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Type: **Invited Oral Presentation**

## Application of superconducting cavities as ultra-sensitive RF photon detectors

*Friday, 24 May 2024 10:00 (30 minutes)*

Superconducting radio frequency (SRF) cavities are the world's most efficient engineered oscillators, and they have long been employed for extremely high efficiency transfer of energy to beams of charged particles. Decades of R&D for particle accelerators have led to modern treatments for SRF cavities that achieve higher performance than was previously possible. Advanced SRF cavities using particle accelerator technology are now being used to search for new physics, including dark matter and gravitational waves. The extremely high Q makes it possible to search for very small signals from photons in the radio frequency range, and the extremely high electric fields makes it possible to perform experiments that involve pumping one mode of a cavity in order to search for power transfer mediated by new physics. This talk will present novel experiments that employ SRF cavities, including searches for axions and dark photons dark matter, light-shining-through-walls, and high frequency gravitational waves. Results to be presented include searches with world record sensitivity.

### Footnotes

### Funding Agency

### Paper preparation format

### Region represented

North America

**Primary author:** GIACCONE, Bianca (Fermi National Accelerator Laboratory)

**Presenter:** GIACCONE, Bianca (Fermi National Accelerator Laboratory)

**Session Classification:** FRXD: Applications of Accelerators, Technology Transfer and Industrial Relations and Outreach (Invited)

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