

IEEE 16th Workshop on
Low Temperature Electronics

WOLTE16

Cagliari, Sardinia, Italy | June 3-6, 2024



WOLTE 16 CONFERENCE PROGRAM

Please visit our website
for more information!

wolte16.org



In collaboration with:



UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II

Table of Contents

16th Workshop on Low Temperature Electronics, WOLTE16 2024.....	2
WOLTE16 2024 Sponsors.....	3
Platinum Sponsors.....	4
Gold Sponsors.....	5
Silver Sponsors.....	6
Keynote Speakers.....	7
Sunday, 2 June 2024.....	9
Monday, 3 June 2024.....	10
Tuesday, 4 June 2024.....	15
Wednesday, 5 June 2024.....	20
Thursday, 6 June 2024.....	25

16th Workshop on Low Temperature Electronics, WOLTE16 2024
June 3 – 6, 2024, Cagliari, Sardinia, Italy

Welcome to WOLTE16 2024.

Thank you for joining us in continuing to meet and share the recent developments in low-temperature electronics research: we have now returned to fully in-person meetings, and this is great news for all of us! Cagliari is a unique and beautiful city on an Italian island, and I'm sure we will enjoy the environment as well as the meetings!

We have created a program that is very interesting from both technical and scientific points of view, and hopefully, you will enjoy it. The number of participants is encouraging.

WOLTE16 will be a four-day workshop bringing together leaders of the research, university, industrial, and commercial communities from around the world in an intimate in-person format to discuss progress and challenges in the field of low-temperature electronics and related topics such as quantum computing including cryogenic qubit control and readout based on superconducting and cryo CMOS circuits, parametric amplifiers, quantum sensors, innovations in superconducting and cryo CMOS electronics including neuromorphic circuits, cryogenic detectors including photon number resolving circuits, and novel superconducting devices. The sessions will include keynotes, invited and contributed talks, and highlights for brief presentations. Industrial contributions will be presented in dedicated technological slots within the program and there will be awards for best presentations in several categories. WOLTE16 per se is based on abstracts and presentations, yet the conference has special arrangements with IEEE Transactions on Applied Superconductivity and Quantum Engineering for publication of full-length archival journal papers (with known high standards through peer reviews). With the excellent support of Conference Catalysts, we aim to offer a program that will enable you to interact directly with your peers as much as you need and want.

WOLTE16 is organized for the second time through full sponsorship of the IEEE Council on Superconductivity led by its President Dr. John Przybysz. IEEE tutelage raises the profile of the conference and provides greater assurance of continuity and quality. WOLTE16 is also proud to benefit from the technical co-sponsorship of The University of Naples Federico II and to enjoy the patronage of seven platinum, gold, and silver sponsors.

Finally, I'd like to thank all the people who have helped us to organize WOLTE16: reviewers, track chairs, organizing committee, program committee, scientific board, sponsors, patrons, and the staff at Conference Catalysts. In particular, special thanks to Mariachiara Lupi and Alexis Wisdom who have provided the indispensable administrative and logistics arrangements for WOLTE16, true film directors of this hopefully fascinating experience.

And even more special thanks to everyone for participating in WOLTE16: nothing would have been possible without you!

Erik P. DeBenedictis

WOLTE 2024 – General Conference Chair



WOLTE16 2024 Sponsors

Conference Sponsors



*Advancing Technology
for Humanity*



In collaboration with:



UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II

Platinum Sponsors



Electron Mec
<https://www.electron-mec.com/>



Basel Precision Instruments
<https://www.baspi.ch/>

Gold Sponsors



Photon Technology Italy
<https://snsdpd.com/>



Quantum Machines
<https://www.quantum-machines.co/>

Silver Sponsors



Assing S.p.A.
<https://www.assing.it/>



JEOL
<https://www.jeol.com/>



ZEISS
<https://www.zeiss.it/>

Keynote Speakers



Anna Grassellino

Fermi National Accelerator Laboratory, USA

“Advancements in critical technologies for superconducting quantum systems at the SQMS Center”



David Frank

IBM Watson Research Center, USA

“Qubit State Control Using 14nm CryoCMOS ASICs”



Francesco Tafuri

Università di Napoli Federico II, Italy

“Quantum computation boosting novel superconducting and hybrid solutions and the impact of PNRR in Italy”



Fabio Sebastiano

Delft University of Technology, The Netherlands

“Cryogenic electrical interfaces for large-scale spin-qubit quantum processors”



Jeffrey Shainline

NIST Boulder, USA

“Semiconductor-superconductor-photonics integration for neuromorphic supercomputing and sensor applications”

Sunday, 2 June 2024

17:30

Registration Opens

18:00 - 20:00

Welcome Reception

Room: Palazzo Doglio

Vico Logudoro 1, 09127 Cagliari CA

Monday, 3 June 2024

08:00

Registration Opens

Room: Teatro Doglio

Vico Logudoro 32, 09127 Cagliari CA

08:40 – 09:00

Welcome

Erik DeBenedictis (General Chair) and Oleg Mukhanov (Technical Program Chair)

Room: Platea

09:00 – 11:40

Session: Quantum Computing

Session Chair: Alexey Ustinov (Karlsruhe Institute of Technology)

Room: Platea

09:00

Keynote Presentation: Advancements in critical technologies for superconducting quantum systems at the SQMS Center

Anna Grassellino (Fermi National Accelerator Laboratory, USA)

09:45

Quantum-based Metrology with Josephson Junction Circuits at NIST

Samuel Benz (NIST, USA)

10:05

On-chip digital readout of a superconducting qubit using a Josephson Digital Phase Detector

Luigi Di Palma (SEEQC-EU, Italy)

Laura Di Marino (University of Naples Federico II & SEEQC-EU, Italy)

Federico Vittorio Lupo (Università Degli Studi di Palermo & SEEQC, Italy)

Amir Salim (SEEQC -US, USA)

Louis Fry-Bouriaux (SEEQC-UK, Italy)

Oleg Mukhanov (SeeQC, USA)

Marco Arzeo (SeeQC, Italy)

