Abstract Submitted
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Studies of Spectral Modification and Extensions of the Paraxial Equation in Laser Wakefield Simulations[1] WENXI ZHU, JOHN PALASTRO, THOMAS ANTONSEN, University of Maryland — Ultrashort intense laser pulses propagating through underdense plasma can drive large amplitude plasma waves that deplete the laser pulse energy. The loss of laser pulse energy and the approximate conservation of laser pulse action imply that spectral redshifting accompanies the depletion. We investigate the spectral shifting of the laser pulse in the strongly depleted regime using WAKE with a recently implemented tenuous plasma, full wave equation. We consider laser and plasma parameters typical of the regime of total cavitation for which redshifting is particularly strong. We examine the scaling of the spectral shifting rate with pulse power, plasma density (including ramps and radial channels), and pulse length. We also consider the temporal and spectral properties of the modified laser pulse to determine the stability of the process for generating ultra short, ultra intense midinfrared pulses [1] for various applications.

[1] C.-H. Pai et al., Phys. Rev. A 82, 063

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