

# SOLARIS NEWS

**LIFE SCIENCE  
OPEN  
SPACE**

**PILOT  
EXPERIMENT  
COMPLETED**

**X-RAY  
MULTIMODAL  
IMAGING**



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## **p. 3**

### **PILOT EXPERIMENT WITH THE COSMETICS INDUSTRY**

We have completed a pilot experiment with our partner from the cosmetics industry

## **p. 4**

### **X-RAY MULTIMODAL IMAGING AT POLYX BEAMLINE**

A brief overview of the new beamline available for academic and industrial users

## **p. 5**

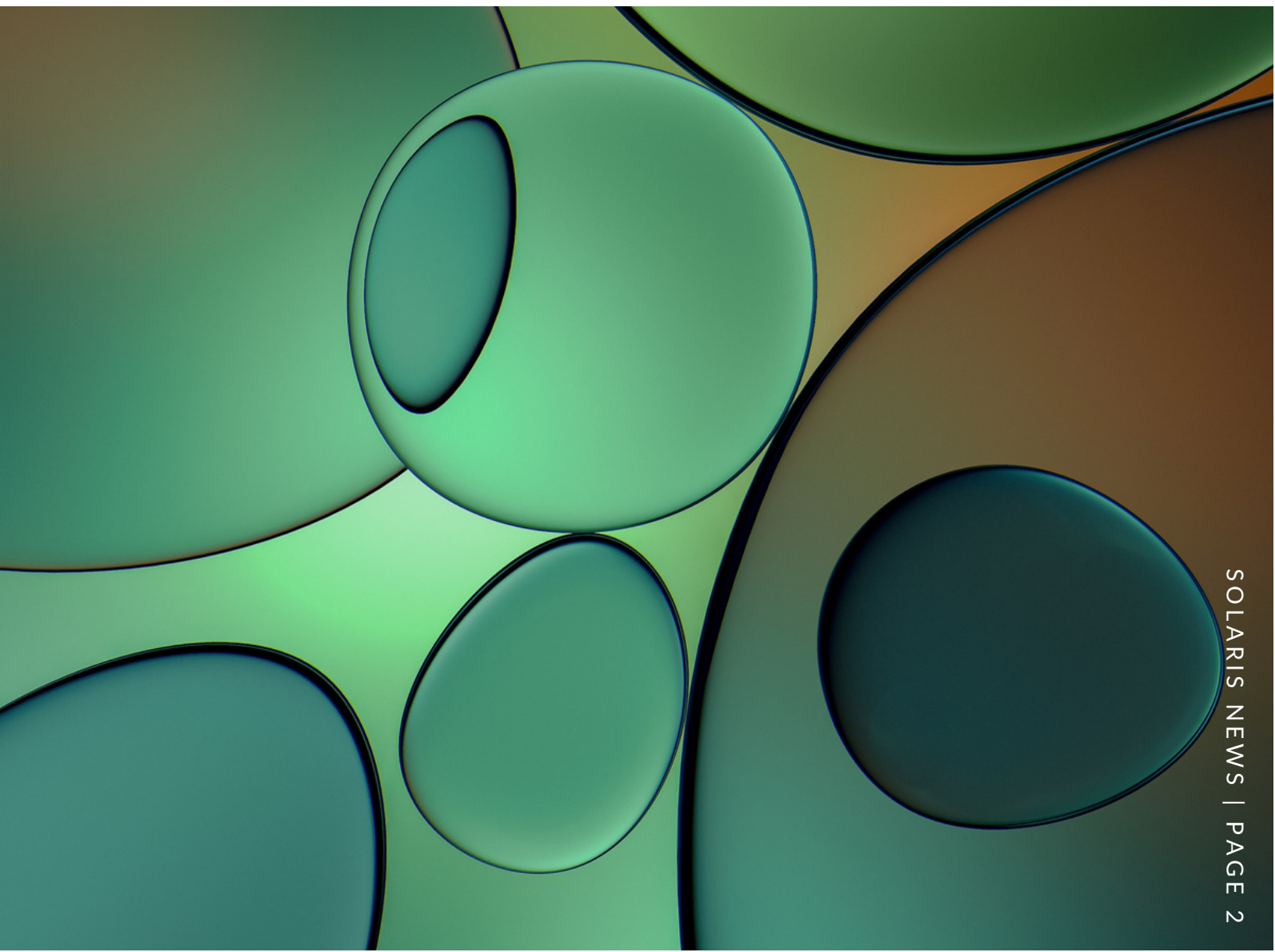
### **SOLARIS DIRECTOR WILL LEAD LEAPS**