10:25 - 10:45

Coffee Break

Session: Quantum Computing continued

Session Chair: Alexey Ustinov (Karlsruhe Institute of Technology)

Room: Platea

10:45

Fast Gates for Slow Fluxonium Qubits Using Single Flux Quantum Control

Maxim G Vavilov (University of Wisconsin - Madison, USA)

Lucas A Rogers (University of Wisconsin - Madison, USA)

Oleg Mukhanov (SeeQC, USA)

11:05

Superconducting digital circuit approaches for control and readout of quantum circuits

Ronny Stolz (Leibniz IPHT, Germany & Technical University Ilmenau, Germany)

Matthias Schmelz (Leibniz IPHT, Germany)

Soundarya Gopala Reddy (Leibniz Institute of Photonic Technology, Germany)

Juergen Kunert (Leibniz IPHT, Germany)

Ugur Yilmaz (IQM Deutschland, Germany)

Thomas Ortlepp (CiS Forschungsinstitut für Mikrosensorik GmbH, Germany)
Gregor Oelsner (Leibniz Institute of Photonic Technology (IPHT), Germany)

11:25

Effect of the remanent magnetic field on the performance of superconducting cavities and quantum systems at high and low microwave field amplitudes

Alexander Romanenko (Fermi National Accelerator Laboratory, USA)

11:40 - 13:15

Session: Photon Number Resolving Detectors

Session Chair: Loredana Parlato (University of Naples Federico II)

Room: Platea

11:40

Photon Number Resolving Superconducting Nanowire Detectors

Marco Colangelo (Northeastern University, USA)

12:00

Photon-number-resolving superconducting single-photon detector with speed of 5 GHz and photon number resolution of 61

Hao Li (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China)

Tianzhu Zhang (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of, China)

Jia Huang (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of, China)

Weijun Zhang (SIMIT, CAS, China)

Lixing You (SIMIT, CAS, China)

12:20

Enabling high photon-number-efficiency detectors with superconducting nanowires Invited

Lorenzo Stasi (ID Quantique SA & University of Geneva, Quantum Technologies Group, Switzerland)

12:40

Towards axion detection in the ALPS-II experiment employing a transition edge sensor

Devendra Kumar Namburi (University of Glasgow, United Kingdom (Great Britain))

13:00

Heat Transport in Low-Temperature Nanodevices

Mariia Sidorova (Humboldt University, Germany)

Alexei Semenov (German Aerospace Center (DLR), Germany)

Alessio Zaccone (University of Milan, Italy)

M. Gonzalez (University of Zürich, Germany)

Ilya Charaev (University of Zürich, Switzerland)

Andreas Schilling (Physics Institute, University of Zürich, Switzerland)

Samuel Gyger (KTH Royal Institute of Technology, Sweden)

Stephan Steinhauer (KTH, Sweden)

13:20 - 14:45

Lunch

14:45 - 17:15

Session: Novel Cryogenic Devices

Session Chair: Vladimir Krasnov (Stockholm University)

Room: Platea

14:45

Gate-controlled superconductivity: mechanisms, device parameters, and technological potential

Leon Ruf (University of Konstanz, Germany)

Jennifer Koch (University of Konstanz, Germany)

Antonio Vecchione (Istituto SPIN CNR Salerno, Italy)

Andrea Caviglia (University of Geneva, Switzerland)

Wolfgang Belzig (University of Konstanz, Germany)

Simone Gasparinetti (Chalmers University of Technology, Sweden)

Szabolcs Csonka (Budapest University of Technology and Economics, Hungary)

Mario Cuoco (CNR-SPIN, Italy)

Francesco Giazotto (NEST Pisa, Italy)

Elke Scheer (University of Konstanz, Germany)

Angelo Di Bernardo (University of Konstanz, Germany)

15:05

Performance parameters of gate-controlled superconducting Nb devices with high reproducibility

Leon Ruf (University of Konstanz, Germany)

Jennifer Koch (University of Konstanz, Germany)

Elke Scheer (University of Konstanz, Germany)

Angelo Di Bernardo (University of Konstanz, Italy & University of Salerno, Italy)

15:25

Wafer-Scale Josephson Field-Effect Transistors Based on CVD Graphene

Andrey Generalov (VTT Technical Research Centre of Finland, Finland)

Klaara Viisanen (VTT Technical Research Centre of Finland, Finland)

Bernardo Realista Ferreira (VTT Technical Research Centre of Finland, Finland)

Jorden Senior (VTT Technical Research Centre of Finland, Finland)

Jian Ma (Aalto University, Finland)

Mikko Möttönen (Aalto University & VTT Technical Research Centre of Finland, Finland)

Mika Prunnila (VTT Technical Research Centre of Finland, Finland)

Heorhii Bohuslavskyi (VTT Technical Research Centre of Finland, Finland)

15:45

Manufacturing challenges and solutions for large-scale high-yield hybrid superconducting-semiconducting quantum circuits

Kaveh Delfanazari (University of Glasgow, United Kingdom (Great Britain))

16:05

Superconducting Nanowire-Driven Charge Configuration Memristor

Anze Mraz (Jozef Stefan Institute, Slovenia)

16:25 - 16:45

Coffee Break

Session: Novel Cryogenic Devices continued**Session Chair:** Vladimir Krasnov (Stockholm University)**Room:** Platea**16:45****Tunnel Magnetic Josephson Junctions Towards Hybrid Superconducting Quantum Architectures**

Roberta Satariano (Università Federico II di Napoli, Italy)

Halima Giovanna Ahmad (Università di Napoli Federico II & CNR-SPIN UOS-Napoli, Italy)

Raffaella Ferraiuolo (Università di Napoli Federico II, Italy)

Luigi Di Palma (Università di Napoli Federico II, Italy)

Zafar Iqbal (University of Naples Federico II, Italy)

Antonio Vettoliere (Consiglio Nazionale delle Ricerche - ISASI, Italy)

Carmine Granata (Consiglio Nazionale delle Ricerche - ISASI, Italy)

Domenico Montemurro (Università di Napoli Federico II, Italy)

Giovanni Ausanio (Università Federico II di Napoli, Italy)

Loredana Parlato (University of Naples Federico II, Italy)

