

2nd International
Nanoscale Analytics Workshop
Munich, May 18 – 20, 2022



Product Line
neaspec

Workshop Program

meet the leading experts in nanoscale analytics

Workshop venue:
Kleines Theater Haar
Casinostr. 75
85540, Haar (Munich)





2nd International Nanoscale Analytics Workshop

Munich, May 18 -21, 2022

NANOSCALE ANALYTICS
advanced imaging & spectroscopy

Workshop Program:

Wednesday | May 18, 2022

08:50 – 09:00 **Welcome & virtual coffee**

09:00 – 09:10 **Dr. Adrian Cernescu** – attocube systems AG
Opening Remarks

09:10 – 09:40 **Dr. Rainer Hillenbrand** – CIC nanoGUNE BRTA, Spain
Infrared nanoimaging and nanospectroscopy - emerging tools for physical and (bio)chemical nanoanalytics

Session 1

Synchrotron and Ultrafast Spectroscopy

Chairman: Dr. Ferenc Borondics – SOLEIL Synchrotron, France

09:40 – 10:00 **Dr. Raul Freitas** – Brazilian Synchrotron Light Laboratory, Brazil
Synchrotron IR nanospectroscopy at Sirius: current developments and perspectives

10:00 – 10:20 **Dr. Bernd Kästner** – PTB Berlin, Germany
Imaging of ferro- and antiferromagnetic domains using s-SNOM

10:20 – 10:40 **Dr. Hans Bechtel** – Lawrence Berkeley National Laboratory, USA
Probing frequency-dependent anisotropical responses with far-infrared synchrotron infrared nanospectroscopy

10:40 – 11:10 **Coffee break**

Chairman: Dr. Michael Martin – Advanced Light Source Division
Lawrence Berkeley National Laboratory, USA

11:10 – 11:30 **Prof. Markus Raschke** – University of Colorado, USA
Ultrafast and broadband nano-spectroscopy of structure, coupling, and dynamics in functional molecular materials

11:30 – 11:50 **Prof. Mengkun Liu** – Stony Brook University, USA
Ultrabroadband SNOM in High Magnetic Field up to 7T, Enhanced by Machine Learning



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Session 1

11:50 – 12:05 **Dr. Gianfelice Cinque** – Diamond Light Source, UK
The new InfraRed nanospectroscopy endstation for photothermal and scattering modes at Diamond Light Source

12:25 – 13:30 **Lunch break**

Session 2

Emerging Applications

Chairman: Prof. Frank Koppens - ICFO, Barcelona, Spain

13:30 – 13:50 **Prof. Yohannes Abate** – University of Georgia, USA
Nanoscopy of Decay, Impermanence, Crunch and Ultimate Death of Quantum Materials

13:50 – 14:10 **Prof. Lukas M. Eng** – TU Dresden, IAPP, Germany
In-situ Kelvin-Probe Force Microscopy 4 s-SNOM – just fancy or really needed?

14:10 – 14:30 **Prof. Volker Deckert** – Friedrich-Schiller University Jena, Germany
Combining scanning probe and optical spectroscopy to identify viral particles

14:30 – 14:45 **Dr. Lars Mester** – CIC nanoGUNE BRTA, Spain
High-fidelity nano-FTIR spectroscopy by on-pixel normalization of signal harmonics

14:45 – 15:00 **Dr. Patryk Kusch** – Freie Universität Berlin, Germany
Applying dielectric disorder to image interlayer excitons in van der Waals heterostructures

15:00 – 15:15 **Daniel Beitner** – Tel Aviv University, Israel
Coupled molecular emitters in superstructures interact with plasmonic nanoparticles

15:15 – 15:30 **Noam Veber** – Faculty of Materials Science & Engineering, Technion, Israel
Correlation of CAFM and nearfield signals for advanced material analysis

15:30 – 16:00 **Coffee break**



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Session 3

Terahertz Applications

Chairman: Dr. Fritz Keilmann – Ludwig Maximilian University of Munich, Germany

16:00 – 16:20

Prof. Aleksandar Rakic – University of Queensland, Brisbane, Australia
Advances and challenges in THz scattering SNOM

16:20 – 16:40

Dr. Jean-Francois Lampin – IEMN-CNRS Lille, France
Imaging terahertz modes using scattering SNOM

