

EXTERNAL MAGNETIC FIELDS AND OPERATING SRF CAVITY

D.A. Sergatskov, T.N. Khabiboulline, R.L. Madrak, J.P. Ozelis, I. Terechkine [Fermilab, Batavia, USA]

Abstract

When an SRF cavity is undergoing a transition to the superconducting state in an external magnetic field it traps some of the flux which results in an increase of surface resistance. This effect was extensively studied, is well understood by now and results in stringent requirements for an ambient magnetic field on the surface of an SRF cavity. The situation is quite different when magnetic field is applied to a cavity already in the superconducting state. During normal operation the bulk of the superconducting Nb should protect the RF surface of the cavity from fields on the outside. So we expect that the requirements on an external magnetic field applied to an operating cavity could be significantly relaxed. One possible failure mode is when the cavity quenches while the external field is applied. The magnetic field would penetrate through a normal zone formed during the quench and can get trapped during the subsequent post-quench cooling. We studied the effects of an external magnetic field applied to an operating SRF cavity and report the results.

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