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Simulation Results of a Clamped Multicell Dielectric Disk Accelerating Structure

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A method of decreasing the required footprint of linear electron accelerators and to improve their energy efficiency is utilizing short RF pulses (~9 ns) with Dielectric Disk Accelerators (DDA). A DDA is an accelerating structure that utilizes dielectric disks in its design to improve the shunt impedance. Two DDA structures have been designed and tested at the Argonne Wakefield Accelerator. A single cell clamped DDA structure recently achieved an accelerating gradient of 102 MV/m. A multicell clamped DDA structure has been designed and is currently being fabricated. Simulation results for this new structure show a 108 MV/m accelerating gradient with 400 MW of input power with a high shunt impedance and group velocity. Engineering designs have been improved from the single cell structure to ensure consistent clamping over the entire structure.

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