

# Summer School on Quantum Information Processing - Gate-based and Annealing Systems

Contribution ID: 12

Type: **not specified**

## Introduction to quantum annealing

*Monday, 28 August 2023 12:30 (1h 30m)*

This talk is a general introduction to quantum annealing. It covers

- how does a quantum annealer work in theory and what can it be used for
  - what are the theoretical and practical limitations
  - how to solve problems on quantum annealers, in particular D-Wave quantum annealers as the one hosted by JSC:
  - the basic information about the architecture of D-Wave quantum annealers
  - how to formulate an optimization problem as a QUBO or Ising problem
  - different encoding strategies
  - how to incorporate constraints
  - how to embed a (logical) problem onto the given hardware graph (considering physical connectivity)
  - how to send a problem to the quantum annealer using D-Wave's Ocean SDK and how to interpret the response
- Finally, some small examples are presented and the talk ends with a short hands-on exercise.

### Motivation letter

**Presenter:** Dr WILLSCH, Madita