



# PHYSICS AND ASTRONOMY

## COLLOQUIUM

### (Online)

**Dr. Anna Grassellino**  
Fermilab

**“Superconducting Quantum Materials and Systems (SQMS) – a new  
DOE National Quantum Information Science Research Center”**

#### Abstract

“In this talk I will describe the mission, goals and the partnership strengths of the new US National Quantum Information Research Center SQMS. SQMS brings the power of DOE laboratories, together with industry, academia and other federal entities, to achieve transformational advances in the major cross-cutting challenge of understanding and eliminating the decoherence mechanisms in superconducting 2D and 3D devices, with the final goal of enabling construction and deployment of superior quantum systems for computing and sensing. SQMS combines the strengths of an array of experts and world-class facilities towards these common goals. Materials science experts will work in understanding and mitigating the key limiting mechanisms of coherence in the quantum regime. Coherence time is the limit on how long a qubit can retain its quantum state before that state is ruined by noise. It is critical to advancing quantum computing, sensing and communication. 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 RF cavities which are integrated with industry-designed and - fabricated computer chips. Leveraging new understanding from the materials development, quantum device and quantum computing researchers will pursue device integration and quantum controls development for 2-D and 3-D superconducting architectures. One of the ambitious goals of SQMS is to build and deploy a beyond-state-of-the-art quantum computer based on superconducting technologies. Its unique high connectivity will provide unprecedented opportunity to explore novel quantum algorithms. SQMS researchers will ultimately build quantum computer prototypes based on 2-D and 3-D architectures, enabling new quantum simulation for science applications.”

Wednesday, January 19, 2022

3:30 p.m. PDT

via Zoom: <https://uvic.zoom.us/j/84200819345>

**\*\*\*Please note that this is a different zoom link from last week\*\*\***