Giovanni Piero Pepe (Naples University Federico II, Italy)

Francesco Tafuri (Università di Napoli Federico II, Italy)

Davide Massarotti (Università degli Studi di Napoli Federico II, Italy)

17:00**Superconducting Tunneling in a Ta/MgO/Ta Heterostructure**

Wei-Che Hsu (National Taiwan University, Taiwan)

Min-Jui Lin (National Taiwan University, Taiwan)

Yao Su (National Taiwan University, Taiwan)

Jiun-Yun Li (National Taiwan University, Taiwan)

17:15 - 19:20**Exhibitor Pitches & Poster Session 1****Session Chair:** Roberta Satariano (University of Naples Federico II)**Room:** Platea**Electron Mec****Photon Technology****Cryogenic DC-coupled readout electronics for high-speed SNSPD using a commercial trans-impedance operational amplifier**

Weijun Zhang (SIMIT, CAS, China)

Zhi-Gang Chen (Shanghai Institute of Microsystem and Information Technology, CAS, China)

Xing-Yu Zhang (Shanghai Institute of Microsystem and Information Technology, China)

Yu-Ze Wang (Shanghai Institute of Microsystem and Information Technology, CAS, China)

Jia-Min Xiong (Shanghai Institute of Microsystem and Information Technology, China)

Yi-Yu Hong (Shanghai Institute of Microsystem and Information Technology, China)

Pu-sheng Yuan (Shanghai Institute of Microsystem and Information Technology, China)

Ling Wu (Shanghai Institute of Microsystem and Information Technology, China)

Zhen Wang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, China);

Lixing You (SIMIT, CAS, China)

Control of a Josephson Digital Phase Detector via an SFQ-based Flux Bias Driver

Laura Di Marino (University of Naples Federico II & SEEQC-EU, Italy)

Luigi Di Palma (SEEQC-EU, Italy)

Federico Vittorio Lupo (Università Degli Studi di Palermo & SEEQC, Italy)

Michele Riccio (University of Naples Federico II, Italy)

Francesco Fienga (University of Naples Federico II, Italy)

Marco Arzeo (SeeQC, Italy)

Oleg Mukhanov (SeeQC, USA)

Evidence for triplet Cooper pairing from reduced decay of Josephson coupling across ferromagnetic junctions with spin-orbit coupling layers

Ivan Kindiak (Max Planck Institute for Microstructure Physics, Germany)

Highly sensitive dc SQUID array amplifier for mK operation

Matthias Schmelz (Leibniz IPHT, Germany)

Vitaly Shvab (Leibniz-IPHT Jena, Germany)

Katja Peiselt (Leibniz-IPHT Jena, Germany)

Juergen Kunert (Leibniz IPHT, Germany)

Vyacheslav Zakosarenko (Leibniz IPHT & Supracon AG, Germany)

Ronny Stolz (Leibniz IPHT, Germany & Technical University Ilmenau, Germany)

Simulation of Quantum Transport in a Si/SiGe Quantum Dot

Yu-Cheng Li (National Taiwan University, Taiwan)

Che-Hao Chang (National Taiwan University, Taiwan)

Yu-Jui Wu (National Taiwan University, Taiwan)

Chen-Yao Liao (National Taiwan University, Taiwan)

Jiun-Yun Li (National Taiwan University, Taiwan)

Cryogenic Characteristics of HZO-Based Ferroelectric Capacitors and FeFETs

Yi-Tzu Wang (National Taiwan University, Taiwan)

Hsiang-Shun Kao (National Taiwan University, Taiwan)

Jiun-Yun Li (National Taiwan University, Taiwan)

Analytical model for the calculation and optimisation of cryogenically cooled current leads and wire interconnects

Joseph Glass (Absolut System, France)

Steven Brebels (IMEC, Belgium)

Dispersion improvement on YBCO ion-irradiated Josephson junctions for the development of quantum interference antennas

Sarah Menouni (Laboratoire Albert Fert - CNRS - Thales - Université Paris-Saclay, France)

Meghan Lecerf (Université Paris-Saclay & Laboratoire Albert Fert & Thales, France)

Denis G Crété (Unité Mixte de Physique CNRS/THALES & THALES REsearch & Technology, France)

Daniel Dolfi (Thales Research & Technology, France)

Christian Ulysse (CNRS, France)

Julien Kermorvant (THALES SIX, France)

Salvatore Mesoraca (Unité Mixte de Physique CNRS/Thales, France)

Juan Trastoy (Unité Mixte de Physique CNRS/THALES, France)

Tuesday, 4 June 2024

08:00

Registration Opens

Room: Teatro Doglio

Vico Logudoro 32, 09127 Cagliari CA

09:00 – 13:15

Session: CryoCMOS Circuits

Session Chair: Fabio Sebastiano (Delft University of Technology) & Alexander Grill (imec)

Room: Platea

09:00

Keynote Presentation: Qubit State Control Using 14nm CryoCMOS ASICs

David J Frank (IBM Watson Research Center, USA)

Devin Underwood (IBM Watson Research Center, USA)

John Timmerwilke (IBM Watson Research Center, USA)

Raphael Robertazzi (IBM Watson Research Center, USA)

Joseph A Glick (IBM Watson Research Center, USA)

Kevin Tien (IBM Watson Research Center, USA)

Sudipto Chakraborty (IBM Watson Research Center, USA)

Mark Yeck (IBM Watson Research Center, USA)

Pat Rosno (IBM Quantum, Rochester, USA);

Brian Gaucher (IBM, USA)

Daniel Friedman (IBM Watson Research Center, USA)

09:45

Cryo-CMOS Interface Chipset in 28nm Bulk CMOS for Quantum Computing

Tiefu Li (Tsinghua University, China)

10:05

Superconducting Qubit Control with Ultra-Low-Power CryoCMOS Multiplexer at Millikelvin Temperatures

Anton Potocnik (IMEC, Belgium)

Rohith Acharya (IMEC, Belgium)

Steven Brebels (IMEC, Belgium)

Alexander Grill (IMEC, Belgium)

Tsvetan Ivanov (IMEC, Belgium)

