



## Programme

### Saturday July 6<sup>th</sup>

12.00 - 18.30: Arrival and Registration

19:00 Pre-Dinner activity - Majorana Center

Dr. Melissa Murray

"How not to draw conclusions"

19.30 - 21:30: Welcome Dinner

from 21:30: **Networking and Scientific discussion**

Sicilian cakes, Marsala and piano music in the "Marsala Room Cave"

Dinner

### Sunday July 7<sup>th</sup>

09:00 - 13:00: Arrival and Registration

12:00 - 14:00 Lunch

14:00– 14:30: **Giorgio Benedek, Federico Capasso, Oleg Mitrofanov** and **Miriam S. Vitiello**

Opening remarks

#### SESSION I

Chair: Miriam Vitiello (CNR-NANO and Scuola Normale Superiore, Italy)

14:30 – 15:30: **Jeremy J. Baumberg** (University of Cambridge, UK) *tutorial*

"Extreme Light-Matter Coupling of Single Emitters using Plasmonics"

15:30 – 16:00 Coffee Break

#### SESSION II

Chair: Oleg Mitrofanov (UCL, UK)

16:00 – 17:00: **Margherita Maiuri** (Politecnico di Milano, Italy) *tutorial*

"Ultrafast all-optical metasurfaces: controlling light and manipulating matter"

17:00 – 17:15: E. E. Narimanov (Purdue University, USA)

"Ultrafast Optical Modulation by Virtual Interband Transitions"

17:15 – 17:30: B. Niau (École Normale Supérieure, Paris France de Lausanne)

"Spin-to-Charge Conversion at the Quantum Interface of a topological insulator and ferromagnet – Ultrafast THz spintronic emission from PbSeSe/Co heterostructures"

17:30 – 17:45: A. Palmieri (Harvard University, USA)  
"Pancharatnam-Berry phase free-standing bilayer metasurfaces"  
17:45 – 18:00: E. Yadav (Indian Institute of Technology, India)  
"THz generation efficiency of epitaxial Co<sub>2</sub>MnGe Heusler Alloy Thin Films"

19:30 – 21:30: Dinner  
From 21:30: Sicilian cakes, marsala piano music in the "Marsala Room Cave"

## Monday July 8<sup>th</sup>

### SESSION III

Chair: Jeremy Baumberg (University of Cambridge, UK)

9:30 – 10:30: **Mikhail A. Belkin** (Technical University Munich, Germany) *tutorial*  
"Nonlinear Intersubband Polaritonic Metasurfaces for Flat Nonlinear Optics"

10:30 – 11:00: Coffee Break

11:00 – 12:00: **Tal Ellenbogen** (Tel Aviv University, Israel) *tutorial*  
"Advances in Controlled THz Generation by Nonlinear Metasurfaces"  
12:00 – 12:15: M. Akturk (Politecnico di Milano, Italy)  
"Ultrafast Giant Modulation of Anisotropy and Birefringence in All-Dielectric Metasurfaces"  
12:15 – 12:30: Z. Basiri (EPFL, Switzerland)  
"High speed modulation of TE and TM guided modes of a single layer organic electro-optic metasurfaces"  
12:30 – 12:45: S. Prescott (University College of London, UK)  
"Enhanced Photon Outcoupling of Semiconductor Quantum Dots using Mie Metasurfaces"

12:45 – 16:00: Lunch Break and Free Time

### SESSION IV

Chair: Mikhail Belkin (Technical University, Munich)

16:00 – 16:30: **Prashant Padmanabhan** (Los Alamos National Laboratories, USA), *invited*  
"Twisted Nonlinear Optics at the Nanoscale"  
16:30 – 16:45: S. Adams (Michigan State University, USA)  
"Resolving a THz-induced phase transition in WTe<sub>2</sub> on the sub-atomic scale with THz-STM"  
16:45 – 17:00: J. Mornhinweg (University of Regensburg, Germany)  
"Subcycle Dynamics of Deep-Strong Light-Matter Coupling"  
17:00 – 17:15: T. Siday (University of Oxford, UK)  
"Sampling Terahertz Conductivity at the Microscale with Resonance-Enhanced Near-Field Microscopy"  
17:15 – 17:30: K. Voronin (Donostia San Sebastian, Spain)  
"Theory for In-plane Hyperbolic Polaritons"  
17:30 – 17:45: R. Rapaport (The Hebrew University of Jerusalem)  
"High dimensional Quantum Key distribution with photon sources based on ultrabright room temperature nano-emitters coupled to nano-optical antennas"  
17:45 – 18:00: L. Hale (ETHZ, Switzerland)  
"Investigating the interaction between ISB polaritons and cyclotron resonances with THz-TDS"

