Abstract Submitted
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Simulation of Terahertz Generation in Corrugated Plasma Waveguides[1] CHENLONG MIAO, IREAP, University of Maryland, College Park, ANDREW PEARSON, Florida International University, JOHN PALASTRO, THOMAS ANTONSEN, IREAP, University of Maryland, College Park — Intense, short laser pulses passing through corrugated plasma channels offer an efficient means to generate THz radiation [1]. Corrugated channels support EM modes that have a Floquet-type dispersion relation. These modes consist of a sum of spatial harmonics with subluminal phase velocities, and thus allow the possibility of phase matching between the ponderomotive potential of the laser pulse and the EM modes. Here, we simulate the response of a modulated plasma channel to an ultrashrot laser pulse with the goal of increasing the efficiency of energy conversion to THz modes. A range of channel and modulation parameters are considered. For a fixed drive pulse with 15 micron spot size in a modulated channel with on axis average density of 10^{18} cm^{-3}, 6% of the energy extracted from the laser pulse is converted to THz with the remainder going to plasma waves. This result increases the previous simulation result [2] by a factor of 5. To realize high THz energies, the laser pulse energy must be largely depleted in a short distance. Full format PIC simulations are conducted to investigate this regime.

[1] T. M. Antonsen et. al., Phys. Plasmas 14, 033107 (2007).
[2] A. J. Pearson et. al., Phys. Review E 83, 056403 (2011).

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Chenlong Miao
IREAP, University of Maryland, College Park

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