MSE-715

Fundamentals of STEM Imaging and Spectroscopy

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Cursus	Sem.	Type
Materials Science and Engineering		Opt.

Language of teaching	English
Credits	2
Session	
Exam	Oral
Workload	60h
Hours	**36**
Lecture	18
Practical work	18
Number of positions	**30**

Frequency

Every 2 years

Summary

Lectures as well as hands-on trainings concerning different STEM imaging and spectroscopy techniques. Fundamentals of STEM, basic and advanced STEM imaging (ABF, ADF, iDPC, and 4D STEM), aberration-corrected STEM imaging and simulation, acquisition and analysis of EELS and EDX data.

Content

CIME Summer Workshop is an intensive 5-day workshop that includes lectures as well as hands-on trainings concerning different STEM imaging and spectroscopy techniques.
The workshop will cover fundamentals of STEM, basic and advanced STEM imaging (ABF, ADF, iDPC, and 4D STEM), aberration-corrected STEM imaging and simulations, as well as acquisition and analysis of electron energy loss spectroscopy (EELS) and energy dispersive x-ray analysis (EDX) data.
The event will finish with a full-day HyperSpy workshop.
The students will be provided with the several opportunities for hands-on training on the transmission electron microscopes, including a Thermofisher Scientific aberration-corrected Titan Themis.
Several external lecturers, worldwide-known in the field of electron microscopy, are invited to give lectures.
All practical sessions will be guided by electron microscopy experts of EPFL.
The students will also have the chance to consult the experts about their materials and research questions.

Keywords

STEM theory and instrumentation, STEM imaging modes, Aberration-corrected STEM, Quantitative STEM, STEM image simulation, EELS: basic principles, data acquisition and processing, EDX: basic principles, data acquisition and processing, HyperSpy, independent component analysis.

Learning Prerequisites

Required courses

MSE-637 or equivalent

Assessment methods

Oral exam

Resources

Websites

- http://cime.epfl.ch