16:40 – 17:00

Dr. Miriam S. Vitiello – Consiglio Nazionale delle Ricerche, Pisa, Italy
Recent development on detectorless near field nanoscopy at THz frequencies

17:00 – 17:20

Prof. Tyler Cocker – Michigan State University, USA
Terahertz scanning tunneling microscopy and spectroscopy on the atomic scale

17:20 – 17:40

Dr. Hynek Nemec – Institute of Physics, The Academy of Sciences of the Czech Republic
Band-bending in single-crystalline GaAs nanobars observed by THz SNOM and far-field THz spectroscopy

17:40 – 18:00

Prof. Peter Jepsen – DTU Fotonik, Technical University of Denmark
Terahertz nanoscopy of thin film metals



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Thursday | May 19, 2022

08:30 – 09:00

Coffee

Session 4

Bio and Medical Applications

Chairman: Dr. Rainer Hillenbrand – CIC nanoGUNE BRTA, Spain

09:00 – 09:20

Dr. Fritz Keilmann – Ludwig Maximilian University of Munich, Germany

Nano-aquarium - a new s-SNOM platform to observe live biological cells in action

09:20 – 09:35

Prof. Andreas Barth – Stockholm University, Sweden

Isotope-edition of nanoscale infrared images distinguishes chemically similar molecules - benefits for Alzheimer's disease research

09:35 – 09:50

Dr. Aude Lereu – Institute Fresnel – CNRS, France

Multimodal scattering near-field optical microscopy revealing plant cell walls physical and chemical properties

09:50 – 10:05

Dr. Luca Quaroni – Jagiellonian University Krakow, Poland

Infrared spectroscopy of phospholipid bilayers: from extended samples to nanoscale structures

10:05 – 10:20

Dr. Ulyana Shimanovich – Weizmann Institute of Science, Israel

Structural transitions underpins the evolution of protein nanofibrils mechanics

10:20 – 10:35

Dr. Rastislav Lagana – Technical University Zvolen, Slovakia

The influence of cell wall composition on mechanics of natural poplar variants at nanoscale

10:35 – 10:55

Coffee break

Session 5

Polymer Applications

Chairman: Prof. Magnus Johnson – KTH Royal Institute of Technology, Stockholm, Sweden

10:55 – 11:10

Prof. Achim Hartschuh – Ludwig Maximilian University of Munich, Germany

VIS-IR nanospectroscopy of novel organic solar cell materials

11:10 – 11:25

Dr. Ognen Pop-Georgievski – Czech Academy of Sciences, Czech Republic *Infrared nanoscopy and nano-tomography of bioactive polymer brushes*



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Session 5

- 11:25 – 11:40 **Dr. Monika Goikoetxea** – CIC NanoGUNE, San Sebastian, Spain
Cross-sectional chemical nanoimaging of composite polymer nanoparticles by infrared nanospectroscopy
- 11:40 – 11:55 **Prof. Szczepan Zapotoczny** – Jagiellonian University Krakow, Poland
Nanostructure and surface dynamics of binary mixed polymer brushes as revealed by advanced scanning probe microscopies
- 11:55 – 12:10 **Dr. Nada Mrkyvkova** – Slovak Academy of Sciences, Slovakia
Nanoimaging of orientational defects in semiconducting organic films
- 12:10 – 12:25 **Dr. Nikolay Kotov** – KTH Royal Institute of Technology, Stockholm, Sweden
Detailed investigation of nanocellulosic materials with sSNOM
- 12:25 – 12:40 **Dr. Marcela Dendisova** – University of Chemistry and Technology, Prague, Czech Republic
Nanoscope study of biomimetic polydopamine anchored layers
- 12:40 – 13:40 **Lunch break**

Session 6

2D Materials Applications

Chairman: Prof. Thomas Taubner – RWTH Aachen University, Germany

- 13:40 – 13:55 **Dr. Pablo Alonso-González** – University of Oviedo, Spain
Visualization of anomalous reflection and refraction of polaritons at the nanoscale
- 13:55 – 14:10 **Dr. Antonio Ambrosio** – Istituto Italiano di Tecnologia, Italy
High quality factor nano-resonators in van der Waals materials
- 14:10 – 14:25 **Prof. Siyuan Dai** – Auburn University, USA
Infrared nano-imaging of configured phonon polaritons
- 14:25 – 14:40 **Prof. Thomas Weitz** – University Göttingen, Germany
Novel quantum phases in few-layer graphene without Moiré
- 14:40 – 14:55 **Dr. William L. Wilson** – Center for Nanoscale Systems, Harvard University
Exploring nanoscale imaging of polariton dynamics in 2D materials
- 14:55 – 15:10 **Dr. Eva Pogna** – Consiglio Nazionale delle Ricerche, Pisa, Italy
THz photocurrent nanoscopy



