



Perspectives on Quantum Simulation and Technologies – The Qombs Project Final Workshop

J une 27-28, 2022 Villa Il Gioiello, Via del Pian dei Giullari, 42, 50125 Firenze (Italy)

J une 29, CNR-INO, Largo Enrico Fermi, 6, 50125 Firenze (Italy)



J UNE 27

09:00-09:30 Registration and Welcome
 09:30-09:50 **Roberto Cimino (MUR)** – PNRR and relaunch of research on a national and European scale
 09:50-10:30 **Massimo Inguscio (CNR-INO/LENS/UCBM)** – Lens on atomic quantum simulation
 10:30-11:00 **Giovanni Modugno (CNR-INO)** – Beyond quantum simulations: the supersolid phase of matter
 11:00-11:30 **Coffee Break**
 11:30-12:15 **Giacomo Roati & Francesco Minardi (CNR-INO)** – Quantum simulation of QCL transport and comb formation with ultracold atoms
 12:15-12:45 **Andrea Trombettoni (SISSA)** – Quantum simulating the electron transport in quantum cascade laser structures
 13:00-14:30 **Lunch (at the conference venue)**
 14:30-15:00 **Nicole Fabbri (CNR-INO)** – Diamond quantum technologies in Florence
 15:00-15:30 **Matteo Zaccanti (CNR-INO)** – Resonantly interacting lithium-chromium Fermi mixtures
 15:30-16:00 **Luca Pezzé (CNR-INO)** – Distributed quantum sensing with squeezed-vacuum light in a configurable network of Mach-Zehnder interferometers
 16:00-16:30 **Coffee Break**
 16:30-17:30 **Paolo De Natale (CNR-INO)** – Moving sensors from classical to quantum
 17:30-18:00 **Etienne Giraud (Alpes)** – High performance quantum cascade laser frequency combs at 6.0 and 5.3 μm
 18:00-18:30 **Pitt Allmendinger (IRsweep AG)** – Demonstration of improved dual-frequency comb spectrometer iris-F1
 19:00-21:00 **Dinner (at the conference venue)**

J UNE 28

09:30-10:00 Registration and Welcome
 10:00-10:30 **Lorenzo Mischi (ppqSense)** – Development of new QubeCL applications - ultra-low noise tools for quantum cascade lasers
 10:30-11:00 **Mario Siciliani de Cumis (ASI)** – QCL-comb combined with WGMR: results and perspectives
 11:00-11:30 **Coffee Break**
 11:30-12:30 **Fabio Sciarrino (Sapienza)** – The quest for quantum advantage with photonics platform
 12:30-13:00 **Costanza Toninelli (CNR-INO)** – Organic molecules for photonic quantum technologies
 13:00-14:30 **Lunch (at the conference venue)**
 14:30-15:00 **Marco Bellini (CNR-INO)** – Coherent multimode photon addition for remote phase sensing and mental card games
 15:00-15:30 **Tecla Gabbrielli (CNR-INO/LENS)** – Towards the detection of quantum correlations in MIR QCL-combs emission
 15:30-16:00 **Iolanda Ricciardi (CNR-INO)** – Two-mode squeezing in cascaded nonlinear processes
 16:00-16:30 **Coffee Break**
 16:30-17:00 **Etienne Rodriguez (CNRS)** – Metamaterial engineering for high-performance unipolar quantum devices
 17:00-17:30 **Christian J irauschek & Johannes Popp (TUM)** – Modeling of phase-locked quantum cascade lasers
 17:30-18:00 **Martin Francké (ETHZ)** – Optimisation of mid-infrared quantum cascade lasers for (non-) classical frequency comb emission
 18:00-18:30 **Philip Täschler (ETHZ)** – Increasing the versatility and stability of mid-infrared quantum cascade laser frequency combs via waveguide fabrication and injection locking
 19:00-21:00 **Dinner (at the conference venue)**

J UNE 29

09:20-09:50 **Jeong Hyun Huh (Menlo Systems)** – Compact and widely tunable Mid-IR frequency comb based on DFG
 09:50-10:20 **Aude Martin (Thales R&T)** – Frequency comb-based Lidar
 10:20-10:30 **Coffee Break**
 10:30-11:30 Governing board meeting - internal
 11:30-12:30 Steering committee meeting - internal
 13:00-14:30 **Lunch (at the conference venue)**

Organizing committee:

Augusto Smerzi, Giacomo Roati, Natalia Bruno, Francesco Cappelli, Tecla Gabbrielli, Paolo De Natale, Pasqualina Pipino, Donata Fornaciari