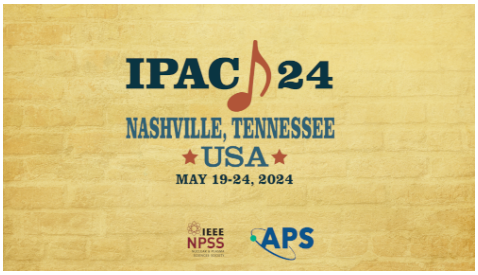

Contribution ID: **1986** Contribution code: **MOPR33** Type: **Poster Presentation**

High gradient testing of cryogenic C-band distributed coupling cavities

Monday, 20 May 2024 16:00 (2 hours)

High field radio frequency (RF) accelerating structures are an essential component of modern linear accelerators (linacs) with applications in photon production and ultrafast electron diffraction. Most advanced designs favor compact, high shunt impedance structures in order to minimize the size and cost of the machines as well as the power consumption. However, breakdown phenomena constitute an intrinsic limitation to high field operation which ultimately affects the performance of a given structure requiring dedicated tests. The introduction of a recent design based on cryogenic distributed coupling structures working at C-band (˜6 GHz) allows to increase the shunt impedance by use of alternative distribution schemes for the RF power while mitigating the breakdowns thanks to the low temperature. In this paper we introduce the plan for high field and breakdown tests envisioned for a simple two-cell version of the aforementioned structure. Moreover, we also discuss the joining procedure utilized to unify the two fabricated halves of such a structure and relying on the diffusion bonding technique which constitutes an attractive alternative to the brazing approach.

Footnotes

Funding Agency

This work is supported by DARPA under Contract N.HR001120C0072, by DOE Contract DE-SC0009914 and DE-SC0020409, by the National Science Foundation Grant N.PHY-1549132 Center from Bright Beams.

Paper preparation format

LaTeX

Region represented

North America

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Session Classification: Monday Poster Session

Track Classification: MC3: Novel Particle Sources and Acceleration Techniques: MC3.A16 Advanced Concepts