MSE-672

LNM Workshop 2023

Cozzo Cédric, Dai Yong, Makowska Malgorzata Grazyna, Pouchon Manuel A.

Cursus	Sem.	Type
Materials Science and Engineering		Opt.

Language of teaching	English
Credits	1
Session	
Exam	Oral presentation
Workload	30h
Hours	**32**
Courses	9
Exercises	3
TP	4
Project	16
Number of positions	**5**

Frequency

Every 3 years

Summary

Seminar for PhD/master-students and postdocs on experimental nuclear materials research and simulation for present and future nuclear systems, with some emphasis on advanced manufacturing and analytics. In a group project the students will work on and present scientific and framing aspects.

Content

Seminar on Nuclear Materials over 2.5 days, off campus in Kaltbad.

The Objective is to offer a pedagogic seminar for PhD- and master-students, plus for postdocs to get a complete and in-depth insight into the nuclear materials research at PSI and beyond.

The Seminar consists of presentations by senior scientists and by PhD students in the field of materials for classical nuclear reactors, and for the future nuclear systems like spallation sources, advanced fission and fusion reactors. Besides the nuclear aspects of materials research, an emphasis will also be given to advanced production techniques coupled with operando observations of the production process.

The presentations of the senior scientists will correspond to 9 hours of lecture, and 3 hours of exercise. Discussions are conducted throughout the program, and some dedicated slots are also reserved.
For the PhD and master students 2 full days of project work are being performed before the seminar, and are reported at the last day of the seminar. The aspect of the group project are an attractive presentation of the scientific work, and to find a leitmotiv. Novel presentation techniques are clearly supported.

The presentations of the PhD students will correspond to 4 hours of Practical Work.
A PhD student can get 1 credit if he/she attends the workshop, works on a group project, gives a presentation on his work-scope and on the seminar project.

The material being covered are Nuclear materials for fission, fusion and spallation sources:
ferritic steels, austentic steels, ODS materials, zircalloy, nuclear fuel, fuel cladding, pure metals, ceramics, composites

â€¢ Radiation effects: basic mechanisms, irradiation induced microstructural changes, mechanical properties and changes
â€¢ Experimental investigation methods: X-rays, Neutrons, TEM, mechanical properties, operando techniques
â€¢ Numerical simulation and modelling methods: multi-scale modeling, connection to the system behaviour

Important aspects of the Seminar are also the promotion of lab-internal collaborations, and of social interaction.

For the program see the webpage stated under "Resources".

Note

Manuel Pouchon manages this seminar and is also directly involved in the PostDoc lecture preparation.
All lecturers are part of the ETH domain, but non being directly paid by EPFL

Keywords

Nuclear materials, radiation effects, synchrotron analytics, neutron analytics, TEM, mechanical properties, operando observations, advanced manufacturing

Learning Prerequisites

Required courses

Advanced knowledge on materials research. This is already given by the defined participant group.

Assessment methods

Oral presentation

Resources

Bibliography

https://nucmaster.web.psi.ch/LNMWorkshop/

Moodle Link

- https://go.epfl.ch/MSE-672