

# Quench-Induced Quality Factor Degradation in Superconducting Resonators

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Quench of superconductivity is a well-known phenomenon causing an increase in the microwave surface resistance of superconducting cavities. In this paper we investigate the nature of these quench-induced losses and present the proof that ambient magnetic field trapped at the quench spot is the single cause. We uncover the effect of different ambient field orientation and also show how the quality factor can be fully recovered after it was highly deteriorated by quenching several times in the presence of the external magnetic field. We also demonstrate that above a certain ambient magnetic field value the cavity quality factor cannot be fully recovered anymore, which we attribute to the migration of the magnetic flux driven by synergistic action of magnetic tension acting on the field lines and the heating caused by the dissipation introduced by the trapped flux itself.

**Author:** CHECCHIN, Mattia (FNAL - IIT)

**Co-authors:** ROMANENKO, Alexander (Fermilab); GRASSELLINO, Anna; Dr SERGATSKOV, Dmitri (FNAL); MARTINELLO, Martina (FNAL - IIT); Dr OLEKSANDR, Melnychuk (FNAL); Dr POSEN, Sam (FNAL)

**Presenter:** CHECCHIN, Mattia (FNAL - IIT)

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