**Special Workshop:** Melissa Murray: Thinking with Object Talk

19:30 - 21:30: Dinner

From 21:30: Sicilian cakes, marsala and piano music in the "Marsala Room Cave"  
(**Special Activity:** Tango artistic workshop with Dr. Melissa Murray)

## Tuesday July 9<sup>th</sup>

### SESSION V

Chair: Mordechai Segev (Technion-Israel Institute of Technology (Israel),

9:30 – 10:30: **Vincent Ginis** (Vrije University of Brussels, Belgium) *tutorial*

“Revolutionizing the Structuring of Light Through Cascaded-Mode Optics”

10:30 – 10:45: L. Dominici (CNR-Nanotec, Italy)

“Structured light in timespace by polariton quantum vortices”

10:45: 11:15: Coffee Break

11:15 – 12:15: **Ebrahim Karimi** (University of Ottawa, Canada) *tutorial*

“Generation, Characterization and Applications of Structured Photons”

12:15 – 12:30: A. Schirato (Politecnico di Milano, Italy)

“Shaping ultrafast hot carriers in plasmonic metasurfaces: from all-optical reconfiguration to photothermal catalysis”

12:30 – 12:45: T. Jiao (University College of London, UK)

“Dual-nanoring and gold back reflectors for broadband, high-efficiency extraction of quantum light”

12:45 – 13:00: K. Yousef (Harvard University)

“Generalized HOM Interference Based on Metasurface for Compact Quantum Information Processors”

13:00 – 13:15: D. Zia (Sapienza University of Rome)

“Interferometric imaging reconstruction of a structured biphoton state”

13:15 – 16:00: Lunch Break and Free Time

### SESSION VI

Chair: Ebrahim Karimi (University of Ottawa, Canada)

16:00 – 17:00: **Alex Cerjan** (Sandia National Laboratory, USA) *tutorial*

“An operator-based approach to topological photonics: Band structures and Bloch eigenstates not required”

17:00 – 17:15: L. Polimeno (CNR-Nanotec, Italy)

“Room temperature polariton condensation from Whispering gallery modes in CsPbBr<sub>3</sub> microplatelets”

17:15 – 17:45: **Michael C. Martin** (Advanced Light Source, Lawrence Berkeley National Laboratory, USA),

*invited*

“Ultrabroadband Infrared Nano Spectroscopy using a Synchrotron and Quantum Materials Science at the ALS”

17:45 – 18:00: R. Piccoli (University of Venice, Italy)

“Generation of vector beams via high-harmonic generation in a waveguide”

18:00- 18:45: **Science&Art Special Workshop** with Dr. Melissa Murray

“Drawing on Science, ink/drawing workshop”

19:30 - 21:30 Dinner

21:30: Sicilian cakes, marsala and piano music in the “Marsala Room Cave”

## Wednesday July 10<sup>th</sup>

### SESSION VII

Chair: Vincent Ginis (Vrije University of Brussels, Belgium)

9:30 – 10:30: **Mordechai Segev** (Technion-Israel Institute of Technology (Israel), *tutorial*

“Light-Matter Interactions in Photonic Time-Crystals”

10:30 – 11:00: Coffee Break

11:00 – 12:00: **Klaas-Jan Tielrooij** (Eindhoven University of Technology), *invited*  
"Nonlinear Quantum Metamaterials and Cool Twisted Quantum Materials"

12:00 – 12:15: F. Schiegl (University of Regensburg)

"All-Optical Subcycle Microscopy of Quantum Materials at the Atomic Scale"

12:15 – 12:30: L.Viti (CNR-NANO, Italy)

"Near-field nanoscopy of Dirac plasmon polaritons in the 2-4.3 THz range in a topological insulator micro-antenna"

