

# Superconducting Microwave Cavities for the Axion Dark Matter Experiment (ADMX)

*Thursday 28 May 2020 09:36 (18 minutes)*

The Axion Dark Matter eXperiment (ADMX) searches for Axions, a hypothetical dark matter candidate, through conversion to photons in a high magnetic field that are subsequently detected within a resonant cavity. The rate that this detector is able to scan potential axion masses (or photon frequency) depends linearly on the cavity quality factor. Though Superconducting Radio Frequency cavities (SRF) have been shown to have several orders of magnitude higher quality factor than copper, their quality factors typically degrade in the high magnetic fields required for Axion detection. Type II superconducting thin films have shown the potential for improved quality factors beyond that of bulk superconductors in a high magnetic field. In this work, we present our progress on studying different superconducting cavity materials for future ADMX detectors.

## Funding information

This work was supported by the U.S. Department of Energy through Grants Nos. DE-SC0009723, DE-SC0010296, DE-SC0010280, DE-SC0010280, DE-FG02-97ER41029, DE-FG02-96ER40956, DE-AC52-07NA27344, and DE-CO

**Author:** BRAINE, Tom

**Co-author:** CAROSI, Gianpaolo (Lawrence Livermore National Laboratory)

**Session Classification:** Sensors: Emerging Technology

**Track Classification:** Sensors: Emerging Technology