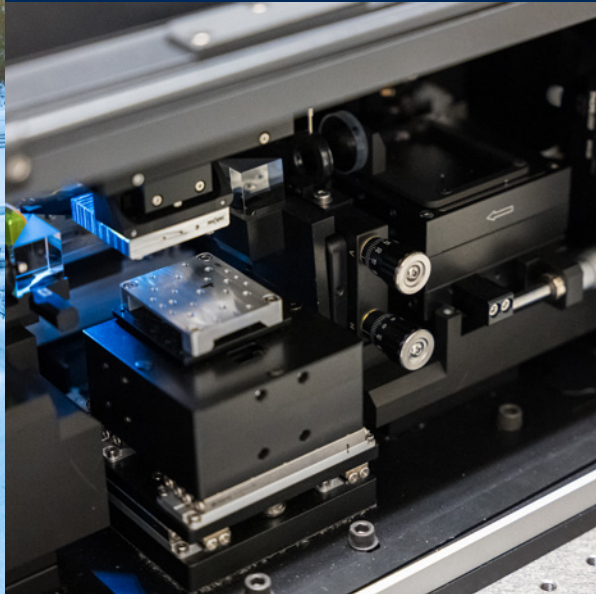
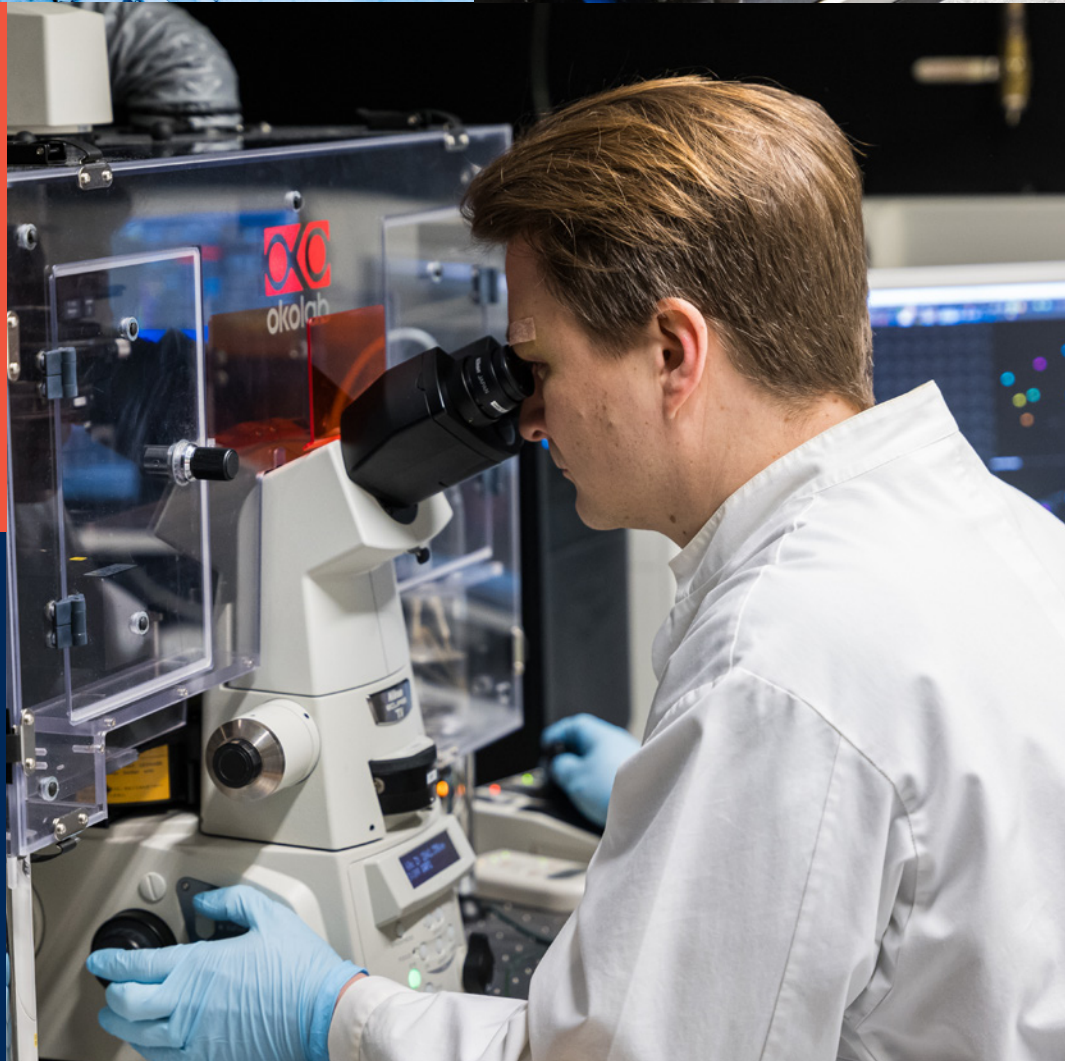




