

Advancements in critical technologies for superconducting quantum systems at the Superconducting Quantum Materials and Systems Center

Anna Grassellino

Wednesday, October 2
3:00 p.m.
Bldg. 402 | APS Auditorium



In this talk, I will describe the progress made in understanding and mitigating decoherence in superconducting quantum devices. SQMS is leading the way in extending coherence time of superconducting quantum systems thanks to world-class materials science and through the world-leading expertise in superconducting radio frequency (RF) cavities, which are integrated with 2D chips.

Leveraging the advances in device coherence, researchers are pursuing devices integration, quantum controls and millikelvin cryogenics developments for 2D and 3D superconducting architectures. SQMS is building and deploying a beyond-state-of-the-art quantum computer and novel quantum sensors at Fermilab. The QPU unique high connectivity will provide unprecedented opportunity to explore novel quantum algorithms. Advances in prototypes based on 2D and 3D architectures, enabling new quantum simulation and sensing for science applications, will be presented.

Anna Grassellino is director of the Superconducting Quantum Materials and Systems Center, a DOE National Quantum Information Science Research Center; a Fermilab senior scientist; and head of the Fermilab SQMS division. She holds an adjunct faculty appointment at Northwestern University, where she is co-director of the Center for Applied Physics and Superconducting Technology. Her research focuses on RF superconductivity, in particular on understanding and improving SRF cavities performance to enable new applications spanning particle accelerators to detectors to quantum information science. She is a fellow of the American Physical Society, and recipient of numerous awards for her pioneering contributions to SRF technology, including the U.S. Presidential Early Career Award, the Frank Sacherer Prize of the European Physical Society, the IEEE PAST Award, the 2016 USPAS prize and a DOE Early Career Award. She holds a Ph.D. in physics from the University of Pennsylvania and a master's of electronic engineering from the University of Pisa, Italy.