Cornell-Japan Collaborative Progress on Nb_3Sn SRF Accelerator Cavities

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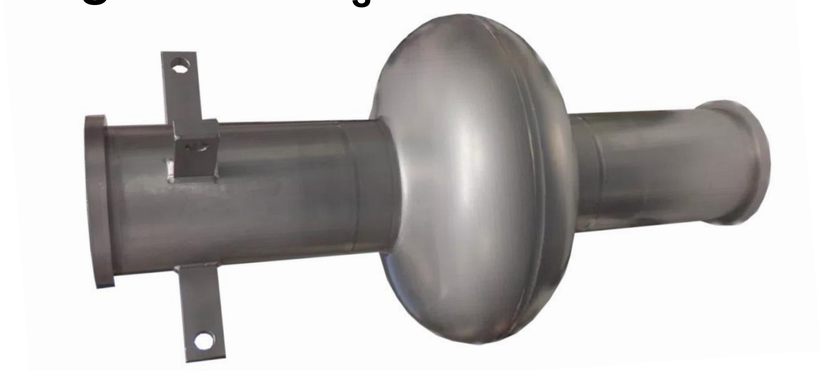
Single-cell Nb_3Sn—Research Cavity



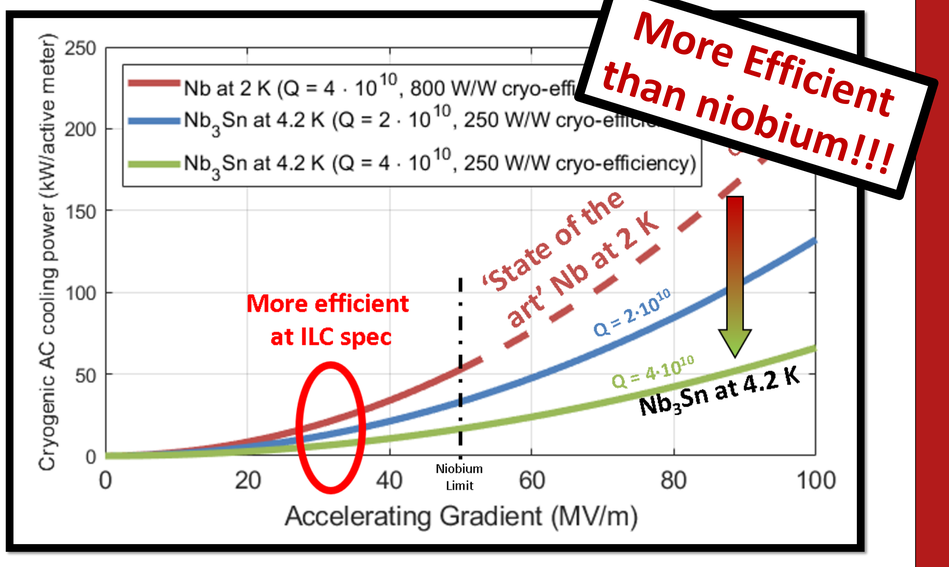
Multi-cell Nb_3Sn—Usable in Accelerators

Near Future

Niobium-3 Tin SRF Cavities

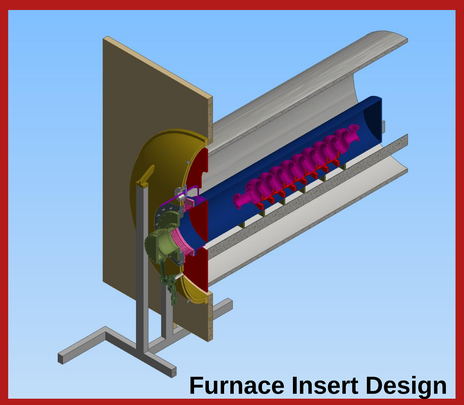
Niobium-3 tin (Nb_3Sn) is the most promising alternative material to niobium for SRF accelerator cavities. The material has the potential to double accelerating gradients and operating temperature of SRF cavities, decreasing costs and increasing efficiency of future accelerators.

We create Nb_3Sn by vaporizing tin in a high vacuum furnace and allowing the tin to absorb into a Nb cavity and form a Nb_3Sn coating. The current system creates high quality cavities but is currently limited to single cells due to size restraints.



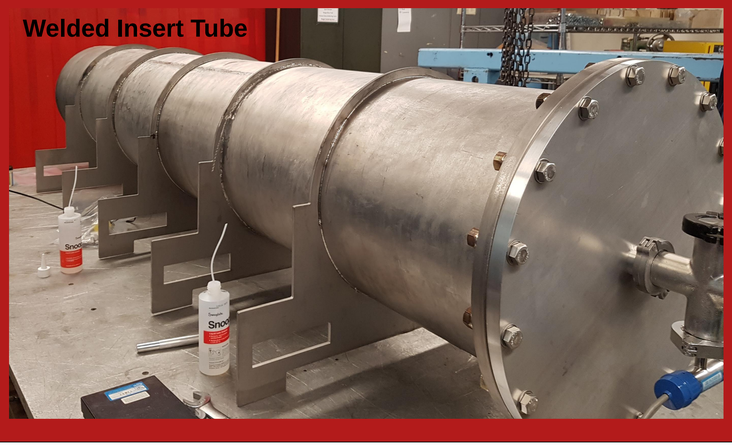
Multi-cell Coating Insert

Cornell is collaborating with KEK to design and build a coating insert for a large vacuum furnace that will accommodate 9-cell cavities. The designs are complete and major components have been made.



Furnace Insert Design

Cornell Vacuum Furnace



Welded Insert Tube

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