Venue

Accommodation

Youth hostel Lauenburg „Zündholzfabrik“
(https://www.jugendherberge.de/en/youth-hostels/lauenburg-zuendholzfabrik-692/portrait/)
and in Lund University Guest House
(https://www.luaccommodation.lu.se/university-guest-house)

The practical experiments will be performed at PETRA III at DESY in Hamburg and at MAX IV in Lund, Sweden.

Application

Please complete and submit the form on the website (https://ms.hereon.de/cms10/ms/summerschool/057773/index.php.en)
and also send

1. your CV (pdf document, maximum one page, including the status of your education, if applicable the topic of your thesis) and

2. your letter of motivation (signed by your supervisor, showing their support for your attendance at the school, also stating their contact address to:
matrac1@hereon.de

Application deadline: beginning 31 January 2023
Decision about participation: beginning of February 2023
Payment deadline: 24 February 2023

The payment details (participation fee: €120) will be provided to all selected participants after acceptance of application.

Organisers

Organising Committee

Jens Birch (Linköping University, Sweden), Thorsten M. Gesing (Universität Bremen, Germany), Maths Karlsson (Chalmers University of Technology, Sweden), Martin Müller (Hereon/CAU Kiel, Germany)

Local Organisers

Nicola Kampner, Klaus Pranzas, Christina Krywka, Peter Staron, Martin Müller (all Hereon, Germany)

The School is supported by

Röntgen Ångström Cluster — the Röntgen Angström Cluster which is a collaboration between Germany and Sweden

Bundesministerium für Bildung und Forschung — the BMBF

via the Röntgen Angström Cluster

Contact:
Nicola Kampner (Ms)
Institute of Materials Physics
Phone: +49 4152 87-2555
Fax: +49 4152 87-2666
nicola.kampner@hereon.de

Cutting-edge Research for a Changing World

Helmholtz-Zentrum hereon
Helmholtz-Zentrum Hereon
Max-Planck-Straße 1
21502 Geesthacht
www.hereon.de

MATRAC 1 - School 2023

Application of Neutrons and Synchrotron Radiation in Engineering Materials Science

picture: © c. Schmid

Helmholtz-Zentrum hereon

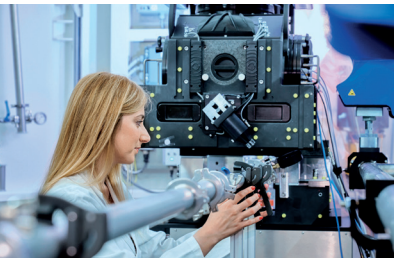
Scope of School

Scientific Background

Neutron and photon sources offer unique possibilities by complementary use of the radiations for structural analyses of advanced engineering materials. By using neutrons and photons information about materials microstructures can be obtained non-destructively in the near-surface region as well as in the bulk of samples and components. Compared to conventional laboratory X-rays the spatial resolution achievable using synchrotron radiation can be improved by up to several orders of magnitude.

Diffraction methods reveal information about crystalline phase volume fractions, texture and residual stresses, while tomography provides complementary 3-dimensional images of the material's microstructure. Both diffraction and tomography have increasing impact in the fields of design of tailored materials, their processing and lifetime assessment. The current situation regarding the exploitation of photons and neutrons for engineering materials science is characterized by rapid developments: flux increase of photon and neutron sources, refurbishment of existing as well as design and construction of new beamlines and instruments with optimised beam optics and position sensitive detectors as well as increasing quality and quantity of data.

These new possibilities for microstructure analyses for advanced materials and multi-material systems meet with increasing demands from the materials engineering point of view. In materials engineering, the establishment and refinement of relationships between microstructure parameters and macroscopic properties requires information on different length and time scales, both covering several orders of magnitude.



Our school "Application of Neutrons and Synchrotron Radiation in Engineering Materials Science" is designed to provide a systematic overview in this field to students from all over Europe. The programme will touch all methods mentioned above.

This school is the continuation of eight very successful summer respectively autumn schools with the same title which took place in 2005, 2007, 2009, 2011, 2013, 2015, 2018 and 2019.

Organisational Details

After an introduction lecture and get-together on Sunday evening, the school starts on Monday with one day of lectures with a first poster session in the evening. The manuscripts of all lectures will be provided in digital form.

The following day will be spent at PETRA III at DESY in Hamburg with practical training at the GEMS/DESY instruments and guided tours of PETRA III and XFEL. Afterwards all participants will be transferred by bus and ferry (dinner and cabin on the ship) to Malmö and then to Lund.

On Wednesday the school will be devoted to further lectures as well as a second poster session in Lund. Thursday will be spent at MAX IV in Lund with practical training at the beamlines and guided tours to MAX IV and ESS. On Friday there will be further talks, the presentation of the results of the experiments at PETRA III and MAX IV by the students as well as summing-up and final discussions. Afterwards there will be a bus transfer to Hamburg. There is the possibility to take an exam to get ECTS credit points.

The MATRAC 1 School is significantly funded by German and Swedish authorities. The participation fee is therefore only €120 (including all school expenses, accommodation, meals, bus, ferry, etc.).

Tentative Programme

Sunday, 12.03.

- Introduction lecture and get-together at „Zündholzfabrik"

Monday, 13.03.

- Lectures (Fundamentals, Scattering Theory, Correlation Function, Determination of Structures, Defects and Residual Stresses in Materials using Diffraction and Imaging Techniques, etc.)
- Poster session

Tuesday, 14.03.

- Practical experiments at PETRA III
- Guided tours of PETRA III and XFEL
- Transfer to Lund (Bus/Ferry)

Wednesday, 15.03.

- Lectures (SAXS, Reflectivity, Imaging combined with Scattering Techniques, X-ray and Photo Electron Spectroscopy, Coherent Imaging, etc.)

Thursday, 16.03.

- Practical experiments at MAX IV
- Guided tours of MAX IV and ESS

Friday, 17.03.

- Lectures
- Presentation of results of experiments at PETRA III and MAX IV
- Final discussions
- Bus transfer to Hamburg