WORKSHOP

Joint Scientific Opportunities at ELETTRA Synchrotron

BOOK OF ABSTRACTS

5 FEBRUARY 2026
IZOLA, SLOVENIA

Joint Scientific Opportunities at ELETTRA Synchrotron
Workshop | 5 February 2026 | Izola, Slovenia
Book of Abstracts

Organised by
InnoRenew CoE, Andrej Marušič Institute, University of Primorska

Published by
University of Primorska Press
Titov trg 5, 6000 Koper, Slovenia
Koper | 2026

Electronic Edition
https://www.hippocampus.si/ISBN/978-961-293-558-0.pdf
https://doi.org/10.26493/978-961-293-558-0

Katáložni zapis o publikaciji (CIP) pripravili
v Narodni in univerzitetni knjižnici v Ljubljani
COBISS.SI-ID 266269955
ISBN 978-961-293-558-0 (PDF)

WORKSHOP

Joint Scientific Opportunities at ELETTRA Synchrotron

5 February 2026

InnoRenew CoE, Livade 6a, 6310 Izola; (Living Lab room, 2nd floor)

Agenda

8:30 - 9:00	**Welcome and Registration**
9:00 - 9:20	**Opening and Welcoming Remarks** *Andreja Kutnar, Department Chair, UP IAM* *Dean Korošak, vice-rector of the University of Maribor* *Frank Uhlig, Head of Institute of Inorganic Chemistry at TU Graz*
Research Opportunities at ELETTRA	
9:20 -10:00	**Keynote**: *Lisa Vaccari, SISSI Beamline, Elettra* Towards Elettra 2.0: new challenges and opportunities for Life Sciences
10:00 -10:25	*Min Li, EXAFS Beamline, Elettra* X-Ray absorption spectroscopy (XAS): principles and applications
10:25 -10:35	**Break**
10:35 -11:25	**Keynote**: *Elena Longo, SYRMEP Beamline, Elettra* SYRMEP beamline: imaging applications and future prospects
11:25 -11:55	*Ilaria Carlomagno, XRF Beamline, Elettra* Micro-fluorescence beamline: a long journey to a multi-purpose instrument
11:55 -12:05	**Break**
Research Opportunities at TU Graz	
12:05 -12:30	*Glen Smales, TU Graz* Small-Angle X-ray Scattering & the SOMAPP laboratory
Research at Slovenian partner facilities	
12:30 -12:50	*Andreja Kutnar, InnoRenew CoE, UP IAM & UP FAMNIT* Research at InnoRenew CoE that can be enhanced by the ELETTRA Synchrotron
12:50- 13:00	**Concluding remarks** (*Sumea Klokic, TU Graz*)
13:00 -14:00	**Lunch & Networking**
14:00 -15:00	**Visit of laboratories at InnoRenew CoE**

REGISTER NOW

CLICK HERE

Organizer of the workshop: Sumea Klokic, TU Graz

Towards Elettra 2.0: new challenges and opportunities for Life Sciences

Lisa Vaccari

Elettra - Sincrotrone Trieste S.C.p.A., s.s. 14, km 163.5, 34149, Trieste, Italy

After 30 years of supporting scientific research into the study of hard, soft and biological materials, Elettra synchrotron is undergoing a major upgrade, involving both the storage ring and its beamlines and laboratories. The improved brightness and coherence of Elettra 2.0 will make it possible to tackle scientific problems that could not have been solved before, thus opening up new avenues also in the Life Sciences research filed.

Starting from the second semester of 2025, coinciding with the Elettra dark period dedicated to the construction of Elettra 2.0, state-of-the-art offline facilities have been opened to external users that offer cutting-edge bench-top instruments for vibrational spectroscopy, imaging, and X-ray Computed Tomography.

Here the status of Elettra 2.0 implementation will be presented, highlighting the effort being made to create an interconnected network of beamlines and offline facilities capable of looking at Life Science topics in a holistic manner, integrating structural, morphological, chemical and dynamical information from the atomic to the total body level.

The focus will be put on the opportunities presently offered by SISSI-Bio, the offline facility for spectroscopy, microscopy and nanoscopy in the infrared. Through selected examples from the biological and environmental sciences, the unmatched opportunities offered by the latest infrared technologies for label-free chemical characterization will be highlighted, in the hope of defining new and stimulating paths of collaboration and joint opportunities.

