

LEAPS MEETS QUANTUM TECHNOLOGY

1st Biennial LEAPS Conference at ELBA, Italy MAY 25-28, 2020



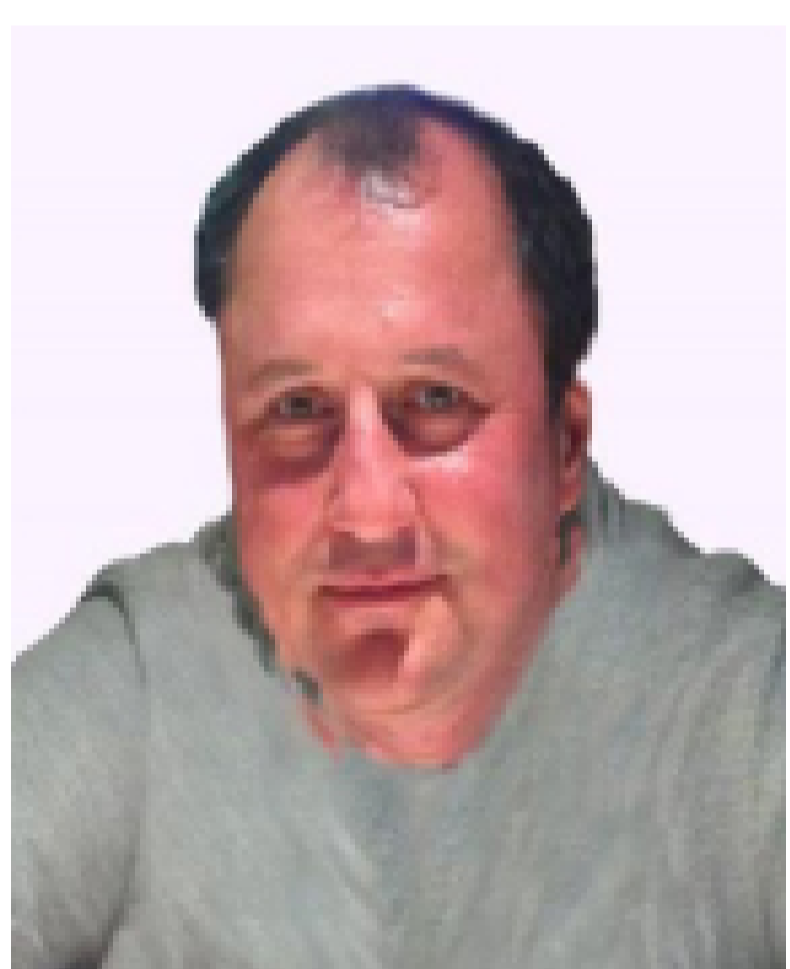
Quantum technologies present tremendous opportunities with the potential to lead to **revolutionary changes in daily life**. The progress has led to increased awareness of quantum technologies in basic and applied science, in industry and society. Quantum technology research is active in the fields quantum computing, quantum communication, quantum sensing, as well as quantum materials and spans in each field the range from fundamental understanding to realization of devices.

Today, **synchrotron radiation methods** support quantum technologies in many ways. This conference will bring together **latest developments in quantum technologies** with those in source development and instrumentation and identify opportunities for both sides. The conference will give impulse for further development of instrumentation and methods. Specifically, the goals of the conference are:

- Presenting an overview on state-of-the-art quantum technologies and how currently X-ray probes contribute to this field.
- Providing a platform for the communities to interact and define needs and actions to allow X-ray based probes contributing to the progress in quantum technologies.
- An important part of the conference will be **tutorial sessions** allowing a deep insight in quantum technologies and in **synchrotron radiation methods** also for **non experts**.

The selected audience of this meeting will profit from quantum technology experts meeting the light source community in an open atmosphere at the spectacular setting on Elba island in central Italy.

