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Dipartimento di Fisica "E. Pacini"
Università di Napoli "Federico II"

Superconducting Electronics vs Quantum Flagship: searching for scientific opportunities

NAPOLI, 15 DICEMBRE 2017
Ore 9:30

*Aula "E. Caianiello", Dipartimento di
Fisica "E. Pancini", Università di
Napoli Federico II, Complesso
Universitario di Monte Sant'Angelo,
Via Cinthia 21 - 80126 - Napoli*

Superconducting Electronics (SE) is an established field of applied science and industry. It comprises of the application of electronic circuits made from superconducting materials which in most cases contain Josephson junctions as functional elements. Based on the macroscopic quantum effect that is superconductivity, it offers circuits whose properties are in large parts governed by quantum physics, and whose parameters are based on constants of nature involving the quantum unit. Key application areas of SE include single photon detection with nanowires, high performance qubits, qubit ultrafast and low dissipation electronics readout for quantum applications, quantum magnetometry, etc... The meeting aims to be an informal brainstorming on the potential opportunities related to SE within the EU Flagship Calls now opened, trying to focus on possible collaborations among Italian researchers and within European networks.

PROGRAM

9:30 Introduction (**C. Ferdeghini, G.Pepe**)

9:45 The opportunities of H2020 Flagship Call (**B. Cagnana, CNR SPIN**)

QUANTUM COMMUNICATION

10:00 A brief overview of Quantum Communication vs SE within the QT Roadmap

The research on SNSPDs @ CNR SPIN (materials, configurations, ...)
(R. Cristiano, CNR SPIN)

The research on SNSPDs @ CNR-IFN (configurations, waveguides, target performances) **(R. Leoni, CNR IFN)**

New ideas for photon superconducting detectors **(P. Solinas, CNR SPIN, E. Strambini, CNR NANO)**

Amorphous superconducting materials for near-IR SNSPDs
(C. Attanasio, UNI. SALERNO)

Single photon detection in single molecule systems
(L. Gianfrani, UNI. CAMPANIA)

The possibilities offered by SeeQC/Hyres vs Quantum Communication

10:45 Open Discussion: hybrid cryogenic technologies, role of cryogenic industries in space applications projects

QUANTUM COMPUTATION

12:00 A brief overview of Quantum Communication vs SE within the QT Roadmap

The idea of Transmon: possibilities offered by unconventional device for quantum control
(D. Massarotti, UNI. NAPOLI)

The idea of Gatemon: possibilities offered by new superconducting electronics
(E. Strambini, CNR NANO)

Superconducting qubit as single microwave photon detector
(F. Chiarello, CNR INF)

Plasmons vs Josephson devices
(A. Tagliacozzo, UNI. NAPOLI)

Superconducting topological quantum platforms **(M. Cuoco, CNR SPIN)**

Quantum Oxide Electronics
(M. Salluzzo, CNR SPIN)

Adiabatic quantum computation
(P. Lucignano, CNR SPIN)

NV centers for quantum sensing and perspectives on hybrid systems
(N. Fabbri, UNI FIRENZE)

The possibilities offered by SeeQc/Hyres vs Quantum Computation

Contribution: "Quantum interference effects in single-molecule superconducting transistors"
(C. Nappi, CNR SPIN)

Contribution: "Project proposals on quantum computation"
(M. Lisitskiy, CNR SPIN)

Open Discussion: hybrid technologies for NV centers in superconducting resonators, fabrication and test of qbits, ...

13:30 LUNCH

14:30 Quantum Computation (Cont)

QUANTUM SENSORS AND METROLOGY

15:30 A brief overview of Quantum Sensors and Metrology vs SE within the QT Roadmap

Superconducting Sensors based on Quantum Interference Effect
(C. Granata, CNR ISASI)

Open Discussion

16:30 Possible topics for Basic Sciences FET projects (Quantum Memories, Oxide Quantum Circuits, etc....)

17:30 Closing