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M3Or3I-04: [Invited] Cryogenics for Superconducting Quantum Technologies

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Recent advancements in superconducting materials combined with advanced cryogenics are enabling new class of quantum applications. Quantum applications will be dependent on modular platforms that can probe and manipulate matter at the nanoscale and at low temperatures and simpler to use and manage. These environments will be used to assemble, align, and analyze functional, organic or inorganic, nano- and microstructures, and to probe their structures, properties and dynamics, with potential applications in quantum technologies, nano based technologies, sensors and nano-electronics.

This contribution presents an overview of recent advancement in cryogenic systems for quantum information processing (QIP), quantum sensors, quantum measurements, quantum materials and low dimensional and 2D materials. The new systems are modular and compact in size and realized by exploiting the recent advances demonstrated in superconducting and cryogenic technologies. These new systems together with cryogen free technology, sample management and advanced instrumentation have opened a new era in quantum technologies.

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