FDITE220 Quantum information theory

Description:

The course provides an overview of quantum information theory

Topics:

The concept of information in its classical interpretation, Shannon entropy, and mutual information.

Foundations of complexity theory.

Basic notions of information in the quantum sense, including quantum states, qubits, tensor products, pure and mixed states.

Entanglement, Bell and CHSH inequalities.

Simple applications such as the BB84 protocol and quantum teleportation.

Basics of quantum cryptography. Criteria for a universal quantum computer.

More advanced applications including the Fourier transform and Shor's algorithm.

Physical implementations.

Literature:

Michael A. Nielsen and Isaac L. Chuang: *Quantum Computation and Quantum Information*, 10th Anniversary Edition, Cambridge University Press, 2010. ISBN: 978-1-107-00217-3