Prof. Jakub Szlachetko to become LEAPS President in 2025

## **p. 6**

### **LIFE SCIENCE OPEN SPACE CONFERENCE**

A short report of our participation in the LSOS conference





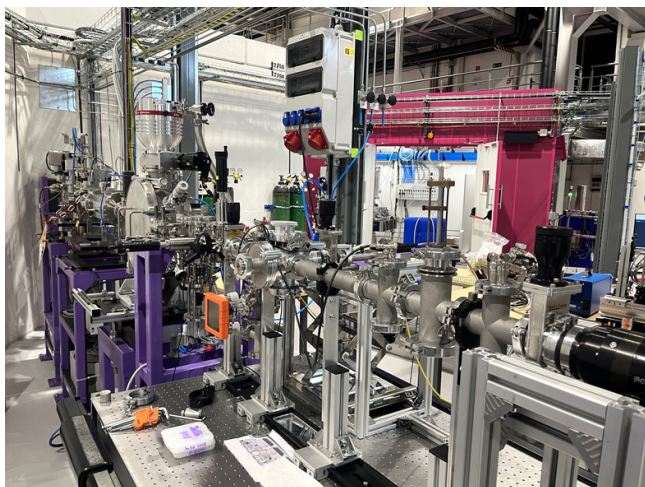
# PILOT EXPERIMENT COMPLETED

National Synchrotron Radiation Centre SOLARIS has completed a pilot experiment conducted in cooperation with a Polish SME, Vis Plantis, a producer of a wide range of cosmetics. The experiment showcases the strengths of synchrotron radiation - based methods in solving key issues of the cosmetics sector and fostering development of innovative products

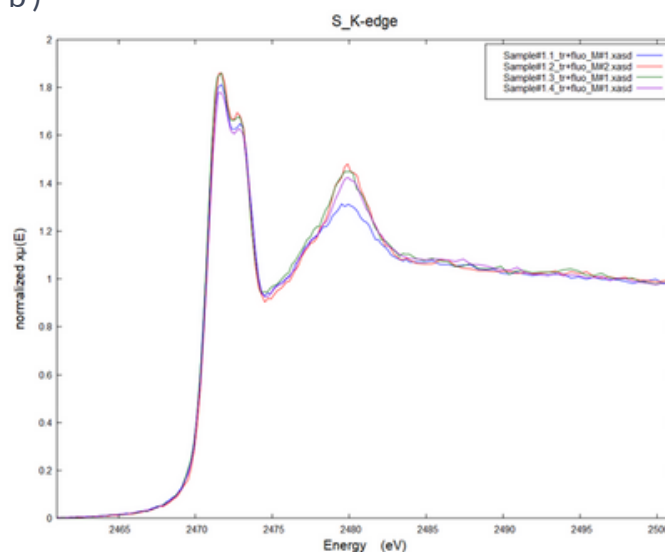
The experiment focused on studying the mechanism of action of a newly developed product, aimed at protecting hair from the negative effects of high - temperature treatments. Applied methods included X-ray absorption spectroscopy in the tender energy range at the ASTRA beamline, IR spectroscopy at the CIRI beamline, optical microscopy (OM), scanning electron microscopy (SEM) and atomic force microscopy (AFM).

The studies have indicated potential protective mechanisms of the substance and will serve as a basis for future cooperation with the cosmetics sector.

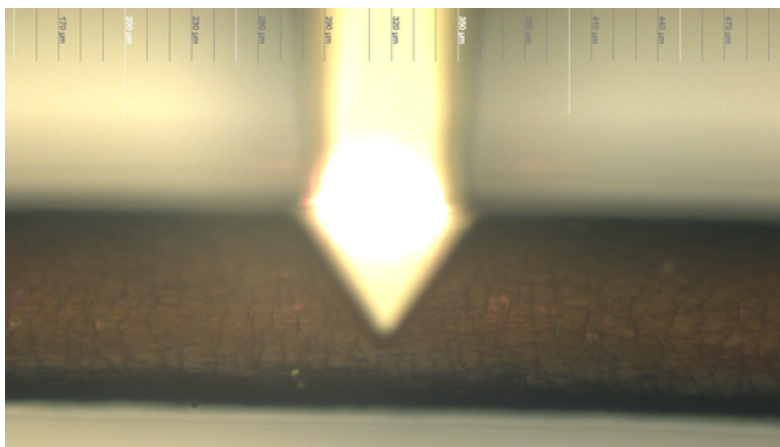
a)



b)



c)



