

Quantum Computing

PhD Course - 2018

AA 2017-2018

Starting date:
October 22, 2018

Duration:
20 hours

Place: Room L, 1st floor, Dipartimento di Informatica, Verona

Schedule

Monday,
9:30 - 12:30
15:30 - 17:30

Tuesday,
14:30 - 17:30

Wednesday,
14:30 - 17:30

Thursday,
14:30 - 17:30

Friday,
9:30 - 12:30

Monday,
14:30 - 17:30

In this course we provide an introduction to the interdisciplinary field of Quantum Computing. The course is structured in two parts:

Part I

The first part introduces the essential notion of **qubit** and the theory of computation and computability based on it.

Starting with the explanation of the basics of quantum mechanics (including finite dimensional Hilbert spaces and their tensor products), we concentrate here on detailed discussions of some key algorithms and protocols such as **Grover's** search algorithm, **Shor's** factorisation algorithm and quantum **teleportation**.

Part II

This part aims to give an overview of important topics in quantum computation and information such as **Quantum Machine Learning**, **Quantum Key Distribution and Communication**, **Quantum Languages** and more.

The course also provides demonstration sessions, where typical quantum behaviour at the base of quantum interference and quantum cryptography will be illustrated via experiments in lab.

A series of lectures on **Quantum Cryptography** and associated experimental experience in lab will take place sometimes in February 2019.