12:30 – 12:45: L. Seitner (University of Munich, Germany)

"Engineering the Emission Spectra of THz Ring QCLs: A Maxwell-Bloch Based Simulation Approach"

12:45 – 13:00: M. Tiberi (University of Cambridge, UK)

"Sub-THz down-conversion with a graphene photobolometer"

12:45 – 15:00 Lunch Break

15:00 – 23:00: **Excursion and Dinner**

## Thursday July 11<sup>th</sup>

### SESSION VIII

Chair: Klaas-Jan Tielrooij (Eindhoven University of Technology),

9:30 – 10:30: **Antonio Ambrosio** (IIT, Italy) *tutorial*

"Nano-imaging and spectroscopy of polaritons in 2D materials"

10:30 – 10:45: Stephanie Adams (Michigan State University, USA)

"Atomic-scale terahertz time-domain spectroscopy"

10:45: 11:15: Coffee Break

11:15 – 12:15: **Roshan Krishna Kumar** (ICFO, Spain) *invited*

"Twisted-Quantum Photovoltaics"

12:15 – 12:30: S. Norman (University College of London, UK)

"Terahertz Surface Current Imaging with Aperture-type Near-field Microscopy"

12:30 – 12:45: J. Schlosser (University Regensburg, Germany)

"Probing ultrafast exciton dynamics in the semiconducting van der Waals magnet CrSBr"

12:45 – 13:00 **Christian Martella** (CNR-IMM, Italy), *invited*

"Shape transformations in 2D materials for functional applications"

13:00 – 16:00: Lunch Break and Free Time

### SESSION IX

Chair: Miriam Vitiello (CNR-NANO, Italy)

16:00 – 17:00: **Sukhdeep Dhillon** (Ecole Normale Supérieure, France) *tutorial*

"Layered Controlled Terahertz Photonics with 2D Transition Metal Dichalcogenides"

17:00 – 17:15: D. Baiocco (University of Pisa, Italy)

"THz plasmon-phonon polaritons in graphene-SrTiO<sub>3</sub> systems"

17:15 – 17:30: N.R. Fox (University of Leeds, UK)

"Finite Element Analysis Simulation of Surface Plasmons in Topological Insulator Metamaterials"

17:30 – 17:45: A. Stroh (Universität Bielefeld, Germany)

"Temperature Dependence of THz Conductivity in (SbBi)<sub>2</sub>Te<sub>3</sub> Thin-Films"

17:45 – 18:00 Evgenii E. Narimanov (Purdue University, USA)

"The Effective Permittivity of a Composite Material"

20:00 – 22:30: **Conference Banquet**

## Friday July 12<sup>th</sup>

### SESSION X

Chair: Michael Martin (Lawrence Berkeley National Laboratory, USA)

9:00 – 09:30: **Ronen Rapaport** (The Hebrew University of Jerusalem), *invited*

“Ultrafast electrically-reconfigurable interacting-photon circuits using waveguided dipolaritons with huge nonlinearities:

from photon scattering on electrical potentials to a GHz two-photon transistor”

09:30 – 09:45: Veronica Vicuna-Hernandez (CNR-INO, Italy)

“Strong Optomechanical coupling with OAM in cavities”

09:45: 10:15: Coffee Break

### SESSION XI

Chair: Oleg Mitrofanov (UCL, UK)

10:15 – 10:45: **Willie Padilla** (Duke University, USA), *invited*

“Fundamental Bounds of Nanoscale Metasurfaces and Optical Knots”

10:45 – 11:00: C.Wen (Cambridge Graphene Center, UK)

“Graphene-based mid-infrared photodetectors on suspended Si waveguides”

11:00 – 11:15 T.H. Dao (INFN, Italy)

“Single Photon Detector for Quantum Computing based on Bi<sub>2</sub>Se<sub>3</sub> Topological Insulators”

11:15 – 11:30 Syed Muhammad Junaid Bukhari (University Federico II, Naples Italy)

“Measurement of picosecond timing jitter of segmented photon number resolving detectors with continuous thermal light”

11:30 – 12:00: Closing Remarks

13:00 – 15:00 Traditional Closing Sicilian Lunch