CONFIRMED INVITED SPEAKERS



Alexei Barinov
Elettra, Trieste
**In operando
band structure
measurement**



Tommaso Calarco
*Forschungszentrum
Jülich*
Quantum Flagship



Stefano Carretta
Università di Parma
Molecular qubits



Paul G. Evans
*University of
Wisconsin-Madison*
Nanobeams



Massimo Ferrario
INFN Frascati
**Free-electron
lasers**



Simon Gerber
*Paul-Scherrer
Institut, Villigen*
**Quantum
materials**



Matthew Gilbert
*University of Illinois/
Stanford University*
**Quantum computing with
topological insulators**



Megan Hill
*Northwestern U.
Evanston*
3D ptychography



Ignace Jarrige
*Brookhaven National
Lab, Upton*
**Synchrotron radiation
for quantum technology**

*... and many
more on the
next page ...*



In ELBA (Italy) - May 25-28, 2020

Registration and abstract submission preferably by January 31 and by February 10 at the latest.

to register, follow the link under
<https://leaps-initiative.eu/>
(Browser must be Firefox, Chrome, Edge or similar)



LEAPS League of European Accelerator-based Photon Sources

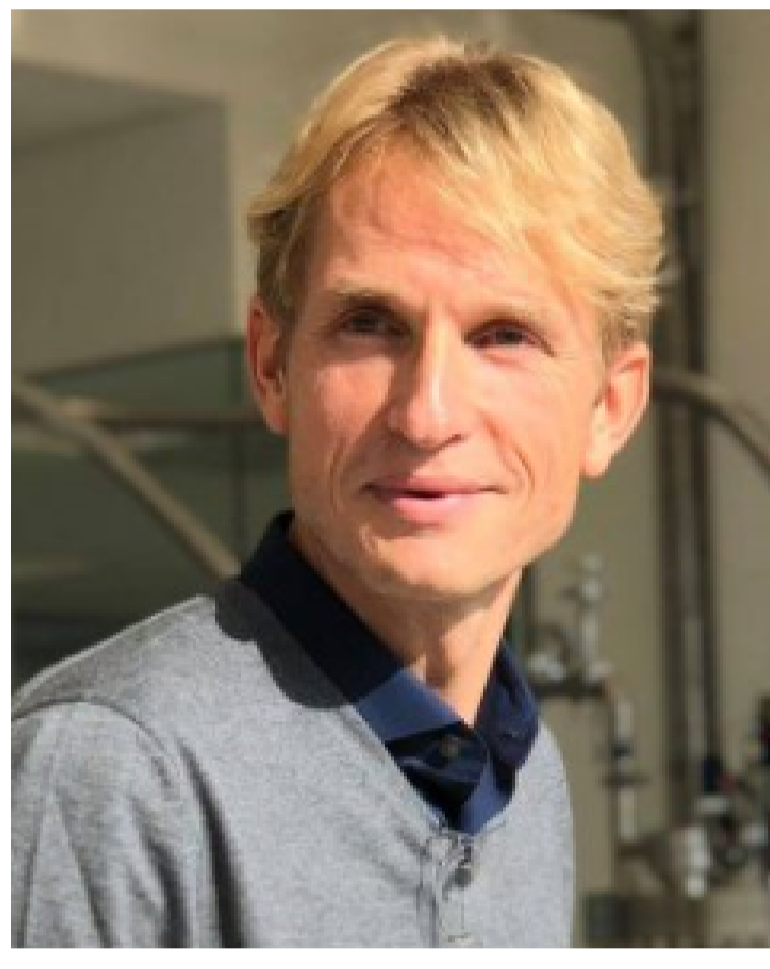
Light Sources for Europe

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CONFIRMED INVITED SPEAKERS (continued)



Peter Krogstrup
U. of Copenhagen and Microsoft

Nanowires



Ian McNulty
MAX IV Lund University

Soft x-ray orbital angular momentum



Ben Murdin
U. of Surrey

Entanglement by FEL radiation



Adriana Pálffy
Max-Planck-Inst. Heidelberg

Nuclear quantum optics



Jean-François Roch
CNRS and ENS Cachan

NV-centers and RT superconductivity



Sharon Schwartz
Bar Ilan University Ramat-Gan

Quantum imaging



Andreas Wallraff *
ETH Zürich

Hybrid qubits

* *to be confirmed*



Jörg Wrachtrup
U. Stuttgart

NV-centers

TENTATIVE PROGRAM

• DAY 1 "QUANTUM TECHNOLOGY"

TUT1 Quantum technology and the Quantum Flagship (60')
INV1 Speaker industry (30')
Coffee break
INV2 Topological materials science (30')
INV3 Speaker industry: Nanowires for quantum technology (30')
INV4 Speaker industry (30')
3 contributed talks (3x 20') + 3 young talks (3x 20')

