



Contribution ID: 115

Type: talk

## Group and phase velocity matching in THz IFEL interaction

*Thursday, September 28, 2017 6:30 PM (20 minutes)*

We review results from the recent guided-THz IFEL experiment at the UCLA PEGASUS facility. Using a parallel plate waveguide, the group velocity of a near-single cycle THz pulse was reduced to match electron beam propagation in an undulator, resulting in a ponderomotive interaction sustained for 30 cm. With a 1 uJ THz pulse obtained by optical rectification in a LN source, the projected beam energy distribution increased from a full peak width of 30 keV to more than 100 keV. When using a long (multi-ps) electron beam, longitudinal phase space measurements reveal the snake-like energy modulation from the ps-scale THz pulse. Using a short beam configuration, we also measure bunch compression, limited by the available drift length to a factor of two. Finally, we explore the application of this technique to amplification of the THz seed using the 1-D multi-frequency simulation code we have developed for this novel zero-slippage interaction scheme.

**Primary author:** CURRY, Emma (UCLA)

**Co-authors:** Prof. GOVER, Avraham (Tel Aviv University); Prof. MUSUMECI, Pietro (UCLA); FABBRI, Siara (UCLA)

**Presenter:** CURRY, Emma (UCLA)

**Session Classification:** WG3\_Parallel

**Track Classification:** WG3 - Electron Beams from Electromagnetic Structures, Including Dielectric and Laser-driven Structures