PHYS-632

Fusion and industrial plasma technologies

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Cursus	Sem.	Type
Advanced Manufacturing		Opt.
Physics		Opt.

Language of teaching	English
Credits	4
Session	
Exam	Oral
Workload	120h
Hours	**56**
Courses	28
Exercises	28
Number of positions	

Frequency

Every 2 years

Remark

Next time: Spring 2027

Summary

The course provides an overview of the technologies that are essential for fusion developments and for industrial plasma applications, highlighting the synergies between the two fields. The aim is to provide a combined theoretical and experimental background to the various topics.

Content

The various topics also include vacuum technologies, cryogenics, high current and voltage systems, materials for fusion, superconducting magnets, control and data acquisition, electrical arcs, mm-wave systems, plasma fuelling and the tritium cycle in fusion reactors.
The course will consist of three parts:
1. Common aspects of fusion and industrial plasma technologies
   - Vacuum technologies; Cryogenics; Electrical arcs; High current and voltage systems (3 lectures)

2. Specific fusion aspects
   - Control and data acquisition (1 lectures)
   - mm-wave sytems (2 lectures)
   - Plasma fuelling and tritium cycle (1 lecture)
   - Materials for fusion (1 lecture)
   - Superconducting magnets for fusion (3 lectures)

3. Specific industrial plasma applications techniques (2 lectures)

Learning Prerequisites

Required courses

The introductory plasma physics and fusion courses are a pre-requisite.