Daniel Perez Lozano (IMEC, Belgium)

Jacques Van Damme (IMEC, Belgium)

A M Vadiraj (IMEC, Belgium)

Massimo Mongillo (IMEC, Belgium)

Danny Wan (IMEC, Belgium)

Jan Craninckx (IMEC, Belgium)

Kristiaan De Greve (IMEC, Belgium)

10:25 - 10:45

Coffee Break

Session: CryoCMOS Circuits continued

Session Chair: Fabio Sebastiano (Delft University of Technology) & Alexander Grill (imec)

Room: Platea

10:45

CMOS on-chip thermometry at deep cryogenic temperatures

Grayson M. Noah (Quantum Motion, United Kingdom (Great Britain))

Thomas H. Swift (London Centre for Nanotechnology, United Kingdom (Great Britain))

Mathieu De Kruijf (London Centre for Nanotechnology, United Kingdom (Great Britain))

Alberto Gomez-Saiz (Quantum Motion, United Kingdom (Great Britain))

John J. L. Morton (Quantum Motion, United Kingdom (Great Britain))

Miguel Fernando Gonzalez Zalba (Quantum Motion & University of Cambridge, United Kingdom (Great Britain))

11:05

Low Temperature Semiconductor/Superconductor Hybrid Systems for Future Computing

Stephen R Whiteley (Synopsys, Inc. & Whiteley Research Inc., USA)

Jamil Kawa (Synopsys, Inc., USA)

11:25

JCMOS: Josephson-CMOS hybrids

Erik P. DeBenedictis (Zettaflops, LLC, USA)

11:45

QUOCCA SET: A Scalable Readout IC for Semiconductor Quantum Dots Using Single Electron Transistors and Correlated Double Sampling

Jonas Bühler (Forschungszentrum Jülich GmbH, Germany)

Arun Ashok (Forschungszentrum Jülich, Germany)

Lammert Duipmans (ZEA-2, Forschungszentrum Jülich GmbH, Germany)

Christian Grewing (Forschungszentrum Jülich GmbH, Germany)

Dennis Nielinger (Forschungszentrum Jülich, Germany)

Patrick N Vliex (Forschungszentrum Jülich, Germany)

André Zambanini (ZEA-2, Forschungszentrum Jülich GmbH, Germany)

Stefan van Waasen (Forschungszentrum Jülich GmbH, Germany)

12:00

Cryogenic Non-volatile Memory and In-memory Computing Based on Thin-film Hf_{0.5}Zr_{0.5}O₂ Capacitors

Heorhii Bohuslavskyi (VTT Technical Research Centre of Finland, Finland)

Kestutis Grigoras (VTT Technical Research Centre of Finland, Finland)

Mario Ribeiro (VTT Technical Research Centre of Finland, Finland)

Mika Prunnila (VTT Technical Research Centre of Finland, Finland)

Sayani Majumdar (Tampere University, Finland)

12:15

Hybrid SFQ-CryoCMOS Qubit Control Using Low-Noise and High-Precision Semiconductor 8-bit Programmable Voltage Generator

Oleg Mukhanov (SeeQC, USA)

Bibhu Datta Sahoo (University at Buffalo, USA)

12:30

A Cryogenic Isolated Gate Drive Circuit for Medium-voltage Medium-current IGBT Power Modules

Yudi Xiao (University of Strathclyde, United Kingdom (Great Britain))

Yuchuan Liao (University of Strathclyde, United Kingdom (Great Britain))

Abdelrahman El-Wakeel (University of Strathclyde, United Kingdom (Great Britain))

Rafael Pena-Alzola (University of Strathclyde, United Kingdom (Great Britain))

Weijia Yuan (University of Strathclyde, United Kingdom (Great Britain))

Min Zhang (University of Strathclyde, United Kingdom (Great Britain))

12:45

Cryogenic Transimpedance Amplifiers Based on Off-the-shelf HEMTs: from Spin Qubit Read-Out to Shot-Noise Measurements

Oskari Pankala (VTT Technical Research Centre of Finland, Finland)

Heorhii Bohuslavskiy (VTT Technical Research Centre of Finland, Finland)

13:00

Cryogenic characterization of 7 nm FinFET technology from 300 K down to 20 mK

Mridula Prathapan (IBM Research, Switzerland)

Thomas Morf (IBM Research - Zurich, Switzerland)

Marcel Kossel (IBM, Switzerland)

Cezar Zota (IBM Research Zurich, Switzerland)

Peter Mueller (University of Basel, Switzerland)

13:20 - 14:45

Lunch

14:45 - 17:20

Session: Cryogenic Quantum Sensors

Session Chair: Nobuyuki Yoshikawa (Yokohama National University)

Room: Platea

14:45

Quantum Backaction and Entanglement with Mechanical Oscillators

Mika A. Sillanpää (Aalto University, Finland)

15:05

Single-Shot Readout of a Superconducting Qubit Using a Thermal Detector

Mikko Möttönen (Aalto University & VTT Technical Research Centre of Finland, Finland)

15:25

Efficient Microwave Photon to Electron Conversion in a High Impedance Circuit

Ognjen Stanisavljevic (Université Paris Saclay & Laboratoire de Physique Des Solides, France)

Jean-Côme Philippe (CNRS, France)

Julien Gabelli (CNRS, Université Paris Sud, France)

Marco Aprili (Laboratoire de Physique Des Solides, France)

Julien Basset (Université Paris Saclay & Laboratoire de Physique Des Solides, France)

Jérôme Estève (CNRS & Laboratoire de Physique Des Solides, France)

15:45

Sensing at the Single-Photon Level with a Josephson Parametric Amplifier

Sorin Paraoanu (Aalto University, Finland)

16:05

VTT cryosensors and circuits for imaging and small signal readout

Juho Luomahaara (VTT Technical Research Centre of Finland Ltd, Finland)

16:25 - 16:45

Coffee Break

Session: Cryogenic Quantum Sensors continued**Session Chair:** Nobuyuki Yoshikawa (Yokohama National University)**Room:** Platea**16:45****Quantum Sensing With Superconducting Qubits for Fundamental Physics**

