Abstract Submitted
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Simulation of Laser Pulse Driven Terahertz Generation in Inhomogeneous Plasmas[1] CHENLONG MIAO, University of Maryland, JOHN PALASTRO, Icarus Research, Bethesda, Maryland, THOMAS ANTONSEN, University of Maryland — Intense, short laser pulses propagating through plasma generate THz radiation. Full format PIC simulations and theoretical analysis are conducted to investigate two mechanisms of ponderomotively driven THz radiation: transition radiation, and slow wave phase matching enabled by corrugated plasma channels. The first mechanism occurs as a laser pulse crosses a plasma boundary [1] and is analogous to transition radiation emitted by charged particle beams. The THz radiation resulting from this transition radiation mechanism (TRM) is characterized by conical emission and a broad spectrum with the maximum frequency occurring near the plasma frequency. The second mechanism occurs in axially periodic plasma channels [2, 3]. These channels support electromagnetic modes with slow wave (Floquet-type) dispersion, which can be phase matched to the ponderomotive current. The slow wave phase-matched radiation (SWPM) is characterized by lateral emission and a coherent spectrum with sharp modes at frequencies associated with the channel.

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

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