



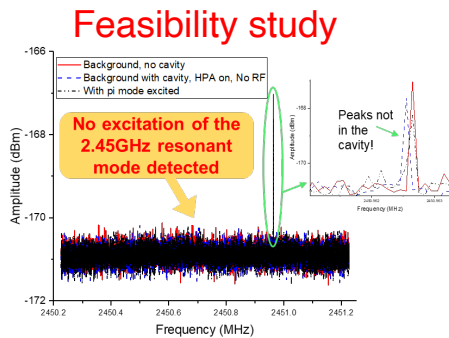
# SQMS axion searches based on $Q_0 \sim 10^{10}$ multimode superconducting cavities

SQMS Physics & Sensing researchers are working on developing searches for axions, ALPs and axions DM with SRF cavities:

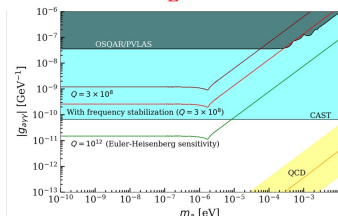
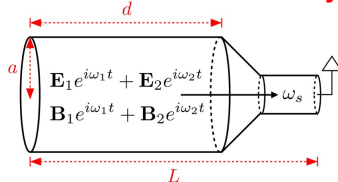
- Conducting feasibility study on 1.3GHz 9-cell cavities in preparation for axion searches development:

- Measure noise background in SRF cavity
- Study possible energy leak from excited mode(s) to other resonant modes or to linear combinations of pump modes (Non-linear Meissner effect)

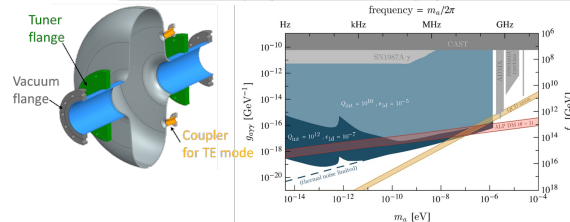
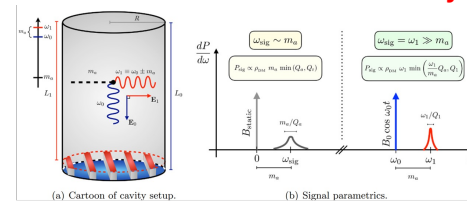
- Working on the **design of the high Q SRF cavities for axion and axion DM searches**



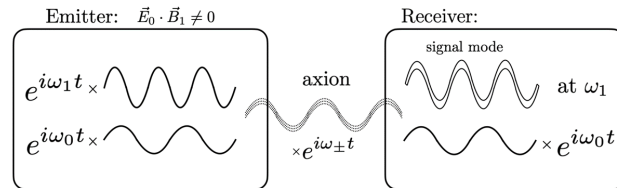
### 3-mode axion cavity



### 2-mode axion DM cavity



### LSW axion search



Berlin, et al., arXiv:2203.12714 (2022)

Berlin, et al., JHEP, DOI:10.1007/JHEP07(2020)088

Bogorad, et al., PRL, DOI:10.1103/PhysRevLett.123.021801

Gao & Harnik, JHEP, DOI:10.1007/JHEP07(2021)053

Sauls, PTEP, DOI:10.1093/ptep/ptac034

Giaccone, et al., arXiv:2207.11346 (2022)

