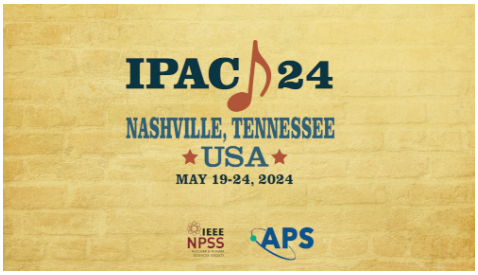

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High gradient C-band cryogenic copper silver structures

Monday 20 May 2024 16:00 (2 hours)

C-band accelerators have been of particular interest in recent years due to their ability to provide high gradients and transport high charge beams for applications such as colliders and medical technologies. New Advancements in high gradient technologies that can suppress the breakdown rate in a particular structure by using distributed coupling, cryogenic cooling, and copper alloys. Previous work has shown each of these separately to significantly improve the maximum gradient. In this work, for the first time, we will combine all three methods in an ultra-high gradient structure and benchmark the difference between Cu and CuAg. The exact same structures were previously tested at room temperature and showed gradients in excess of 200 MeV/m and a 20% improvement in the CuAg version over its pure Cu counterpart [1]. These structures are now tested at 77K simultaneously. They were found to perform similarly due to the presence of significant beam loading. Taking beam loading into account, a maximum achievable gradient of 200 MeV/m achieved for a 1 μs pulse at an input power of 5 MW into each cavity with a breakdown rate of 1e-1 breakdown/pulse/m.

Footnotes

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