



Contribution ID: 29

Type: **not specified**

# A 180 GHz Corrugated Waveguide-Based Colinear Wakefield Accelerator

*Monday, 22 July 2024 13:30 (15 minutes)*

Development of the corrugated waveguide-based colinear wakefield accelerator at Argonne National Laboratory (ANL) for a compact hard x-ray free-electron laser (FEL) facility has passed a milestone with the demonstration of most principal accelerator and FEL components: a 30 cm long strong-back structure to hold and cool the corrugated waveguide, sub-terahertz frequency electromagnetic couplers for extraction of the fundamental mode power and beam offset diagnostic, high field gradient quadrupoles for beam guidance and suppression of a beam breakup instability, small gap force neutral adjustable phase undulator (FNAPU). All structures and couplers have been tested in the microwave laboratory at ANL and with the electron beam at the Brookhaven National Laboratory's Accelerator Test Facility. The quadrupoles and a prototype of the quadrupole "wiggler" have been characterized via magnetic measurements. A FNAPU's prototype was fabricated and characterized. In all cases, a good agreement with design parameters has been demonstrated.

## Working group

WG4 : Novel structure acceleration

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**Session Classification:** WG4