NANO-SCIENCE CENTER



NSC
FINLAND



UNIVERSITY OF JYVÄSKYLÄ

The Nanoscience Center

is an international, interdisciplinary research organization where biologists, chemists and physicists work together to study nature at the nanoscale.

Research projects span from fundamental investigations of processes in nanoscale structures to the development of commercial products.



As it celebrates its 20th anniversary, the Nanoscience Center (NSC), established in 2004, has been at the forefront of research and innovation for two decades.

Today, NSC is a mature research organization whose members belong to one or more of the three Departments of Biological and Environmental Science, Chemistry, and Physics.

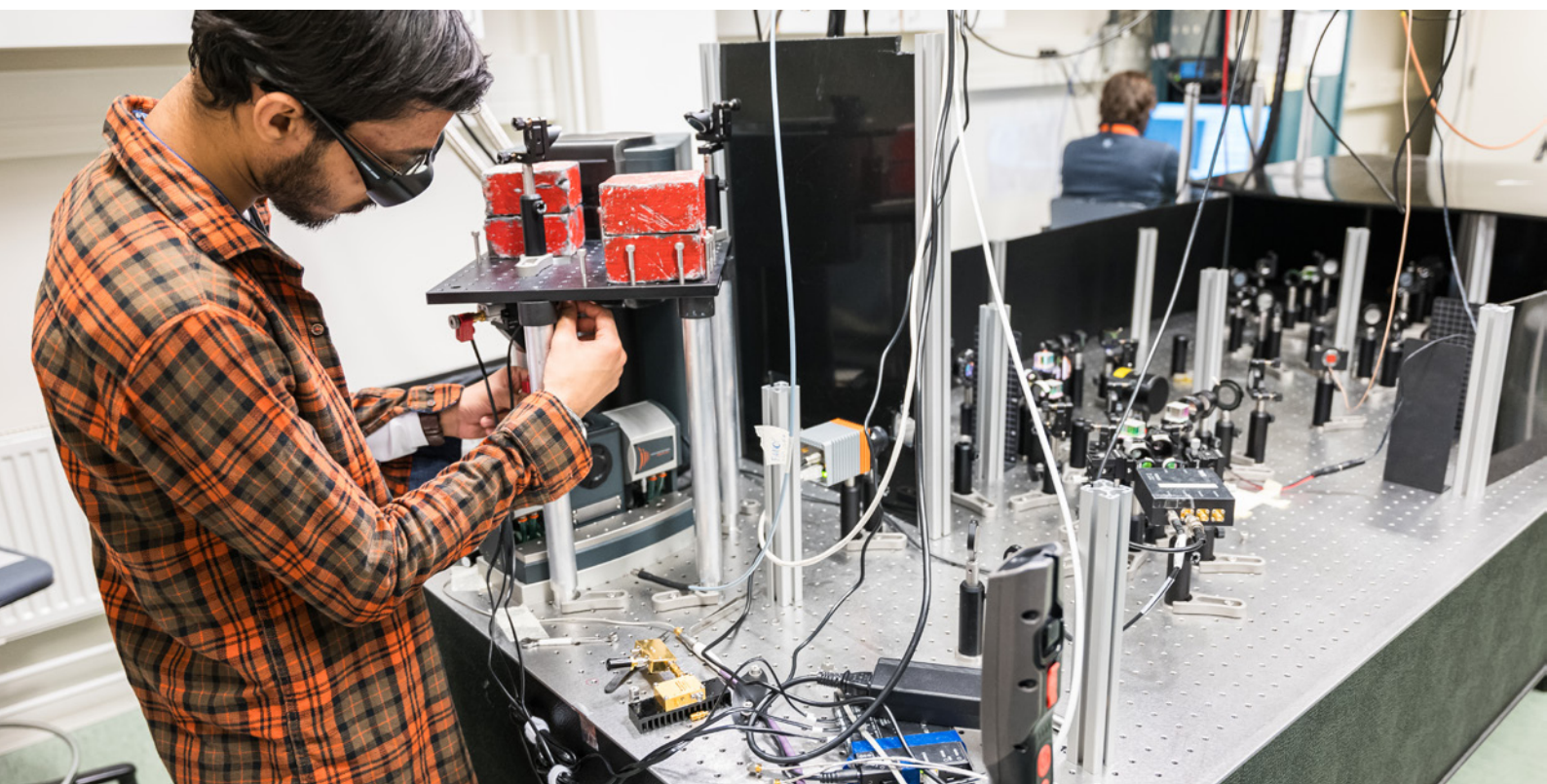
Nanoscience influences numerous technological areas from biotechnology to quantum technology, highlighting the increasing need for multidisciplinary experts in nanoscale research and development. The International Master's Degree Programme in Nanoscience equips its graduates with knowledge on high-tech methods and instruments. Students learn to characterize and control single molecules, produce materials at the nanoscale, and modify them into functional devices, preparing them for cutting-edge scientific and industrial challenges.

