# NANOACADEMIC
## TECHNOLOGIES
### Coherent Modeling

**Nanoacademic** develops 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.*
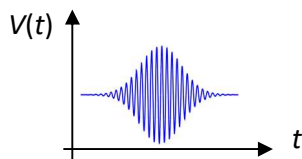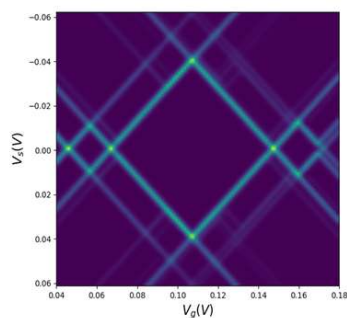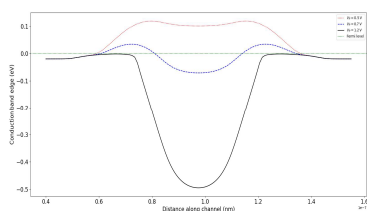
# ⫴QTCAD ⟩

## 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.



compatible
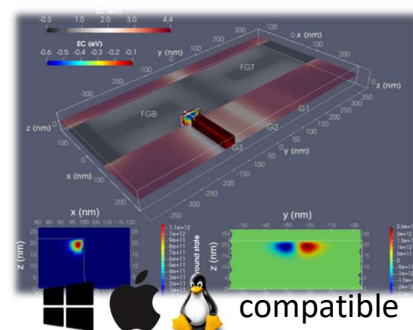
### Key features are:

- 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.
- 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 1D, 2D and 3D device geometries are defined via Gmsh using our adaptive meshing technique to avoid time-consuming manual mesh refinements. Simulations are launched using our user-friendly Python API.

Additional features are in the works, please stay tuned to our articles, newsletters and posts on our **Linked** in page to hear 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**

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