PHYS-734

Control and Operation of Tokamaks

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Cursus	Sem.	Type
Physics		Obl.

Language of teaching	English
Credits	2
Session	
Exam	Oral presentation
Workload	60h
Hours	**40**
Courses	16
Exercises	16
TP	8
Number of positions	

Frequency

Every 2 years

Remark

Next time: Spring 2020 (Block course)

Summary

Obtain an understanding of the principal requirements for the control of high power tokamak pulses and to understand how these can be met by applying the basic principles of control theory.

Content

1. Overview of control requirements in a tokamak - current ITER design of plasma control
2. Basic principles of control theory - model types, identification, controllers, LTI, non-LTI
3. Design of controllers for plasma equilibrium control of ITER
4. Advanced issues related to ITER plasma shape control - constraints, optimisation
5. Design of controllers for kinetic control of 0-D quantities - energy and density, quantised actuators
6. Advanced issues related to kinetic control of 0-D quantities
7. Formulation of the control of continuous radial plasma profiles
8. Advanced issues related to profile control - actuator conflict
9. Stabilisation of MHD activity and current research work
10. Issues related to the control of the plasma-wall interactions - divertor, wall contact
11. Overview of the state of the art in the field and future tendencies in ITER

Resources

Websites

- http://crpp.epfl.ch