(a) ASTRA beamline during the measurements; (b) Sulphur K-edge XAS spectra of the hair samples, which have undergone various treatments; (c) AFM measurements of a hair sample

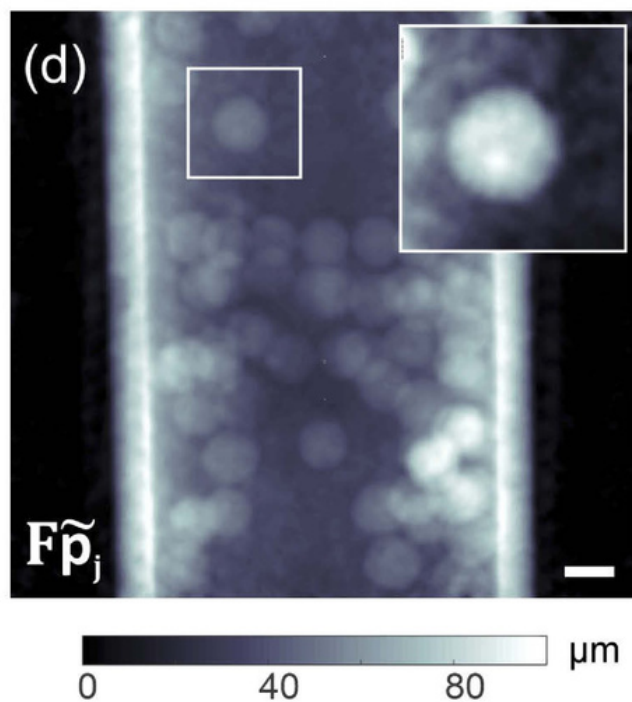
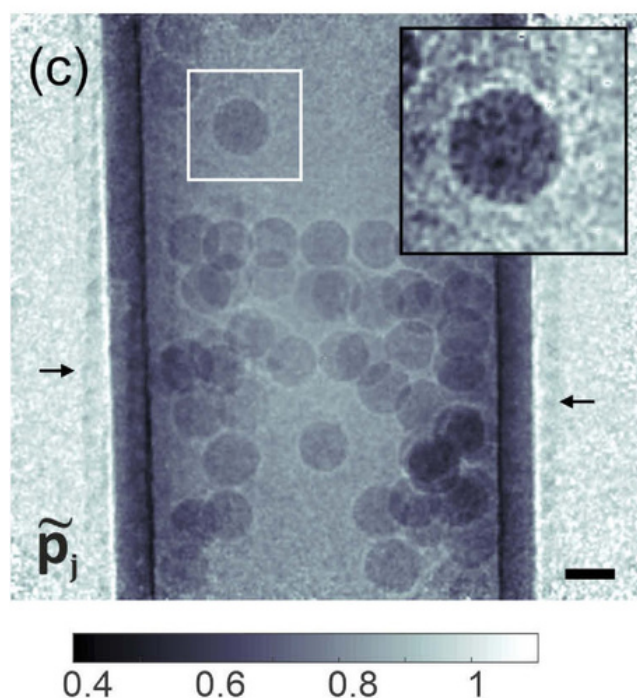
# X - RAY MULTIMODAL IMAGING

POLYX beamline, one of the newest additions to the beamlines available at SOLARIS, is currently in an expert commissioning mode and is expected to become fully available to external users in the autumn call of proposals. The available photon energies are 4-15 keV. But what exactly are the beamline's capabilities?

This compact beamline, using polycapillary optics, generating high photon flux, is dedicated to X-ray multimodal imaging, combining several different imaging and spectroscopic techniques.

The methods include microimaging and microtomography with absorption and phase contrast, micro-fluorescence microscopy ( $\mu$ XRF), X-ray absorption ( $\mu$ XAS) and emission ( $\mu$ XES) spectroscopy. They can be used to study a wide variety of samples in air, helium, or low vacuum atmospheres. Research at POLYX makes it possible to study the 2- and 3-dimensional structure of samples, combined with elemental distribution and information about chemical composition, as well as different chemical environments. This can be used, for example, in life sciences, materials science, chemistry, environmental and cultural heritage studies

Studying 3D structure of samples with chemical sensitivity opens up exciting research areas in the food & agriculture industries, such as characterizing (sub) soil structure or elements' uptake by plants.