Roberto Moretti (INFN - Sezione di Milano Bicocca & Università Degli Studi di Milano Bicocca, Italy)

17:05**Annealing effects on ion-irradiated Josephson junctions to improve the performance of YBCO-based quantum interference antennas**

Meghan Lecerf (Université Paris-Saclay & Laboratoire Albert Fert & Thales, France)

Sarah Menouni (Laboratoire Albert Fert - CNRS - Thales - Université Paris-Saclay, France)

Denis G Crété (Unité Mixte de Physique CNRS/THALES & THALES REsearch & Technology, France)

Daniel Dolfi (Thales Research & Technology, France)

Christian Ulysse (CNRS, France)

Julien Kermorvant (THALES SIX, France)

Salvatore Mesoraca (Unité Mixte de Physique CNRS/Thales, France)

Juan Trastoy (Unité Mixte de Physique CNRS/THALES, France)

17:20 - 19:20**Exhibitor Pitches & Poster Session 2****Session Chair:** Luigi Di Palma (SEEQC)**Room:** Platea**Basel Precision Instruments****Quantum Machines****Scalable microwave SQUID multiplexer readout architecture for TES-based THz security camera**

Matthias Schmelz (Leibniz IPHT, Germany)

Erik Heinz (Supracon AG, Germany)

Katja Peiselt (Leibniz-IPHT Jena, Germany)

Gabriel Zieger (Leibniz-IPHT Jena, Germany)

Oliver Brandel (Leibniz-IPHT Jena, Germany)

Detlef Born (Leibniz-IPHT Jena, Germany)

Juergen Kunert (Leibniz IPHT, Germany)

Michael Siegel (Supracon AG, Germany)

Vyacheslav Zakosarenko (Leibniz IPHT & Supracon AG, Germany)

Matthias Meyer (Supracon AG, Germany)

Ronny Stolz (Leibniz IPHT, Germany & Technical University Ilmenau, Germany)

Combining ferromagnetic Josephson junctions and magnetic racetracks

Swapna Sindhu Mishra (Max Planck Institute of Microstructure Physics, Halle, Germany)

Investigating the added noise of a SNAIL-based Traveling Wave Parametric Amplifier

Pegah darvehi (CNR SPIN, Italy)

Anna Levochkina (Naples University Federico II, Italy)

Domenico Montemurro (Università di Napoli Federico II, Italy)

Isita Chatterjee (Naples University Federico II, Italy)

Halima Giovanna Ahmad (Università di Napoli Federico II & CNR-SPIN UOS-Napoli, Italy)

Pasquale Mastrovito (Naples University Federico II, Italy)

Roberta Satariano (Università Federico II di Napoli, Italy)

Francesco Tafuri (Università di Napoli Federico II, Italy)

Davide Massarotti (Università degli Studi di Napoli Federico II, Italy)
Giovanni Piero Pepe (Naples University Federico II, Italy)
Martina Esposito (CNR SPIN, Italy)
Paolo Scotto Di Vettimo (CNR, Italy)

Preliminary Design of a W-band DC-Biased Three-Wave Mixing Kinetic Inductance Travelling Wave Parametric Amplifier

Javier Navarro Montilla (University of Oxford, United Kingdom (Great Britain))
Nikita Klimovich (University of Oxford, United Kingdom (Great Britain))
Ryan C. Stephenson (Jet Propulsion Laboratory, California Institute of Technology, USA)
Farzad Faramarzi (Jet Propulsion Laboratory, California Institute of Technology, USA)
Peter K. Day (Jet Propulsion Laboratory, California Institute of Technology, USA)
Boon-Kok Tan (University of Oxford, United Kingdom (Great Britain))

High-Q Thin Tantalum Superconducting Resonator Arrays on Silicon Chip

Kaveh Delfanazari (University of Glasgow, United Kingdom (Great Britain))

Low-Temperature Photon Dynamics for Photodegradation by Singlet Oxygen with Low Energy

Ivonne Hahyoung Jin (Cheongna Dalton School, Korea (South))
Ivette Suhyoung Jin (Cheongna Dalton School, Korea (South))
Richard Kyung (CRG-NJ, USA)

Characterization of 650 V GaN Transistors at Cryogenic Temperature in All-electric Aircraft Applications

Yuchuan Liao (University of Strathclyde, United Kingdom (Great Britain))
Yudi Xiao (University of Strathclyde, United Kingdom (Great Britain))
Abdelrahman El-Wakeel (University of Strathclyde, United Kingdom (Great Britain))
Rafael Pena-Alzola (University of Strathclyde, United Kingdom (Great Britain))
Min Zhang (University of Strathclyde, United Kingdom (Great Britain))
Weijia Yuan (University of Strathclyde, United Kingdom (Great Britain))

Zero-field Coulomb Blockade Thermometers

Juho Luomahaara (VTT Technical Research Centre of Finland Ltd, Finland)
Renan P. Loreto (VTT Technical Research Centre of Finland Ltd, Finland)
Omid S. Sedeh (University of Basel, Switzerland)
Lassi Lehtisyrjä (VTT Technical Research Centre of Finland Ltd, Finland)
Janne Lehtinen (VTT Technical Research Centre of Finland Ltd, Finland)
Nikolai Yurttagul (VTT Technical Research Centre of Finland Ltd, Finland)
Leif Grönberg (VTT Technical Research Center, Finland)
Tuure Rantanen (VTT Technical Research Centre of Finland Ltd, Finland)
Christian Scheller (University of Basel, Switzerland)
Dominik Zumbühl (University of Basel, Switzerland)
Alexander T. Jones (Lancaster University, United Kingdom (Great Britain))
Jonathan R Pranc (Lancaster University, United Kingdom (Great Britain))
Samuli Autti (Lancaster University, United Kingdom (Great Britain))
Richard P. Haley (Lancaster University, United Kingdom (Great Britain))
Mika Prunnila (VTT Technical Research Centre of Finland, Finland)

Wednesday, 5 June 2024

08:00

Registration Opens

Room: Teatro Doglio

Vico Logudoro 32, 09127 Cagliari CA

09:00 – 09:45

Session: Quantum Computing

Session Chair: Ronny Stolz (Leibniz Institute of Photonic Technology) & Coenrad Fourie (Stellenbosch University)

