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## Cryocooler conduction cooled SRF cavities: experiments and compact SRF accelerator development at Fermilab

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Fermilab recently demonstrated practical accelerating gradients (~6.5 MV/m cw) on a Nb<sub>3</sub>Sn SRF cavity with cryocooler conduction-cooling, without using the conventional liquid helium bath. The successful integration of this cryocooling scheme with an SRF cavity is a stepping-stone for realizing compact SRF based e-beam sources for high-throughput industrial applications of electron irradiation. Since the first gradient demonstration, Fermilab has continued to push up the performance of the SRF cavity as well as design a high-power e-beam SRF accelerator utilizing the conduction-cooling technique. Furthermore, construction efforts have started for a technology demonstration conduction-cooled SRF accelerator. This talk will present the results from the gradient demonstration program and progress towards the design and development of the SRF accelerators.

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