NEPHEWS virtual training

Report of Contributions

https://indico.desy.de/e/47693

Contribution ID: **1** Type: **not specified**

Session 1: chair Bridget Murphy (ESUO Vice President)

Monday 3 February 2025 09:00 (1 minute)

Contribution ID: **2** Type: **not specified**

Introduction to NEPHEWS virtual training by Bridget Murphy (ESUO Vice President)

Monday 3 February 2025 09:01 (14 minutes)

Contribution ID: **3** Type: **not specified**

The synchrotron and FEL landscape in Europe by Cormac McGuinness (ESUO President)

Monday 3 February 2025 09:15 (30 minutes)

Contribution ID: **4** Type: **not specified**

The neutron landscape in Europe by Astrid Schneidewind (ENSA president)

Monday 3 February 2025 09:45 (30 minutes)

Contribution ID: **5** Type: **not specified**

Introduction to X-rays as a probe of matter, materials and processes by Luigi Paolasini (ESRF)

Monday 3 February 2025 10:30 (1h 30m)

Large accelerator machines designed for the production of intense X-ray beams are now a unique experimental resource and an exceptional opportunity for new generations pursuing scientific studies.

This seminar aims to provide a foundational theoretical and experimental overview of synchrotron light scattering, specifically for the study of condensed matter.

It will cover the description and operation of electron accelerators, with a particular focus on the physics behind the emission of synchrotron light by ultra-relativistic electrons.

The fundamental aspects of the interaction between X-ray radiation and matter will be explored, focusing on the processes of scattering and electron absorption. The dual nature of radiation, both wave-like and particle-like, will be emphasized, with discussions on classical and quantum frameworks as they pertain to various theoretical models used to interpret experiments.

Finally, the properties of synchrotron light will be linked to key experiments conducted at large-scale facilities, including elastic and inelastic scattering, absorption spectroscopy, and the optical properties of X-rays.

Contribution ID: **6** Type: **not specified**

Session 2: chair Mark Johnson (ILL)

Monday 3 February 2025 13:30 (1 minute)

Contribution ID: **7** Type: **not specified**

Introduction to neutrons as a probe of matter, materials and processes by Mark Johnson (ILL)

Monday 3 February 2025 13:31 (59 minutes)

Contribution ID: **8** Type: **not specified**

Neutron diffraction –introduction and examples by Navid Qureshi (ILL)

Monday 3 February 2025 14:30 (30 minutes)

Contribution ID: **9** Type: **not specified**

Small angle neutron scattering and neutron reflectometry by Andrew Jackson (ESS)

Monday 3 February 2025 15:00 (30 minutes)

Contribution ID: **10** Type: **not specified**

Neutron imaging –introduction and examples by Markus Strobl (PSI)

Monday 3 February 2025 15:45 (30 minutes)

Contribution ID: **11** Type: **not specified**

Neutrons as Probes for Soft Matter: Shinning the Beam on Cancer Cells and Burned Bones by Maria Paula Marques (Uni Coimbra - PT)

Monday 3 February 2025 16:15 (30 minutes)

The talk focuses on research studies concerning development of novel anticancer agents, with an emphasis on new drug targets and impact of heat on human bones.

Contribution ID: **12** Type: **not specified**

Nuclear and particle physics –introduction and examples by Bastian Märkisch (Tech. Uni. Munich - D)

Monday 3 February 2025 16:45 (30 minutes)

Contribution ID: **13** Type: **not specified**

Session 3: chair Marcin Sikora (SOLARIS)

Tuesday 4 February 2025 09:00 (1 minute)

Contribution ID: **14** Type: **not specified**

Synchrotron X-ray Absorption Spectroscopy – insights into experimental techniques and science examples by Alexey Maximenko (SOLARIS)

Tuesday 4 February 2025 09:01 (29 minutes)

Contribution ID: **15** Type: **not specified**

Synchrotron Photoemission spectroscopy –from core levels, to environments by Norbert Koch (Humboldt University)

Tuesday 4 February 2025 09:30 (30 minutes)

Contribution ID: **16** Type: **not specified**

Synchrotron X-ray Diffraction –an emphasis on powder diffraction by Andy Fitch (ESRF)

Tuesday 4 February 2025 10:00 (30 minutes)

Contribution ID: **17** Type: **not specified**

Synchrotron X-ray imaging and computed tomography by Paul Tafforeau (ESRF)