Room: Platea

09:00

Keynote Presentation: Quantum computation boosting novel superconducting and hybrid solutions and the impact of PNRR in Italy

Francesco Tafuri (Università di Napoli Federico II, Italy)

09:45 – 13:20

Session: Superconducting Electronics

Session Chair: Ronny Stolz (Leibniz Institute of Photonic Technology) & Coenrad Fourie (Stellenbosch University)

Room: Platea

09:45

Demonstration of 38-Gbps Readout Operation of Josephson-CMOS Hybrid Memory

Nobuyuki Yoshikawa (Yokohama National University, Japan)

10:05

Superconducting Array of Arrays for Acceleration of Transformers

Manu Perumkunnil Komalan (IMEC, Belgium)

Kartik Lakshminarasimhan (IMEC, Belgium)

Udara De Silva (IMEC, Belgium)

Debjyoti Bhattacharjee (IMEC, Belgium)

Trent Josephson (IMEC, Belgium)

Quentin Herr (IMEC, Belgium)

Anna Herr (IMEC, Belgium)

10:25 - 10:45

Coffee Break

Session: Superconducting Electronics continued

Session Chair: Ronny Stolz (Leibniz Institute of Photonic Technology) & Coenrad Fourie (Stellenbosch University)

Room: Platea

10:45

Development of High-Frequency Single Flux Quantum Circuits on Different Fabrication Processes with Nb and NbN Josephson Junctions

Jie Ren (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Science, China)

11:05

Sustainable Superconductive Ballistic Fluxon Circuit Technology

Federico Vittorio Lupo (Università Degli Studi di Palermo & SEEQC, Italy)

Sam Adler (SEEQC US, Italy)

Marco Arzeo (SeeQC, Italy)

Oleg Mukhanov (SeeQC, USA)

11:25

Vortex-based digital superconducting electronics

Vladimir M. Krasnov (Stockholm University, Sweden)

11:45

Electronic Design Automation Tools for Superconductor Electronics with Application to Flux Trapping Analysis

Coenrad Fourie (Stellenbosch University, South Africa)

Kyle Jackman (Stellenbosch University, South Africa & SUN Magnetics, South Africa)

12:05

Advancing SQUID Array Simulations: High-Fidelity Circuit Modeling with Comprehensive Mutual Inductance Integration

Kyle Jackman (Stellenbosch University, South Africa & SUN Magnetics, South Africa)

Coenrad Fourie (Stellenbosch University, South Africa)

12:20

Evaluation of Self and Mutual Inductances of Circuit Structures in Planarized Fabrication Process with 8-Metal Layers

Xue Zhang (Shanghai Institute of Microsystem and Information Technology, China)

Liliang Ying (Shanghai Institute of Microsystem and Information Technology, China)

Xi Gao (Shanghai Institute of Microsystem and Information Technology, China)

Guixiang He (Shanghai Institute of Microsystem and Information Technology, China)

Linxian Ma (Shanghai Institute of Microsystem and Information Technology, China)

Weifeng Shi (Shanghai Institute of Microsystem and Information Technology, China)

Jie Ren (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Science, China)

Wei Peng (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, China)

Zhen Wang (Shanghai Institute of Microsystem and Information Technology & University of Chinese Academy of Sciences, China)

12:35

Superconducting Readout of a Compensated Memory Bit

Jackson Miller (Victoria University of Wellington, New Zealand)

William Holmes-Hewett (Victoria University of Wellington, New Zealand)

Simon Granville (Victoria University of Wellington & MacDiarmid Institute for Advanced Materials and Nanotechnology, New Zealand)

Joe Trodahl (Victoria University of Wellington, New Zealand)

Ben Ruck (Victoria University of Wellington, New Zealand)

12:50

Quantum phase slips in disordered superconducting NbN thin films

Evgeni Il'ichev (Leibniz Institute of Photonic Technology, Germany)

13:05

Thermal Management in a Superconducting Coherent Terahertz Emitter with Engineered Cavity

Mingqi Zhang (University of Glasgow, United Kingdom (Great Britain))

Kazuo Kadowaki (University of Tsukuba, USA)

T Kashiwagi (University of Tsukuba, United Kingdom (Great Britain))

Kaveh Delfanazari (University of Glasgow, United Kingdom (Great Britain))

13:20 - 14:45

Lunch

14:45 - 17:50

Session: CryoCMOS Components

Session Chair: Fernando Gonzalez-Zalba (Quantum Motion) & Heorhii Bohuslavskyi (VTT Technical Research Centre of Finland)

Room: Platea

14:45

Keynote Presentation: Cryogenic electrical interfaces for large-scale spin-qubit quantum processors

Fabio Sebastiano (Delft University of Technology, The Netherlands)

15:30

Self-heating and Thermal Coupling Effects in Advanced FD-SOI CMOS Nodes Down to Cryogenic Temperatures

Flavio Bergamaschi (CEA-Leti, France)

Tadeu M. Frutuoso (CEA-Leti, France)

Bruna C. Paz (Quobly, France)

G rard Billiot (CEA-Leti, France)

Louis Jansen (CEA-IRIG, France)

Philippe Galy (STMicroelectronics, Switzerland)

Mika l Cass  (CEA-Leti, France)

Emmanuel Vincent (ST Microelectronics, France)

15:50

Milli-Kelvin Analysis Revealing the Role of Band-edge States in Cryogenic MOSFETs

Hiroshi Oka (National Institute of Advanced Industrial Science and Technology, Japan)

Hidehiro Asai (National Institute of Advanced Industrial Science and Technology, Japan)

Takumi Inaba (National Institute of Advanced Industrial Science and Technology, Japan)

Shunsuke Shitakata (National Institute of Advanced Industrial Science and Technology, Japan)

Hitoshi Yui (National Institute of Advanced Industrial Science and Technology, Japan)

Hiroshi Fuketa (National Institute of Advanced Industrial Science and Technology (AIST), Japan)

Shota Iizuka (National Institute of Advanced Industrial Science and Technology, Japan)

