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Sideband excitation phenomena study in SRF vertical testing

Thursday 25 September 2025 14:30 (3 hours)

Sideband excitations observed in superconducting radio-frequency (SRF) cavities during vertical tests are indicative of complex underlying phenomena that can impact cavity performance and their measurements. This work presents an analysis combining experimental data and numerical simulations to investigate the origins and contributions of multipactor and field emission to sideband generation. RF measurements and radiation monitoring were employed during vertical tests of several niobium cavities to characterize the temporal and spectral features of the side bands under varying field levels. Complementary particle tracking and electromagnetic simulations were performed to model electron trajectories, secondary emission, and RF power deposition in the cavity. This study provides new insight into the interplay between surface phenomena and RF field dynamics in SRF cavities and offers guidelines for improved interpretation of vertical test data and enhanced cavity processing strategies.

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Yes

Footnotes

Funding Agency

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