

Application

<https://ms.hereon.de/summerschool/078564/index.php.en>

In addition to the application form provided on the internet, please send your CV (pdf document, maximum one page, including the status of your education, if applicable the topic of your thesis) as well as your letter of motivation, supported and signed by your supervisor also stating his/her contact address, to matrac2@hereon.de

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 (Hereon, Germany)
Klaus Pranzas (Hereon, Germany)
Sebastian Busch (Hereon, Germany)
Martin Müller (Hereon, Germany)

The School is supported by



the Röntgen Angström Cluster - a collaboration between Germany and Sweden



the BMBF



Vetenskapsrådet

the Swedish Research Council

Venue and Arrival

The three-day theoretical course will be given at the conference centre „Haus der bayerischen Landwirtschaft“ in Herrsching/Ammersee which is located in the Southwest of Munich, about 40 km from Munich City centre. Herrsching is connected to Munich public transport and can be reached by suburban train. For the practical training at FRM II, a bus transfer will be organised to shuttle the students from Herrsching to Garching.

Accommodation for all participants has already been booked at:

Haus der bayerischen Landwirtschaft Herrsching,
Rieder Str. 70, 82211 Herrsching/Ammersee, Germany
Phone: +49-8152-938-000
Email: Info@HdbL-Herrsching.de
<https://www.hdbL-herrsching.de/>

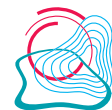
Please note

Final application deadline:	30.04.2024
Decision about participation:	early June 2024
Payment deadline:	mid July 2024

Contact:

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Institute of Materials Physics
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nicola.kampner@hereon.de

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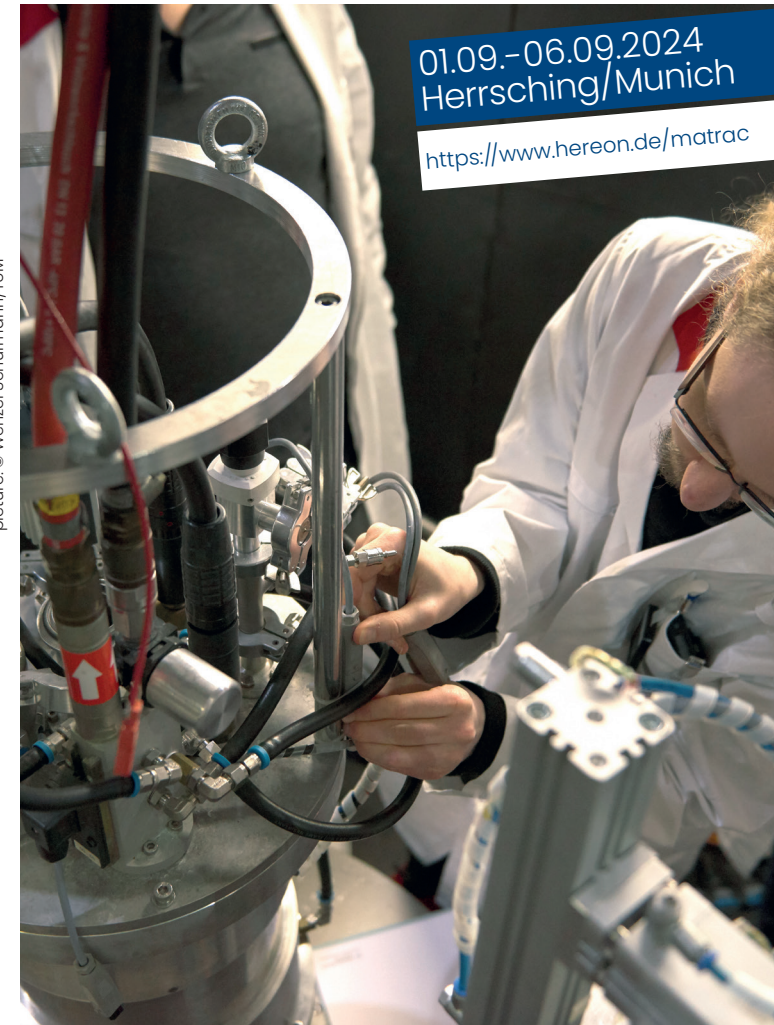


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Max-Planck-Straße 1
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MATRAC 2 – School 2024

Application of Neutrons and Synchrotron Radiation in Materials Science with special focus on Fundamental Aspects of Materials



Scope of School

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 and neutrons provide complementary information due to their different interaction with matter.

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. Spectroscopy provides unique information about details of chemical bonding and helps to understand interatomic interactions. The current situation regarding the exploitation of photons and neutrons for engineering materials science is characterised 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.

The MATRAC 2 School "Application of Neutrons and Synchrotron Radiation in Materials Science with special focus on Fundamental Aspects of Materials" is designed to provide a systematic overview of this field to students from all over Europe. The programme will cover all methods mentioned above in a focussed theoretical course.

Organisational Details

The school starts with two days of lectures. The manuscripts of all lectures will be provided in digital form.

The following two days will be spent at FRM II in Garching (near Munich) with practical training at the instruments of the MLZ (Heinz Maier-Leibnitz Zentrum). The fifth day of the school will be devoted to further lectures as well as a summing-up and final discussions. The MATRAC 2 School is significantly funded by German and Swedish authorities for their respective students. Furthermore, financial support for students from other EU countries is granted. The participation fee amounts to 120 €.

Tentative Programme

Sunday, 01.09.2024

- Introductory Talk
- Get Together

Monday, 02.09.2024

- Properties of Neutrons and Photons, Introduction to Scattering Theory
- Scattering Theory, Correlation Functions
- Structure Determination
- Real Structure, Defects and Residual Stresses
- Experimental Techniques I: Diffraction
- Experimental Techniques II: SANS, Reflectivity
- Engineering Materials Science
- Experimental Techniques III: Strain Scanning
- Poster Session

Tuesday, 03.09.2024

- Lattice Dynamics/Photons
- Experimental Techniques IV: TAS, TOF
- Experimental Techniques V: Imaging and Tomography
- Large Scale Structures (Polymers, Porous Materials, Biomaterials)
- Experimental Techniques VI: Spin Echo Spectroscopy
- Students' Presentations
- Introduction and Preparation of Experiments at FRM II
- Poster Session

Wednesday, 04.09.2024

Experiments at FRM II

Thursday, 05.09.2024

Experiments at FRM II

Friday, 06.09.2024

- Data Treatment and Modelling
- Actual Topic of Materials Science
- Results of Experiments
- Final Discussion



MATRAC 2:

Application of Neutrons and Synchrotron Radiation in Materials Science with special focus on Fundamental Aspects of Materials
01.09.-06.09.2024 in Herrsching/Garching