Kimihiko Kato (National Institute of Advanced Industrial Science and Technology, Japan)

Takashi Nakayama (National Institute of Advanced Industrial Science and Technology, Japan)

Takahiro Mori (National Institute of Advanced Industrial Science and Technology, Japan)

16:10

A Cryogenic 22nm FD-SOI CMOS 12 Channel DAC for Spin Qubit Bias

Lea Schreckenber (Forschungszentrum Juelich GmbH, Germany)

Patrick N Vliex (Forschungszentrum Juelich, Germany)

Volker Christ (Forschungszentrum Juelich GmbH, Germany)

Andre Kruth (Forschungszentrum Juelich GmbH, Germany)

Sabitha Kusuma (Forschungszentrum Juelich GmbH, Germany)

Daniel Liebau (Forschungszentrum Juelich GmbH, Germany)

Jonas Mair (Forschungszentrum Juelich GmbH, Germany)

Stefan van Waasen (Forschungszentrum Juelich GmbH, Germany)

16:25 - 16:45

Coffee Break

Session: CryoCMOS Components continued**Session Chair:** Fernando Gonzalez-Zalba (Quantum Motion) & Heorhii Bohuslavskiy (VTT Technical Research Centre of Finland)**Room:** Platea**16:45****Understanding cryogenic CMOS device physics to enable scaling of quantum computers**

Alexander Grill (IMEC, Belgium)

Jakob Michl (TU Vienna, Austria)

Ruben Asanovski (IMEC, Belgium)

Javier Diaz Fortuny (IMEC, Belgium)

Arnout Beckers (IMEC, Belgium)

Erik Bury (IMEC, Belgium)

Stanislav Tyaginov (IMEC, Belgium)

Adrian Chasin (IMEC, Belgium)

Tibor Grasser (Vienna University of Technology, Austria)

Michael Waltl (TU Wien, Austria)

Ben Kaczer (IMEC, Belgium)

Kristiaan De Greve (IMEC, Belgium)

17:05**Evaluation of Cryogenic Models for FDSOI CMOS Transistors**

Phanish Chava (Central Institute of Engineering, Electronics and Analytics, Electronics Systems (ZEA-2), Forschungszentrum Jülich GmbH)

Heidrun Alius (AdMOS GmbH, Germany)

Jonas Bühler (Central Institute of Engineering, Electronics and Analytics, Electronics Systems (ZEA-2), Forschungszentrum Jülich GmbH)

Alfonso Cabrera-Galicia (Central Institute of Engineering, Electronics and Analytics, Electronics Systems (ZEA-2), Forschungszentrum Jülich GmbH)

Carsten Degenhardt (Central Institute of Engineering, Electronics and Analytics, Electronics Systems (ZEA-2), Forschungszentrum Jülich GmbH)

Thomas Gneiting (AdMOS GmbH, Germany)

Markus Harff (Central Institute of Engineering, Electronics and Analytics, Electronics Systems (ZEA-2), Forschungszentrum Jülich GmbH)

Peter Javorka (GlobalFoundries, Germany)

Maximilian Lederer (Fraunhofer Institute for Photonic Microsystems IPMS, Center Nanoelectronic Technologies (CNT), Germany)

Steffen Lehmann (GlobalFoundries, Germany)

Maik Simon (Fraunhofer Institute for Photonic Microsystems IPMS, Center Nanoelectronic Technologies (CNT), Germany)

Meng Su (AdMOS GmbH, Germany)

Patrick N Vliex (Central Institute of Engineering, Electronics and Analytics, Electronics Systems (ZEA-2), Forschungszentrum Jülich GmbH)

Stefan van Waasen (Central Institute of Engineering, Electronics and Analytics, Electronics Systems (ZEA-2), Forschungszentrum Jülich GmbH)

Christian Witt (GlobalFoundries, Belgium)

17:20**High gain stability and ultra-low noise cryogenic amplifier for the Square Kilometre Array Band 2 receiver**

Nianhua Jiang (National Research Council of Canada (NRC) & Department of Electrical and Computer Engineering at University of Victoria, Canada)

17:35**Opto-electrical Data Transfer from Room Temperature to 4K for Superconducting Quantum Computing**

Zheng Chang (Tsinghua University, China)

19:30**Transportation to Gala Dinner**

20:00

Gala Dinner

Location: Ristorante Calmosca

Viale Calamosca, 50, 09126 Cagliari CA, Italy

Thursday, 6 June 2024

08:00

Registration Opens

Room: Teatro Doglio

Vico Logudoro 32, 09127 Cagliari CA

09:00 – 10:55

Session: Cryogenic Artificial Intelligence Circuits

Session Chair: Elie Track (IEEE CSC)

Room: Platea

09:00

Keynote Presentation: Semiconductor-superconductor-photonic integration for neuromorphic supercomputing and sensor applications

Jeffrey Shainline (NIST Boulder, USA)

09:45

Superconducting artificial neurons and synapses for neuromorphic computing

Ken Segall (Colgate University, USA)

10:05

Neuromorphic Optoelectronic Circuits with Integrated Josephson Junctions and Superconducting-Nanowire Single-Photon Detectors

Bryce Primavera, Saeed Khan and Jeffrey Shainline (NIST Boulder, USA)

10:20 - 10:40

Coffee Break

Session: Cryogenic Artificial Intelligence Circuits continued

Session Chair: Elie Track (IEEE CSC)

Room: Platea

10:40

Superconductor-ferromagnet hybrids for cryogenic neuromorphic computing

Thomas Gunkel (Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain)

10:55 – 13:05

Session: Travelling Wave Parametric Amplifiers

Session Chair: Marco Arzeo (SEEQC)

Room: Platea

10:55

Three-wave Mixing Traveling-wave Parametric Amplifiers: Design and Implementation Considerations

Anita Fadavi Roudsari (Chalmers University of Technology, Sweden)

Daryoush Shiri (Chalmers University of Technology, Sweden)

Hampus Renberg Nilsson (Chalmers University of Technology, Sweden)

Giovanna Tancredi (Chalmers University of Technology, Sweden)

Amr Osman (Chalmers University of Technology, Sweden)

