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Multi-scale Modelling of Quantum Devices and Experiments with Spins

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Semiconductor quantum devices that allow to confine and manipulate single spins as well as control the interactions between them, are a natural system to explore fundamental quantum phenomena or host qubits in tomorrow's quantum computers. Understanding and designing experiments on such chips, requires modelling both at the device and the microscopic scale. Here, I will give an overview of simulations that I have performed on different spin systems from optically active quantum dots in gallium arsenide, to donor atoms in silicon, and germanium super-semi hybrid devices.

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