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Session 6

15:10 – 15:25 **Gergely Németh** – Wigner Research Centre for Physics, Budapest, Hungary
Rolled-up 2D for strong light-matter interaction: nanotube polaritonics

15:25 – 15:55 **Coffee break**

Session 7

Cryogenic Applications

Chairman: Dr. Pablo Alonso-González – University of Oviedo, Spain

15:55 – 16:15 **Prof. Dmitri Basov** – Columbia University, USA
Infrared nanoscopy at cryogenic temperatures

16:15 – 16:30 **Prof. Frank Koppens** – ICFO, Barcelona, Spain
Cryogenic photocurrent nanoscopy of twisted bilayer graphene

16:30 – 16:45 **Dr. Alexey Kuzmenko** – University of Geneva, Switzerland
Cryo-SNOM nano-FTIR spectroscopy of phonon-polaritons in oxides

16:45 – 17:00 **Dr. Alexander McLeod** – University of Minnesota, USA
Hidden in plain sight: nano-imaging of plasmonic signatures in metallic oxides

17:00 – 17:15 **Dr. Mirko Bacani** – attocube systems AG, Haar-Munich, Germany
Fingerprint of Faraday effect in Raman spectra of MoS₂

17:15 – 17:30 **Dr. De-Bo Hu** – National Center for Nanoscience and Technology, China
Probing hyperbolic phonon polaritons in vdW materials with cryogenic s-SNOM



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Friday | May 20, 2022

08:30 – 09:00 **Coffee**

Session 8 **Inorganic Materials Applications**

Chairman: Dr. Raul Freitas – Brazilian Synchrotron Light Laboratory, Brazil

09:00 – 09:20 **Prof. Magnus Johnson** – KTH Royal Institute of Technology, Stockholm, Sweden
Nanoscale studies of atmospheric corrosion

09:20 – 09:35 **Prof. Jin-Chong Tan** – University of Oxford, UK
Probing metal-organic frameworks via infrared nanospectroscopy and Tip-Force microscopy

09:35 – 09:50 **Dr. Julian Barnett** – RWTH Aachen, Germany
Far-infrared near-field optical imaging and Kelvin Probe Force Microscopy of laser-crystallized and -amorphized phase change material Ge₃Sb₂Te₆

09:50 – 10:05 **Jonathan Larson** – Lawrence Berkeley National Laboratory, USA
Nano-FTIR of buried electrochemical energy storage interfaces and interphases

10:05 – 10:20 **Dr. Jean-Yves Chaleau** – SPEC CEA Saclay, France
Observation and manipulation of antiferromagnetic distributions in magneto-electric multiferroics

10:20 – 10:50 **Coffee break**

Session 9 **Plasmonics and Metamaterials Applications**

Chairman: Prof. Markus Raschke, University of Colorado, USA

10:50 – 11:10 **Prof. Thomas Taubner** – RWTH Aachen University, Germany
Programmable nanophotonics materials

11:10 – 11:25 **Dr. Vladimir Zenin** – University of Southern Denmark, Denmark
Advanced neaspec user: tips and tricks

11:25 – 11:40 **Dr. Andreas Tittel** – Ludwig Maximilian University of Munich, Germany
Tip coupling and array effects of gold nanoantennas in near-field microscopy

11:40 – 11:55 **Prof. Zhe Fei** – Iowa State University, USA
Exploring exciton polaritons in van der Waals semiconductors



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Session 9

- 11:55 – 12:10 **Laura Casses** – Technical University of Denmark, Lyngby, Denmark
Quantitative near-field characterization of surface plasmon polaritons on single-crystalline gold platelets
- 12:10 – 12:20 **Robert Stabla** – neaspec Head of Support, attocube systems AG
neaSCAN 2.0 - Flexible software solutions and usability
- 12:20 – 12:25 **Dr. Marcus Diem** – neaspec Senior Director, attocube systems AG
Closing remarks
- 12:30 – 13:30 **Lunch break**