



Russell Berrie Nanotechnology Institute
Technion - Israel Institute of Technology



Prof. Christiane Koch

Theoretical physics, Quantum Dynamics
and Control
Kassel University

▶ "Quantum control for quantum
technologies: Tools, achievements,
limitations."

**Wednesday,
21 March, 2018**

12:00 refreshments
12:30 lecture

Wang Auditorium
The Dalia Maydan Building
Faculty of Materials Science and Engineering

RBNI
**Monthly
Seminar
Series**
2018



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Quantum control is an important prerequisite for quantum devices. A major obstacle is the fact that a quantum system can never completely be isolated from its environment, and the interaction with the environment causes decoherence. Optimal control theory is a tool that can be used to identify control strategies in the presence of decoherence. I will show how to adapt optimal control theory to quantum information tasks for open quantum systems and present examples for superconducting qubits.

The perspective on decoherence only as the adversary of quantum control is nevertheless too narrow. There exist a number of control tasks, such as cooling and measurement that can only be achieved by an interplay of control and dissipation. I will show how to utilize optimal control theory to derive efficient cooling strategies when the timescales of coherent dynamics and dissipation are very different. Our approach can be generalized to quantum reservoir engineering, opening up new avenues for control.