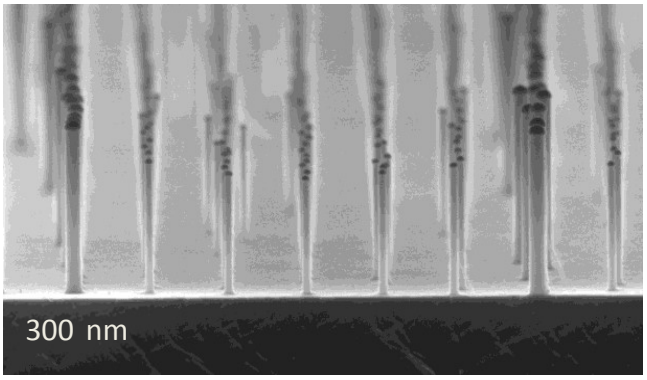
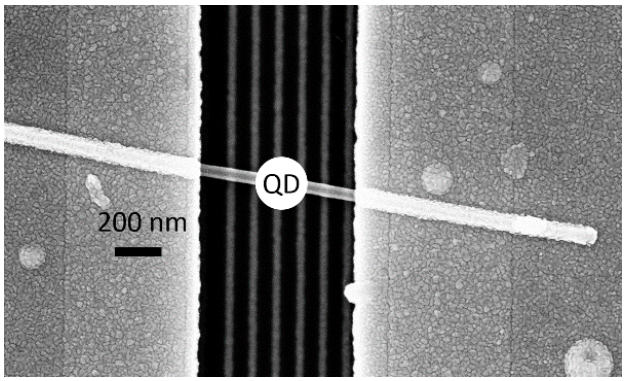
# BSc/MSc project

NanoElectronics Group

**Title:** **Spin qubits in GeSi nanowire quantum dots**

**Supervisor:** *Matthias Brauns (post-doc), Joost Ridderbos (PhD student)*




**Goal and motivation**

Quantum bits (qubits) are the building blocks for future quantum computers. One possibility to form such qubits is controlling the spin states of individual electrons or dopants in quantum dot structures.

Semiconductor nanowires with their intrinsically strong confinement in two dimensions are ideal systems to realize single-electron as well as single-dopant spin quantum bits.

We use a highly tunable device design to explore the fundamental physics governing the performance of our structures as qubits, e.g. spin-orbit coupling strength, g-factor, and spin decoherence mechanisms.

**The assignment**

Your tasks may include all the essential steps for device fabrication and measurement:

- Device fabrication at the nanoscale using our high-end cleanroom equipment in the NanoLab
- Nanowire deposition using a dedicated nanomanipulation setup
- Characterization of the as-produced devices (using e.g. high-resolution scanning electron microscopy, atomic force microscopy, electronic transport equipment)
- Measurement of the nanowire devices at cryogenic conditions (below 50 mK) in our cutting-edge dilution refrigerator using our specially built electronic equipment

The focus of these tasks for your BSc project can be adjusted according to your affinities and skills.

**Profile**

You should have a background in advanced technology, (applied) physics or electrical engineering or a related field. If you like to be part of a young, international team and you are motivated to learn and discover new interesting physics, then you are a perfect candidate for us.

**Graduating in NE**

As a student in NE you are a full group member and expected to give an active contribution to ongoing research. You will be involved in specific aspects of the research (device fabrication, measurements and analysis). Besides you are also encouraged to participate in the regular social activities.

**Contact**

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