NANOACADEMIC TECHNOLOGIES

Coherent Modeling

Nanoacademic provides first principles computer-aided design tools for materials science and device simulations in the quantum-technology era including some advanced DFT-based solvers.

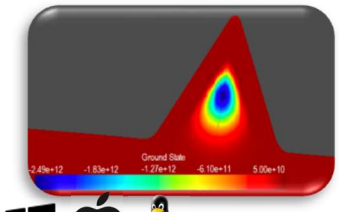
This new product will enable quantum computer designers to model and simulate spin qubits in different semiconductors to ensure their devices perform optimally.

Currently under beta testing
Expected release on Q2 2022

QTCAD

A quantum technology simulation tool for qubit design

QTCAD (**Q**uantum-**T**echnology **C**omputer-**A**ided **D**esign) is a finite-element (FEM) simulator used to predict the performance of solid-state spin-qubit devices before their production which is a huge cost-saver enabling to explore many design scenarios. QTCAD calculates the envelope functions and energy levels of electrons or holes confined in nanostructures within k.p theory by using non-linear Poisson, Schrödinger, and many-body solvers.



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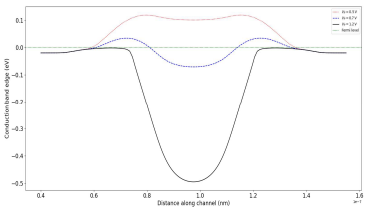

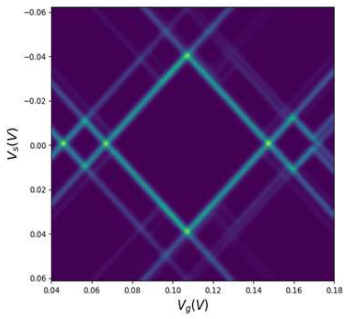

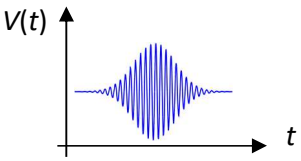

Key features at time of release will include:

- An interface with our large scale DFT software **RESCU** for calculating material parameters that enter the k.p theory.
- An electrostatics tool that solves the confining potential of quantum dots in semiconductor nanostructures under split gates.
- A valley-splitting calculation tool.
- An exact diagonalization tool for rigorous treatment of few-electron systems
- A master equation solver for quantum transport calculations in the sequential tunneling regime enabling treatment of Coulomb blockade and predicting charge stability diagrams.
- Our electric-dipole spin resonance module interfaces with QuTiP for time-dependent simulations of quantum control.
- Works at cryogenic (sub-K) temperatures in many practical designs of solid-state spin qubits, which is a notoriously difficult problem to solve with available TCAD software.
- Arbitrary 2D and 3D device geometries are defined using FEM mesh-generation such as GMSH. Simulations are launched using our user-friendly Python API.

Additional features are already under development, please stay tuned to our articles, newsletters and posts on our LinkedIn page to avoid missing anything about Nanoacademic's latest news!

Contact us to become a beta-tester and discover how QTCAD can accelerate your projects!

DESIGN TOOLS FOR NEXT GEN MATERIALS

+1 514-387-4003

nanoacademic.com

info@nanoacademic.com

666 Sherbrooke Street West, Suite 802
Montréal, Québec H3A 1E7 Canada