We also welcome you to the Nanoscience Days conference at the University of Jyväskylä. Together we have the opportunity to celebrate the 20 year anniversary of our Nanoscience Center.

Nanoscience Days is an annual two-day conference organized for the twentieth time in 2024 by NSC at University of Jyväskylä (JYU). The scientific programme consists of about 10 plenary lectures given by prominent scientists around the world on topics of common interest to physicists, chemists, and biologists that concern the nanoscale phenomena. In addition, the programme includes a wide poster session for student presentations as well as a conference dinner for networking.



Please read more about the Nanoscience Days:
www.jyu.fi/nsd





HEALTH AND WELL-BEING

Our multifaceted research delves into health-focused topics, exploring how bacteria and viruses infect, strategies for antimicrobial defense, diagnostic techniques, and innovative methods to comprehend how cells interact with their surroundings.

Biomolecules act as nature's nanomachines

The Nanoscience Center provides a range of multidisciplinary methods, employing techniques

from cell and molecular biology, chemistry, and physics to unravel the mysteries inherent in biological systems. Such a comprehensive approach enables scientists to grasp the basic processes that govern the behavior of cells, proteins, and viruses, extending to the minute detail of their molecular structures. The valuable data derived from this research can be applied in areas such as biomedical sciences and various other biotechnological fields.

**WATCH
OUR
VIDEO!**



OUR AIM IS TO LEAD IN RESEARCH OF SUSTAINABLE MATERIALS

and their creation, promoting the circular economy, and developing light-responsive molecules, nanostructures, and catalytic methods that advance a low-carbon society.



SUSTAINABLE SOCIETY

Nanoscience is essential for sustainable innovations.

To create eco-friendly solutions, it's vital to grasp the intricacies at the nanoscale. A varied range of disciplines is necessary to comprehend aspects such as the fundamentals of catalytic reactions, the ways materials engage with light, and strategies for minimizing or repurposing by-products, like using them in antimicrobial applications.

Exploring how light interacts with materials helps us to understand their properties. The infrared and Raman spectroscopic analysis provide insights into molecular vibrations and therefore their identity, conformations and interactions. Nanostructures exhibit unique optical characteristics that can be utilized to change how molecules react with light.