X-Ray absorption spectroscopy (XAS): principles and applications

Min Li

Elettra - Sincrotrone Trieste S.C.p.A., s.s. 14, km 163.5, 34149, Trieste, Italy

X-ray Absorption Spectroscopy (XAS) is a powerful analytical technique used to probe the local atomic structure and electronic state of a specific element within a material. The working principle of XAS relies on scanning the incident X-ray energy across the absorption edge of a target element. By measuring the resulting absorption or emission, it provides an average spectroscopic information over entire beam spot.

By analyzing the X-ray absorption near edge structure (XANES) and extended X-ray absorption fine structure (EXAFS) data, researchers can investigate the oxidation state and coordination environment of atoms inside samples, such as the battery materials, catalysts, environmental materials. This information provides insights into reaction mechanisms, catalytic pathways, material degradation, and interface behavior.

SYRMEP beamline: imaging applications and future prospects

Elena Longo

Elettra - Sincrotrone Trieste S.C.p.A., s.s. 14, km 163.5, 34149, Trieste, Italy

SYRMEP (SYnchrotron Radiation for MEdical Physics) is the hard X-ray imaging beamline of the Elettra synchrotron light source located in Trieste, Italy [1]. It offers advanced full-field X-ray imaging techniques and multiscale microtomography (microCT) in phase-contrast mode. Over the years, it has established as a multidisciplinary research platform.

Following the upgrade to Elettra 2.0, the new beamline SYRMEP Life-Science (SYRMEP-LS) will operate in a broader energy range (10-120 keV) with improved temporal and spatial resolution. Thanks to the higher spatial coherence provided by Elettra 2.0, optimized phase-contrast approaches will be enabled as well. In this new scenario, the beamline research applications will expand to dynamic studies, paleontology, high-absorbing materials science and clinical low-dose lung CT. This talk will present SYRMEP main technical aspects and a selection of scientific applications mainly carried out in the life science, biomaterials and environmental fields. Finally, it will be given a glance to the future prospects foreseen for SYRMEP-LS.

[1] E. Longo, A. Contillo, L. D'Amico, M. Prašek, G. Saccomano, N. Sodini, C. Dullin, D. Dreossi, G. Tromba, "SYRMEP beamline: state of the art, upgrades and future prospects", The European Physical Journal Plus 139, 880 (2024); doi:10.1140/epjp/s13360-024-05489-1.

Micro-fluorescence beamline: a long journey to a multi-purpose instrument

Ilaria Carlomagno

Elettra - Sincrotrone Trieste S.C.p.A., s.s. 14, km 163.5, 34149, Trieste, Italy

X-Ray Fluorescence (XRF) is a widespread technique to characterize the elemental profile of a sample. XRF analysis can be carried out on any kind of sample, requiring no preparation. The X-rays provide a few microns of surface sensitivity and, in most of the cases, can be considered as a non-destructive probe. The most common approach consists of a 2D scanning mode, providing the spatial distribution of the surface element.

All of the above is easily found in many XRF laboratories, using standard X-ray tubes but XRF can be carried out using synchrotron sources. The immediate advantages are the energy tunability and the high-intensity, monochromatic photon flux. These characteristics make synchrotron-based XRF (S-XRF) ideally suited for the detection and quantification of trace elements (ppm range). In particular, S-XRF greatly overcomes laboratory XRF in the case of samples having a light matrix and/or when major elements have a similar atomic number to trace elements.

A further major advantage offered by synchrotrons is provided by the complementary techniques available. As an example, we will see the potentialities of S-XRF combined with X-ray Absorption Spectroscopy. As a practical reference, we will see what will be soon available at Elettra 2.0, at the micro-fluorescence beamline.

Small-Angle X-ray Scattering & the SOMAPP laboratory

Glen Smales

Institute of Inorganic Chemistry, Graz University of Technology, 8010 Graz, Austria

Small-angle X-ray scattering (SAXS) is a powerful analytical technique used to probe the nanoscale structure of materials. Its working principle is based on measuring the elastic scattering of X-rays at small angles, which arises from electron density variations within the sample. Analysis of the scattering pattern provides average structural information such as size, shape, and spatial correlations, over the entire illuminated sample volume.

This presentation explores the multi-scale characterization of complex materials using SAXS at the SOMAPP Lab (TU Graz), highlighting recent and future hardware and software developments for the SAXSpoint 700 instrument. The talk focuses on the development of automated, reproducible workflows essential for high-throughput research across a wide range of material systems.