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Suppression of Weibel Instabilities by High Harmonic Electron Bernstein Modes in Advanced Fast Ignition Laser Fusion Pellets[1] V. STEFAN, Tesla Laboratories,The Stefan University — A novel mechanism for the suppression of Weibel instabilities*[2] in the core of advanced fast ignition pellets*[3] is addressed. The propagation of generated suprathermal electron beam toward the core may lead to the appearance of colossal (∼10MG), small scale (L∼c/ω_{pe}, c—velocity of light, ω_{pe}—local electron plasma frequency)*[4,a,b] magnetic fields. The suppression synergy of high harmonic electron Bernstein, (EB), modes and Weibel modes, (WB), in the cone-attached laser fusion pellets is based on nonlinear mode-mode coupling. EB modes are excited by ignition, a cone guided, or implosion laser beams. High harmonic EB modes easily propagate to the core of the pellet whereby they nonlinearly interact with, and suppress, the WB. The suppression synergy is maximized at the simultaneous action of ignition and implosion lasers.

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[2]* E. S. Weibel, Phys. Rev. Lett., 2,83 (1959)

[3]* M. Tabak, J. Hammer, M.E. Glinsky, W.L. Kruer, S. C. Wilks, J. Woodworth, E. M. Campbell, and M.D. Perry, Phys. Plasmas 1 (5), 1626 (1994).

[4]*,a,b V. Stefan, (a) Quasi-Stationary B-Fields due to Weibel Instability in FI Laser Fusion Pellets; (b) Pellet Core Heating Via High Harmonic EB Modes in FI Laser Fusion. 35th Annual A.A.C, 2005, *Puerto Rico*

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