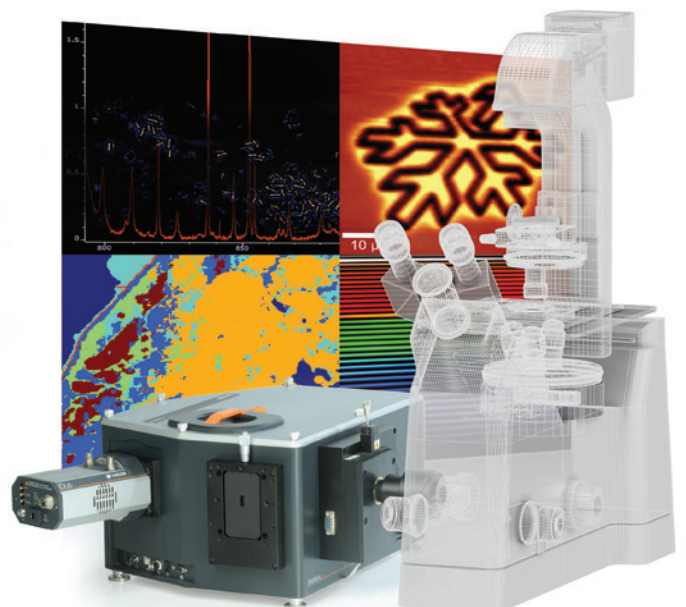
Andor spectroscopy and microscopy systems feature a combination of market leading cameras, detectors and spectral instruments, seamlessly controlled through Andor's dedicated and intuitive software platform.

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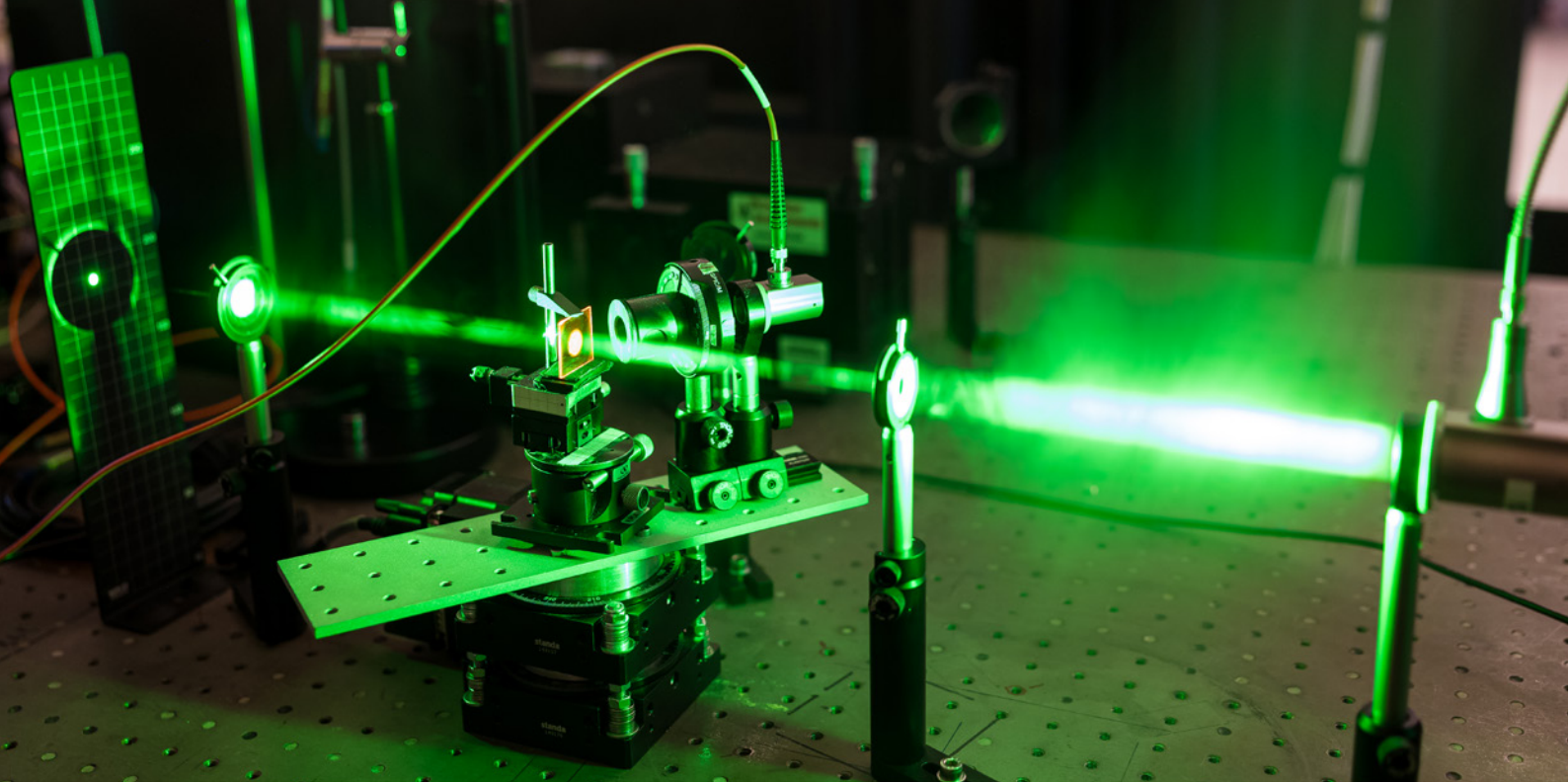
Photron: High speed cameras and imaging



