HOT TOPICS: SOURCE OF QUENCH PRODUCING DEFECTS

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Abstract

Recent efforts in pushing the performance of superconducting RF niobium cavities for the International Linear Collider have resulted in two-fold progresses: reduced field emission and improved quench limit in real 9-cell cavities. RF testing at cryogenic temperatures assisted with quench-detection instrumentation reveals that quench happens often times at highly localized areas inside or near the equator weld of a cavity cell, which is also the high surface magnetic field region. High-resolution optical inspection of the identified quench location makes it possible to correlate the cavity quench limit with certain types of defects. Several sources of quench producing defects are being explored. We will discuss the experimental evidence in supporting each of these sources. We will also discuss the methods of curing or preventing these defects for improved gradient limit and reduced gradient spread.

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