

Announcement

Medical Imaging and Applications

Prof. Volker Rasche, Tobias Speidel, Patrick Metzke

Description

A large number of medical diagnoses are nowadays based on the evaluation of images of the body's internal structures. Over the years, many imaging modalities have been established which include ultrasound imaging, computed tomography (X-ray) imaging, magnetic resonance imaging or even specific methods such as PET or SPECT. Each method is thereby suited for certain applications and is based on various physical principles.

In this advanced seminar we will investigate the most commonly used imaging methods on their physical basis and discuss resulting advantages and disadvantages which lead to specific applications and future prospects for each modality.

Content

- Computed tomography: Physical principle and contrast generation
- Principles of nuclear magnetic resonance
- NMR spectroscopy
- Basics of MR imaging
- Fourier space: Encoding, acquisition and reconstruction
- Applications: FMRI, cardiac MRI, hyperpolarization
- Ultrasound
- Nuclear functional imaging: PET and SPECT

Prerequisites

Undergraduate physics and mathematics, some experience in programming would be helpful

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. Volker Rasche, Experimental Cardiovascular Imaging (ExCaVI), Universitätsklinikum Ulm

