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Design and Testing of a High-Gradient mm-Wave Accelerator Prototype

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Accelerators operating in the mm-wave regime can reach much higher gradients than conventional accelerators due to the favorable scaling of the breakdown threshold with frequency. These structures also have the potential to achieve a much higher shunt impedance, enabling the efficient use of RF power that is critical given the current limitations on high power RF sources in this regime. We report on the design, fabrication, and testing of a 95 GHz linac. Simulations predict this π -mode standing wave accelerator composed of 16 cells will produce an energy gain of 3 MeV for an input power of 1 MW. We report on cold test results characterizing the fabricated prototype, as well as techniques for tuning the cavities. We discuss the outlook for beam tests of this mm-wave accelerator utilizing a field emission gun and injector, as well as extending this approach to higher beam energies.

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Footnotes

I have read and accept the Privacy Policy Statement

Yes

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