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Progress in the Design of a High-Gradient, THz-Driven Electron Gun[1] SAMANTHA LEWIS, MOHAMED OTHMAN, EMILIO NANNI, SAMI TANTAWI, SLAC National Accelerator Laboratory — High energy particle sources are in demand for a variety of applications including ultrafast electron diffraction, free electron lasers, medical accelerators, and future colliders. To limit the size and cost of these sources, high accelerating gradient is required. Vacuum breakdown limits the achievable gradient in normal conducting accelerators, but using THz-frequency structures could allow for compact, GV/m-scale devices. We are developing a THz-driven field-emission electron gun to generate relativistic electrons in mm length scales. The gun operates in the pi-mode with a cavity frequency of 110.08 GHz. The cavities and field emission cathode are made from copper. This work will present progress in the fabrication and testing of a prototype structure as well as results from 3D particle simulations.

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