

Superconducting quantum devices at FBK: From single circuit components to the first qubit made in Italy

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In the last two decades, extraordinary advances have been made in the field of quantum technologies, exploiting different approaches. Thanks to its flexible circuital dynamics and to its scalability, the superconducting platform has become the leading candidate for quantum computing architectures. The elementary building block of a superconducting quantum computer is the quantum bit (qubit). In turn, a qubit is based on single circuital components, such as superconducting resonators and Josephson junctions. Such components can be combined to build not only superconducting qubits, but a large variety of quantum circuits, including quantum sensors, parametric amplifiers, magnetometers, photon detectors and sources of entangled photons. The development of the single components is therefore the key to unlock the capability to microfabricate a vast spectrum of innovative devices.

In this presentation, we will review the recent research activities on superconducting quantum devices at the Sensors & Devices Centre at FBK, which made possible to realize the first superconducting qubit entirely developed and microfabricated in Italy.