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Standing wave Dielectric Disk Accelerating structure design and cold test results

Monday 26 August 2024 16:00 (2 hours)

A Dielectric Disk Accelerator (DDA) is a metallic accelerating structure loaded with dielectric disks to increase coupling between cells, thus high group velocity, while still maintaining a high shunt impedance. This is crucial for achieving high efficiency high gradient acceleration in the short rf pulse acceleration regime. Research of these structures has produced traveling wave structures that are powered by very short (˜9 ns), very high power (400 MW) RF pulses using two beam acceleration to produce these pulses. In testing, these structures have withstood more than 320 MW of power and produced accelerating gradients of over 100 MV/m. The next step of testing these structures will use a more conventional, klystron power source. A new standing wave DDA structure is being fabricated for testing on the Nextef2 test stand at KEK. Simulation results of this structure show that at 50 MW of input power, the DDA produces a 457 MV/m gradient. It also has a large shunt impedance of 160 MΩ/m and an r/Q of 21.6 kΩ/m. Cold testing of this structure will be conducted July 2024 with high power testing to be done in August.

Footnotes

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