Module: Elective Advanced Lectures: Theoretical Physics

Module No.: physics70c

Course: universität**bonn** Introduction to Quantum Computing (T)

Course No.: physics7514

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	2+2	5	ST

Requirements for Participation:

Preparation:
Theoretical courses at the Bachelor degree level

Form of Testing and Examination:
Written / oral examination

Length of Course:
1 semester

Aims of the Course:
Understanding the theory and applications of quantum computing.

Contents of the Course:
- Quantum versus classical computing
- Quantum circuits and algorithms
- Quantum error correction and mitigation
- Applications in physics and chemistry

Recommended Literature:
M. A. Nielsen and I. L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press.
A. Yu. Kitaev, A. H. Shen, and M. N. Vyalyi, Classical and Quantum Computation, American Mathematical Society.
J. Watrous, The Theory of Quantum Information, Cambridge University Press.

within the Transdisciplinary Research Area "Building Blocks of Matter and Fundamental Interactions"