Tuesday 4 February 2025 10:30 (30 minutes)

Contribution ID: **18** Type: **not specified**

Introduction to Femtosecond X-ray Experiments at X-ray Free Electron Lasers by Christian Bressler (EuXFEL, Universität Hamburg)

Tuesday 4 February 2025 11:15 (1 hour)

We will introduce the concept of x-ray free electron lasers, and provide a few examples, where it resolves new information not obtainable with Synchrotron Radiation or femtosecond laser spectroscopy methods. The central part features a detailed walk-through an XFEL beamline to see, how these experiments are actually done. This walkthrough features an advanced pump-probe experiment with live data to study a reacting molecular system with femtosecond time precision.

Contribution ID: **19** Type: **not specified**

Infrared FELs, their applications and science examples by Stefan Winnerl (Helmholtz Zentrum Dresden Rossendorf)

Tuesday 4 February 2025 12:15 (30 minutes)

Contribution ID: **20** Type: **not specified**

Experiments at large scale facilities and FAIR and open data, practice and workflows in X-ray science by Hans-Georg Steinrück (Forschungszentrum Jülich GmbH)

Tuesday 4 February 2025 12:45 (30 minutes)

Contribution ID: **21** Type: **not specified**

Session 4: chair Piotr Piwowarczyk (SOLARIS)

Tuesday 4 February 2025 14:30 (1 minute)

Contribution ID: **22** Type: **not specified**

Accessing beamtime at large scale facilities for new and non-expert users through NEPHEWS via User-Twinning by Antje Vollmer (HZB) & Philip King (UKRI/ISIS),

Tuesday 4 February 2025 15:31 (29 minutes)

Contribution ID: **23** Type: **not specified**

Accessing beamtime at large scale facilities through NEPHEWS –access modes and proposal writing by Giovanna Cicognani (ILL) & Joanne Mc Carthy (ESRF) & Rainer Lechner (Montanuniversitaet Leoben)

Tuesday 4 February 2025 14:31 (1 hour)

Contribution ID: **24** Type: **not specified**

A case study in neutron science of user access at large scale facilities from non-facility countries by Paavo Penttilä (Uni Aalto –FI)

Tuesday 4 February 2025 16:00 (30 minutes)

How to access large-scale neutron facilities from non-facility countries - a case study from Finland

Finland has no own neutron source nor is it a member of any international neutron facility. Nevertheless, a demand for using neutrons exists and the local user community is utilizing different ways to access neutrons at large-scale facilities abroad. This presentation discusses accessing large-scale neutron facilities from non-facility and non-member countries through a case study concerning Finland.

Contribution ID: **25** Type: **not specified**

Using XRF mapping and micro-XAFS to explore the spatial distribution and stability of nanoparticles injected in tissues by Maria Katsikini (School of Physics, Aristotle University of Thessaloniki)

Tuesday 4 February 2025 16:00 (30 minutes)

A case study on the application of X-Ray Fluorescence (XRF) mapping and micro-X-ray Absorption Fine Structure (μ-XAFS) spectroscopy for investigating the spatial distribution and stability of Gd0.6Eu0.4VO4 nanoparticles injected into mouse ear pinnae will be presented. The measurements were carried out at the BESSY-II Storage Ring of the Helmholtz Zentrum für Materialien und Energie and were supported by the CALIPSOplus project (HORIZON 2020), the predecessor of NEPHEWS. The process, from the conceptualization of the experiment to the publication of the paper, will be briefly outlined. Additionally, issues related to sample preparation, measurement conditions and the information extracted through data evaluation will also be discussed.

Other scientists who contributed to this work:

* XAFS/XRF measurements: Eleni Proiou (MSc Thesis), Fani Pinakidou, Eleni C. Paloura (Aristotle University of Thessaloniki)

* Beamline Scientist: Götz Schuck (BESSY-II, Helmholtz Zentrum Berlin)

* Preparation of nanoparticles and injection into tissues: Nicolas Pétri, Thierry Gacoin, Corinne Laplace-Builhé, Antigoni Alexandrou (Laboratoire d'Optique et Biosciences & Laboratoire de Physique de la Matière Condensée, École Polytechnique; Photon Imaging and Flow Cytometry, CNRS, INSERM, Gustave Roussy Cancer Campus, France)