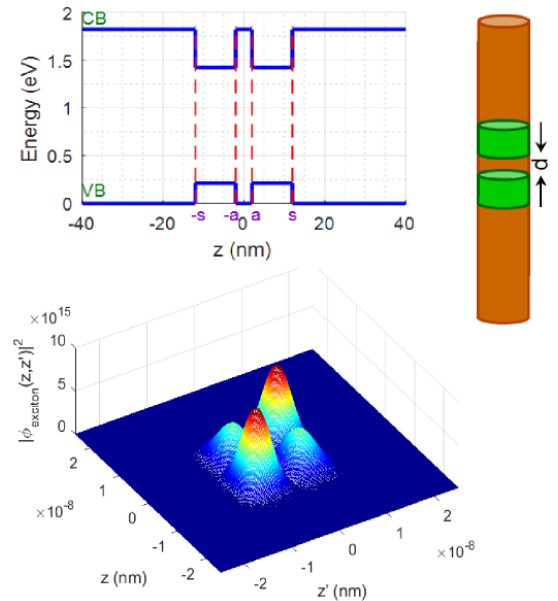
B.Sc. (including Fagprojekter) or M.Sc. project

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

Quantum information technology with quantum dots in nanowire

The aim of this project is to design and simulate the behavior of novel structures based on quantum dots inside nanowires in order to propose new device designs for quantum information technology

Nanowire quantum dots are one of the new big players in quantum technologies and many game-changer devices, like quantum gates or quantum memories, still need to be designed! We have the tools to design, to fabricate and to test novel structures in order to make such devices, but first we need to simulate them using our recently developed post-Hartree-Fock-based model to understand which semiconductor structure could be the next-step device in quantum information technology.



Goals of the project (which may be modified according to the interests of the student):

- Develop an understanding of the requirements for new quantum information devices
- Use the existing simulation tool to investigate new structures like stacked quantum dots and different materials
- Iterate a process of proposing and testing of different designs from the student to the rest of the team for growing and characterizing proposed structures

Skills/knowledge acquired through the project:

Post-Hartree-Fock modeling of semiconductor structures, band-gap energy calculations, exciton in semiconductor quantum dots, excitonic wavefunction.

Background requirements:

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

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