CAST: Mechanical tuning of RADES microwave cavities

Presenter:

Jessica Golm on behalf of the CAST collaboration

CAST-RADES detector

$$\mathcal{F} \sim g_{A\gamma}^4 B^4 T_{sys}^{-2} V^2 G^4 m_A^2 Q$$

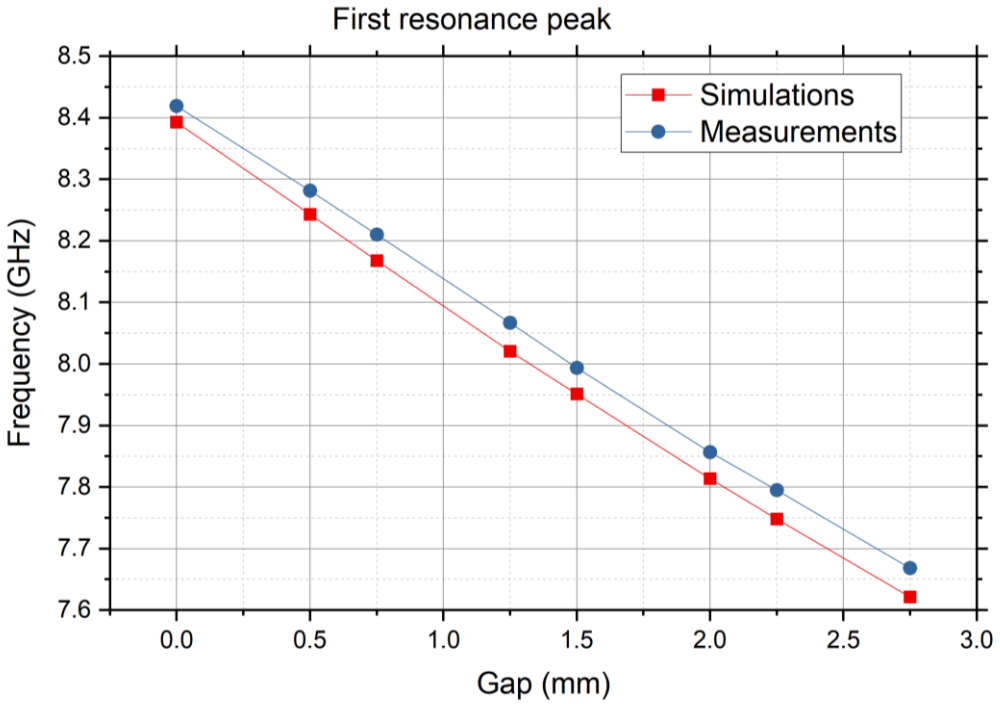
CERN Axion Solar Telescope (CAST) :
9 T superconducting dipole magnet

microwave filter-like structure composed of five coupled cavities connected by rectangular irises to increase V

vertical cut along electric field-lines within filter (should not alter the filter's properties)

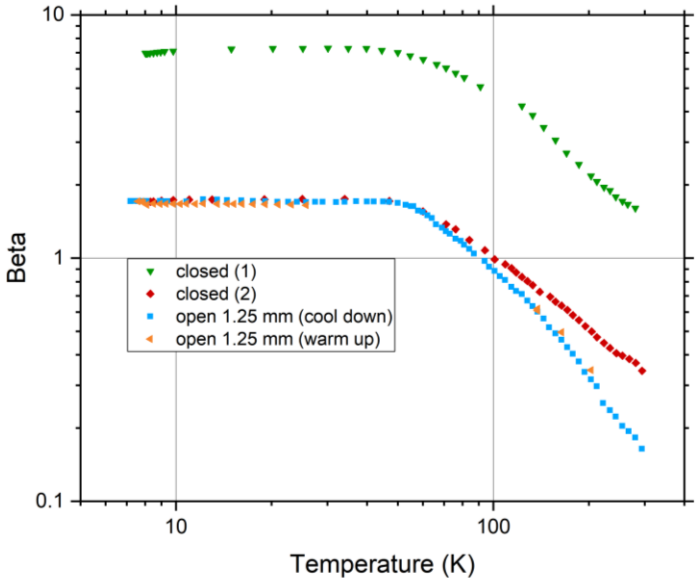
gap to widen geometry and change frequency without significant change of Q

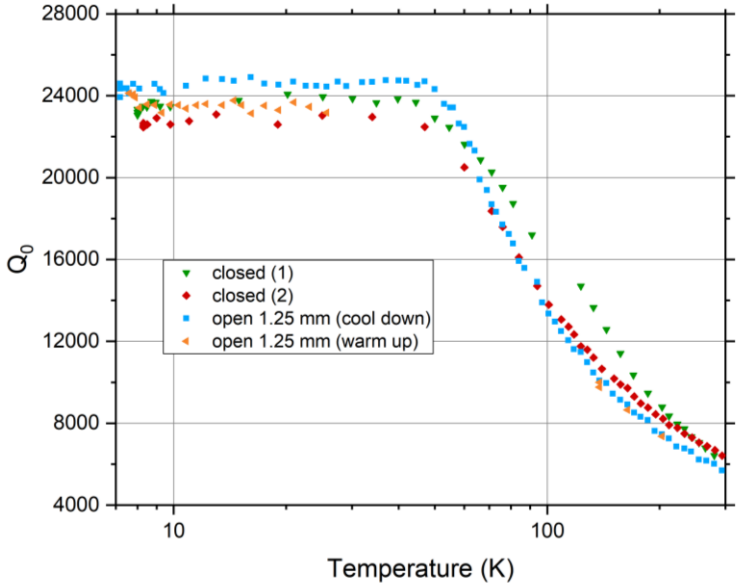
Tuning range



- gap size manually changed by spacers
- measurement at ambient temperature
- tuning range of 600 MHz for a 2 mm gap

Cavity characterization at cryogenic temperatures





$$Q_0 = (1+\beta)Q_L$$

Q_0 unloaded Q : Q of the resonator itself disregarding external loading effects
Q_L loaded Q
β coupling

Thank you for your attention !

Acknowledgements:

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