



Announcement

Quantum Sensing and Metrology

Physik im Alltag: Quantensensorik und Metrologie

Prof. Dr. Fedor Jelezko, Prof. Dr. Peter Reineker

Description

In this advanced seminar a bridge is built between quantum science and quantum technology as applied in quantum metrology. Some of the topics will be based on classical physics while other topics need quantum physics. For Physics Master students, the talk should be on an advanced level and be presented in English. Lerhamt students can give a more basic talk and it can be in German or English.

Content

- Concept of new measuring units
- Standard of length
- Standard of mass
- Atomic clocks
- Decoherence and precision limits in sensing and metrology
- Entanglement based sensing
- Quantum magnetometer
- Quantum ampere
- Single photon sources
- Quantum microscopy
- Nuclear magnetic resonance
- Electron magnetic resonance
- Magnetic resonance imaging

Prerequisites

Mechanics, Theoretical Mechanics, basics of Atomic Physics. For the advanced talks: fundamentals of quantum mechanics.

Additional information

The module is suitable for Bachelor and Master students, and it can be taken as a Seminar or Advanced Seminar.

Exam form:

Seminar - 3 ECTS: oral presentation and discussion

Advanced Seminar - 4 ECTS: oral presentation, discussion and separate written report

Lecturer

Prof. Dr. Fedor Jelezko, Prof. Dr. Peter Reineker, Ulm University