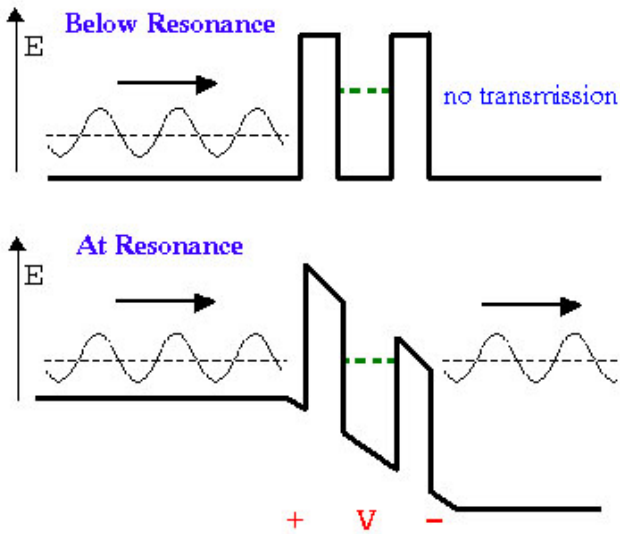


Resonant Tunneling Diode Learning Materials



By completing the [Resonant Tunneling Diode Simulation with NEGF](#), users will be able to: a) understand the principle of operation of resonant tunneling diode, b) the meaning of the quasibound states, resonant and non-resonant tunneling and c) the concept of quantum interference which is the basis for the formation of quasi-bound states and the operation of a Resonant Tunneling Diode.

The specific objectives of the Resonant Tunneling Diode Module are:

Physical Model	Mathematical Model	Computational Model
<p>a) Introduce the concept of:</p> <ul style="list-style-type: none"> - Quantum interference - Quasi-bound states - Resonant Tunneling 	<p>b) Apply Mathematical techniques for calculating:</p> <ul style="list-style-type: none"> - Transmission Coefficient - Current density 	
<p>c) Validate Resonant Tunneling Diode Lab by running the examples provided</p>		

Recommended Reading

Users who are new to the principles of operation of a resonant tunneling diode should consult the following resource:

Hiroshi Mizuta and Tomonori Tanoue, *The Physics and Applications of Resonant Tunneling Diodes* (Cambridge Studies in Semiconductor Physics and Microelectronic Engineering).

Theoretical descriptions

- * [Resonant Tunneling Diode operation](#)
- * [RTD with NEGF Demonstration: Basic RTD Asymmetric](#)
- * [NEMO 1-D: The First NEGF-based TCAD Tool and Network for Computational Nanotechnology](#)
- * [Application of the Keldysh Formalism to Quantum Device Modeling and Analysis](#)

Exercises and Homework Assignments

1. [Exercise: Resonant Tunneling Diode](#)

Solutions to Exercises

Solutions are provided only to instructors!

Evaluation

This test will assess the users conceptual understanding of the physical, mathematical and computational knowledge related to operation of Resonant Tunneling Diodes.

[RTD Topic Page: Test for Resonant Tunneling Diode](#)

Challenge

Users are challenged to integrate what they have learned about operation of Resonant Tunneling Diodes.

[Resonant Tunneling Diodes: an Exercise](#)