



Hauptseminar Plasma Physics: Diagnostics for plasma physics and application to nuclear fusion research

Start: 25.04.2018

Description

Nuclear fusion is one of the promising options for generating large amounts of carbon-free energy in the future. Fusion is the process that heats the Sun and all other stars, where atomic nuclei collide together and release energy. Fusion scientists and engineers are developing the technology to use this process in tomorrow's power stations. This seminar covers several key physics topics of nuclear fusion research, each one accompanied by an applied part on how the respective topic can be investigated (diagnostics, analysis methods, etc.).

Learning Outcomes

Basic understanding of key physics topics of today's nuclear fusion science. Understanding on how to diagnose important quantities of a fusion plasma along with their interpretation, also in regard of ITER and beyond.

Content

Each seminar will consist of a pair of two related presentations (not compulsory). One of them introduces the key physics topic or quantity, while the other covers a more applied view on how to diagnose, analyze and interpret the topic under consideration. In the first meeting, the topics will be presented and assigned and the criteria for evaluation will be explained.

Topics:

- Plasma current profile in tokamaks / Motional Stark Effect
- Turbulence in fusion plasmas / Reflectometry
- The edge pedestal of fusion plasmas / Thomson Scattering & ECE
- Radiation in fusion plasmas / Bolometry
- Power exhaust (ex. ITER) / Infrared Thermography
- Impurities, Helium transport / Charge Exchange Recombination Spectroscopy

Prerequisites

Experimental physics and electrodynamics advantageous, Plasma I not necessary but beneficial.

Literature

Will be discussed on first meeting and provided to the seminar presenters.

Additional Information

Maximum number of participants: 14. The seminar is suited to be combined with the course on 'Plasma Physics: Applications' held by T. Eich.

Lecturer

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