• DAY 2 "ATOMS - DEFECTS – SPINS"

TUT1 Diamond NV-centers (60')
INV1 NV-centers and the quest for room temperature superconductors (30')
Coffee break
INV2 Rydberg states and entanglement in the light of FEL THz radiation (30')
INV3 Magnetic molecular qubits (30')
INV4 Spins in metal-organic frameworks by synchrotron radiation (30')
3 contributed talks (3x 20') + 3 young talks (3x 20')

• DAY 3 "QUANTUM MATERIALS AND QUANTUM DOTS"

TUT1 Topological insulators and quantum computation, tutorial (60')
INV1 Hybrid qubits (30')
Coffee break
INV2 Nanobeams for electronics (30')
INV3 ARPES microscopy and the effect of electric gating (30')
INV4 Understanding quantum materials by merging time-resolved ARPES & x-ray diffraction (30')
3 contributed talks (3x 20') + 3 young talks (3x 20')

• DAY 4 "QUANTUM PROPERTIES OF SYNCHROTRON LIGHT"

TUT1 Quantum cryptography (60')
INV1 Quantum optics and nuclear physics (30')
Coffee break
INV2 Coherent x-rays for 3D Bragg projection ptychography (30')
INV3 Imposing orbital angular momentum on soft x-rays (30')
INV4 Ghost imaging with FEL radiation (30')
3 contributed talks (3x 20') + 3 young talks (3x 20')

