

Fabrication and beam testing of a 180 GHz colinear wakefield accelerator

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Corrugated waveguide based colinear wakefield accelerator development at Argonne National Laboratory has been ongoing, achieving significant progress in fabrication and testing of most principal components of the accelerator module. A few 30 cm long corrugated waveguides with a 2 mm ID and short transition sections which provide fundamental mode power extraction and beam offset diagnostics via the wakefield induced dipole mode have been fabricated. Several high field gradient quadrupoles envisioned for beam guidance and suppression of a beam breakup instability have been fabricated as well. The structures have been tested at mmWave frequencies and the quadrupoles were characterized via magnetic measurements. Electron beam testing was conducted at Brookhaven National Lab's Accelerator Test Facility. The fundamental and dipole mode's frequency and signal levels were measured and a good agreement with design parameters has been demonstrated.

Footnotes

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