Ida-Maria Svensson (Chalmers University of Technology, Sweden)

Marina Kudrav

Marcus Rommel (Chalmers University of Technology, Sweden)

Jonas Bylander (Chalmers University of Technology, Sweden)

Vitaly Shumeiko (Chalmers University of Technology, Sweden)

Per Delsing (Chalmers University of Technology, Sweden)

11:15

Superconducting Josephson Traveling-Wave Parametric Amplifiers

Gwenael Le Gal (Néel Institute & CNRS, France)

11:35

Investigating the generation of pump harmonics in a SNAIL-based Traveling Wave Parametric Amplifier

Anna Levochkina (Naples University Federico II, Italy)

Halima Giovanna Ahmad (Università di Napoli Federico II & CNR-SPIN UOS-Napoli, Italy)

Pasquale Mastrovito (Naples University Federico II, Italy)

Isita Chatterjee (Naples University Federico II, Italy)

Giuseppe Serpico (Naples University Federico II, Italy)

Pegah darvehi (CNR SPIN, Italy)

Roberta Satariano (Università Federico II di Napoli, Italy)

Davide Massarotti (Università degli Studi di Napoli Federico II, Italy)

Domenico Montemurro (Università di Napoli Federico II, Italy)

Francesco Tafuri (Università di Napoli Federico II, Italy)

Giovanni Piero Pepe (Naples University Federico II, Italy)

Martina Esposito (CNR SPIN, Italy)

11:50

Effects of a non-sinusoidal current-phase relation on the performance of a Josephson Travelling Wave Parametric Amplifier

Claudio Guarcello (University of Salerno, Italy)

12:05

Towards broadband quantum-limited superconducting parametric amplifiers based on high kinetic inductance films

Federica Mantegazzini (Fondazione Bruno Kessler, Italy)

12:20

Nonlinear and Large-Signal Analysis of Josephson Junction Devices for Parametric Amplifiers

Daryoush Shiri (Chalmers University of Technology, Sweden)

Pavan Telluri (Eindhoven University of Technology, The Netherlands)

Hampus Renberg Nilsson (Chalmers University of Technology, Sweden)

Anita Fadavi Roudsari (Chalmers University of Technology, Sweden)

Vitaly Shumeiko (Chalmers University of Technology, Sweden)

Christian Fager (Chalmers University of Technology, Sweden)

Per Delsing (Chalmers University of Technology, Sweden)

12:35

Advancements in the experimental characterization of RF-SQUID-based Josephson Traveling Wave Parametric Amplifiers exploiting a Resonant Phase Matching scheme

Luca Fasolo (Istituto Nazionale di Ricerca Metrologica, Italy)

Andrea Celotto (Politecnico di Torino, Italy)

Alessandro Alocco (Politecnico di Torino, Italy)

Bernardo Galvano (Università di Palermo, Italy)

Luca Oberto (Istituto Nazionale di Ricerca Metrologica, INRIM, Italy)

Luca Callegaro (INRIM - Istituto Nazionale di Ricerca Metrologica, Italy)

Emanuele Enrico (Istituto Nazionale di Ricerca Metrologica, Italy)

12:50

Broad band microwave amplification in RF-SQUID array metamaterial

Iliia E Pologov (NUST MISiS, Russia)

Alexandre Karpov (NUST MISiS, Russia)

Lyudmila Filippenko (IRE RAS, Russia)

Valery Koshelets (IRE RAS, Russia)

13:20 - 14:45

Lunch

14:45 – 15:15

Session: Quantum Computing

Session Chair: Mikkel Ejrnaes (CNR-SPIN)

Room: Platea

14:45

Josephson transmission lines employing superconductors with high kinetic inductance

Alexey Ustinov (Karlsruhe Institute of Technology, Germany)

15:00

Broadband RF Characterization and Modeling of Superconducting Coplanar Waveguides

Corentin Beilvert (Université Grenoble Alpes, CEA LETI, France)

Norman Vivien (Université Grenoble Alpes, CEA LETI, France)

Candice Thomas (Université Grenoble Alpes, CEA LETI, France)

Jean Charbonnier (CEA Leti, France)

Edouard Deschaseaux (Université Grenoble Alpes, CEA LETI, France)

Franck Badets (CEA, France)

Jean-Philippe Michel (Université Grenoble Alpes, CEA LETI, France)

15:15– 16:00

Session: Cryogenic Detectors

Session Chair: Mikkel Ejrnaes (CNR-SPIN)

Room: Platea

15:15

Multiphysics Simulation of a Superconducting Neutron Detector

Simone Sparacio (Politecnico di Torino & INFN, Italy)

Giuseppe Celentano (ENEA, Italy)

Antonino Pietropaolo (ENEA, Italy)

Daniele Torsello (Dipartimento di Scienza Applicata e Tecnologia, Politecnico di Torino & INFN, Istituto Nazionale di Fisica Nucleare, Sezione di Torino, Italy)

Francesco Laviano (Dipartimento di Scienza Applicata e Tecnologia, Politecnico di Torino & INFN, Istituto Nazionale di Fisica Nucleare, Sezione di Torino, Italy)

15:30

Characterization of a TES detector for ALPS II

Jose Alejandro Rubiera Gimeno (Deutsches Elektronen-Synchrotron (DESY), Germany)

Katharina-Sophie Isleif (Deutsches Elektronen-Synchrotron DESY, USA)

Friederike Januschek (Deutsches Elektronen-Synchrotron DESY, USA)

Axel Lindner (Deutsches Elektronen-Synchrotron DESY, USA)

Manuel Meyer (University of Southern Denmark, Denmark)

Gulden Othman (Universität Hamburg, Germany)

Elmeri Rivasto (University of Southern Denmark, Denmark)

Christina Schwemmbauer (Deutsches Elektronen-Synchrotron, Germany)

Rikhav Shah (Universität Hamburg, Germany)

15:45

Toward magnetic field resistant microwave single photon detector based on van der Waals Josephson junctions

Alessandro D'Elia (INFN-LNF, Italy)

16:00 – 16:45

Concluding Remarks & Awards Ceremony

Room: Platea