# 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"