COMMITTEES

• CONFERENCE CHAIRS

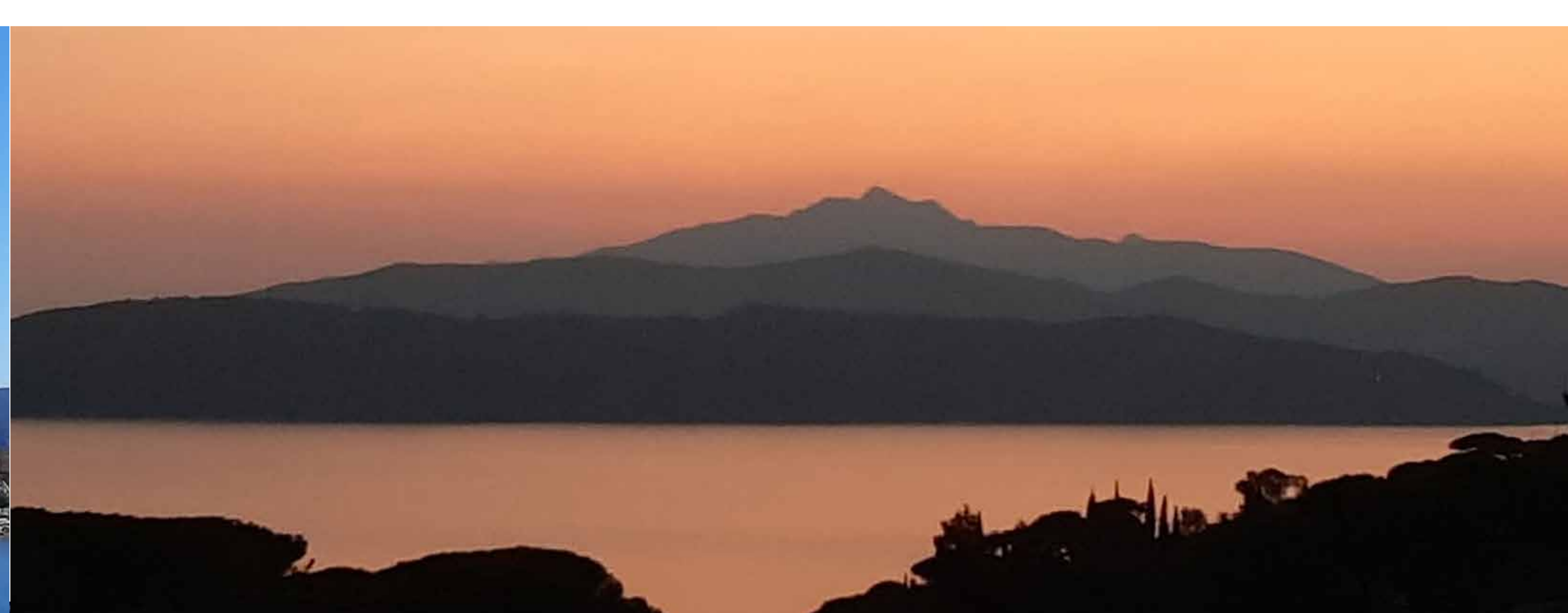
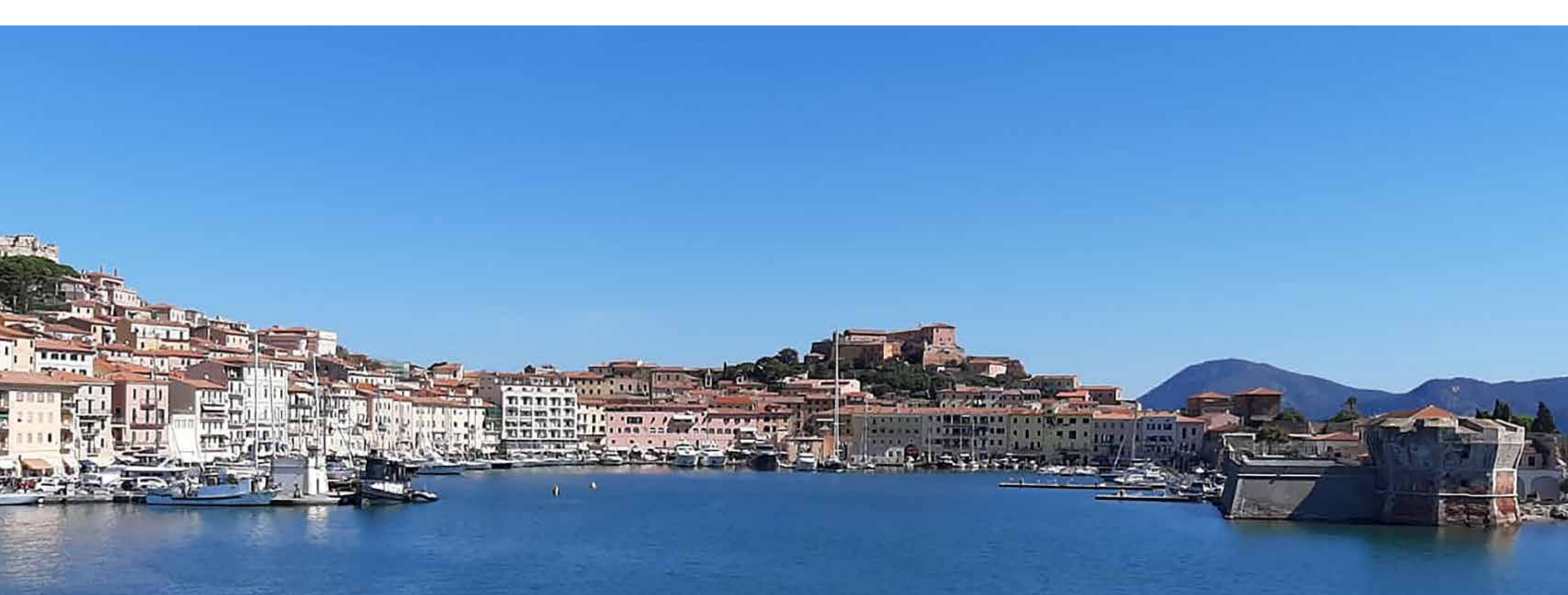
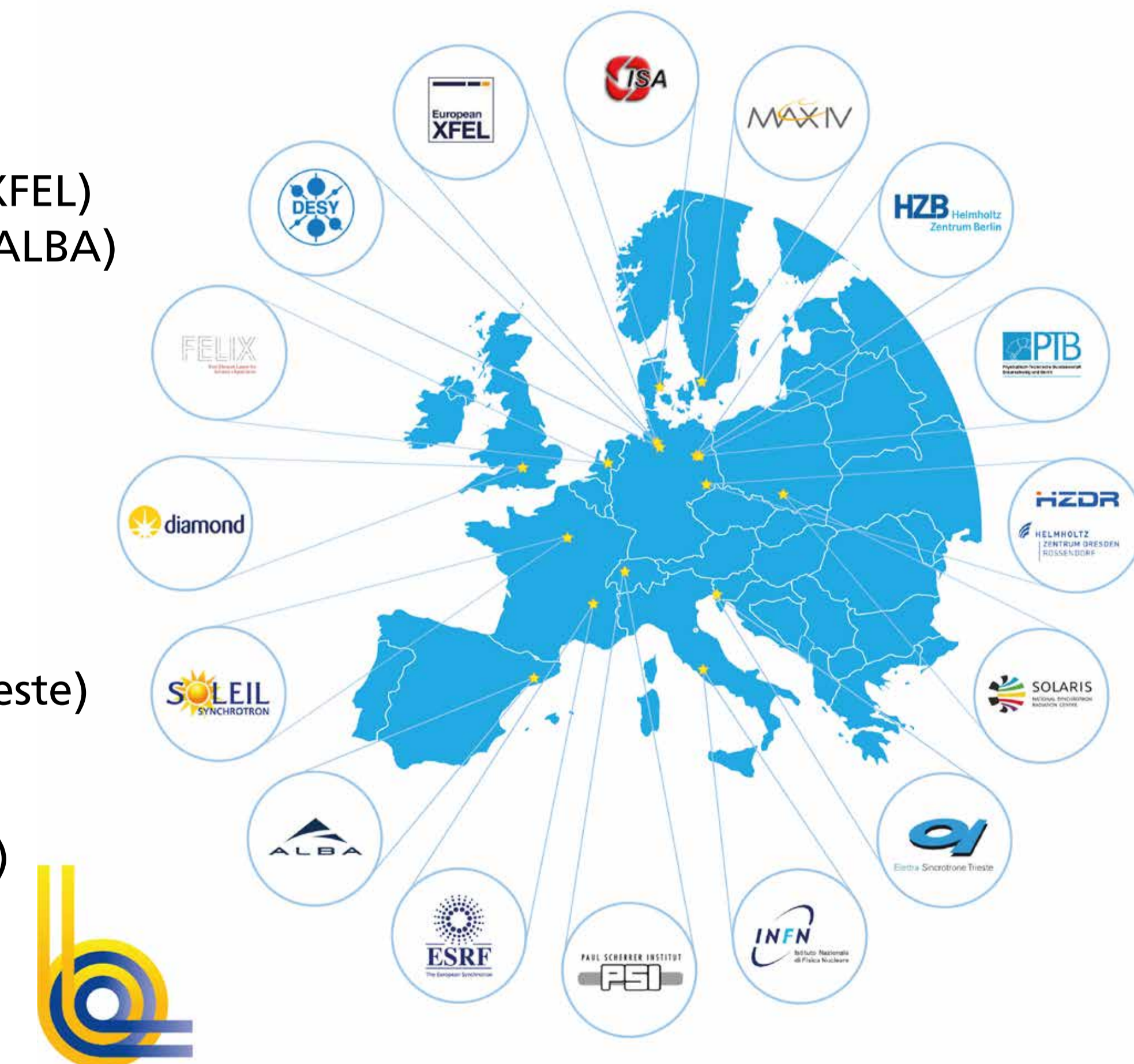
Caterina Biscari (ALBA) and Helmut Dosch (DESY)

• ORGANIZING COMMITTEE

Massimo Ferrario (co-chair, INFN - LNF)
Søren Pape Møller (co-chair, Aarhus University)
Maria Rita Ferrazza (INFN - LNF)
Julia Hauk (DESY)
Ute Krell (DESY)
Lucia Lilli (INFN - Pisa)
Susanne Schaefer (DESY)
Francesco Sette (ESRF)
Francesco Stellato (University of Roma "Tor Vergata")
Fabio Villa (INFN - LNF)
Giulia Vinicola (INFN-LNF)

• SCIENTIFIC PROGRAM COMMITTEE

Oliver Rader (co-chair, HZB)
Sakura Pascarelli (co-chair, XFEL)
Klaus Attenkofer (co-chair, ALBA)
Gabriel Aeppli (PSI)
Ralph Assmann (DESY)
Simon Gerber (PSI)
Giacomo Ghiringhelli (Politecnico di Milano)
Andrei I. Kirilyuk (Radboud University Nijmegen)
Andrea Locatelli (Elettra-Trieste)
Ralf Röhlsberger (DESY)
Tobias Schulli (ESRF)
Thomas Tschentscher (XFEL)
Joachim Wosnitza (HZDR)



Strengthening Europe's leading role in science and innovation