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SECOND QUANTUM REVOLUTION

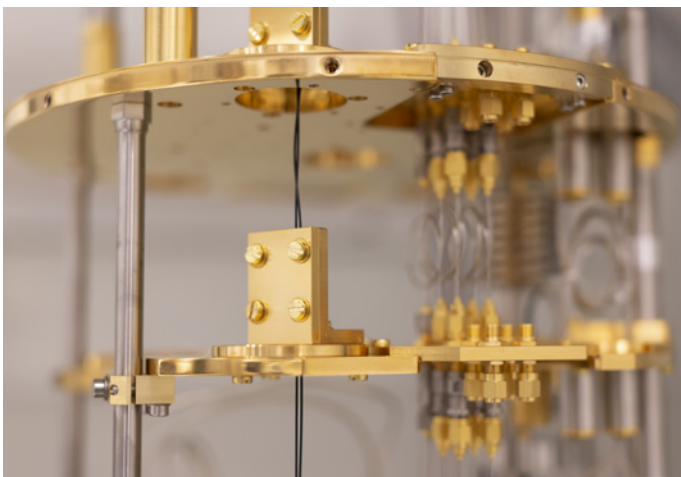
The objective of the second quantum revolution is to harness quantum characteristics of matter such as superposition and entanglement to innovate functional instruments and devices. This includes, for instance, leveraging the quantum aspects of nanoscale electrical and optical systems and applying these properties in quantum computing as well as in the creation of sensors and various other technologies.

The emergence of quantum properties is a hallmark of the nanoscale.

More profound comprehension of quantum mechanics together with recent innovations in nanofabrication, nanoscopy and more sensitive measurement techniques have made it possible to observe and manipulate quantum states previously inaccessible during the first quantum revolution. As a result, there

has been a significant acceleration in developing actual quantum devices, such as quantum computers, which in the near future will surpass traditional computers by employing sophisticated quantum algorithms or more accurately simulating the nanoscopic structures of materials.

In NSC the quantum aspects are studied in a multidisciplinary way for example by combining light with organic molecules to form new hybrid polariton states, or by connecting light with vibrations to read out and couple quantum bits. Advanced nanofabrication enables creation of novel quantum materials and superconducting devices. These quantum technologies can be utilized for instance in sensing and light harvesting, with potential to revolutionize these fields and elevate them to entirely new heights.



SUOMEN JOHTAVA TYHJIÖTEKNOLOGIAN OSAAJA

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