Reconstructed image of a borosilicate glass capillary filled with 25  $\mu\text{m}$  diameter  $\text{SiO}_2$  spheres (on the left) and sample thickness (on the right) obtained using polycapillary imaging

# SOLARIS DIRECTOR LEADING LEAPS

The League of European Accelerator based-Photon Sources (LEAPS) is the pan-European consortium, consisting of all European synchrotron radiation facilities and free electron lasers. It currently consists of 16 members from 11 countries. The facilities serve broad European and international science & innovation communities and provide key capabilities for world - class researchers.

During the General Assembly meeting of the consortium on 19 December 2023, the Board of Directors has chosen prof. Jakub Szlachetko, the Director of the SOLARIS National Synchrotron Radiation Centre to become of the member of the Board and serve as the LEAPS President in 2025. This will coincide with the Polish presidency of the European Council in the first six months of 2025.

In addition to managing priority science & innovation programmes, the focus of the LEAPS presidency under prof. Szlachetko will be to expand the community in Central and Eastern Europe, with the emphasis on Ukraine, and to monitor implemented transnational access initiatives.



A map of the LEAPS consortium

Source: <https://leaps-initiative.eu/about/>



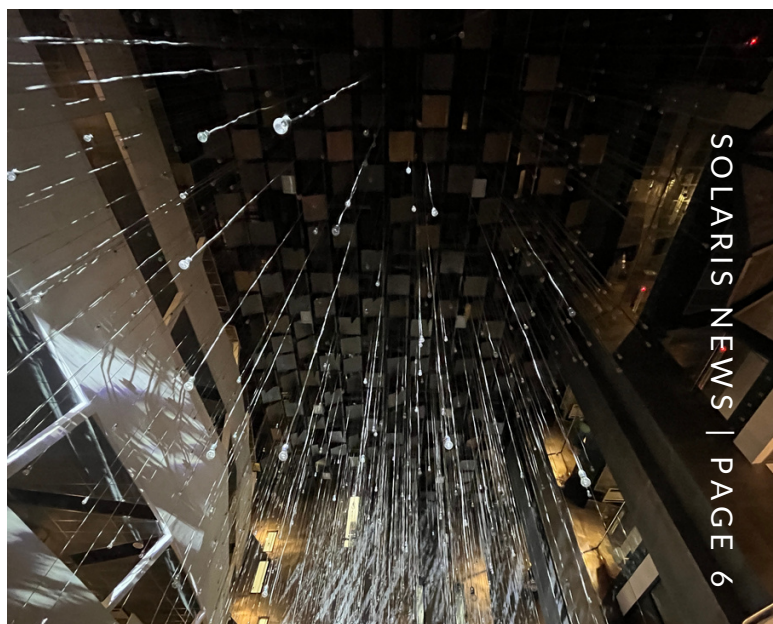
# LIFE SCIENCE OPEN SPACE

Between 30.11.2023 and 01.12.2023 SOLARIS team has showcased offer for the life sciences industry during the 13th Life Science Open Space conference, organized by the LifeScience Cluster. In addition to participating in the exhibition, Industry Liaison Officer from SOLARIS, Piotr Ciochoń, has discussed the potential of synchrotron radiation and cryo-electron microscopy in drug discovery.

The event was organized in collaboration with SANO Centre for Computational Personalized Medicine and Kraków Technological Park, and has attracted over 300 participants.

The event featured several thematic sessions, focusing on important challenges, facing the broadly devined life sciences industry: hospital of the future, lifestyle, personalized medicine, digital healthcare, visualizing health, drug discovery & development, data - driven treatments. In addition, several workshops, as well as startup session and a hackathon, were organized.

Life Science Open Space was a great forum for fruitful discussions and initiating new partnerships. The potential of SOLARIS Centre in helping solve some of the sector's crucial problems and fostering innovation is very large. The event made it possible to present the capabilities of the Centre in the area of CryoEM, infrared nanospectroscopies and X-ray based characterization methods, and signal the arrival of new, powerful tools for the life sciences industry.



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**STAY TUNED FOR THE NEXT NUMBER  
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