Abstract Submitted
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Impact of Laser Plasma Instability Induced Intensity Limitations on Target Design[1] ANDREW J. SCHMITT, D.E. FYFE, S.P. OBENSCHAIN, Naval Research Laboratory, Washington DC, S.T. ZALESAK, Berkeley Research Associates, Beltsville MD — ICF direct-drive targets perform best when the pressure of the driving pulse is maximized: the targets can then be designed with small aspect ratios that are more hydrodynamically stable. However the drive pressure in direct drive targets is limited by laser plasma instabilities, which must be avoided to limit unwanted preheat of the fusion fuel. In direct drive, the instability with the lowest threshold is the two plasmon decay instability, which experiments have so far shown to be approximated by the simple formula[2] $I_{thresh} \sim 80\ T_{keV}/\lambda_{\mu m} L_{\mu m}$ where T and L are the electron temperature and density scalelength at the quarter critical surface, and λ is the laser wavelength. Limiting the intensity to this threshold can be done by increasing the target aspect ratio and/or increasing the collisionality of the ablator. We investigate the implications of these strategies on hydro stability and target design, for both glass laser and KrF-laser driven targets.

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[2]A. Simon, *et al.*, Phys. Fluids **26**, 3107 (1983); B. Afeyan and E.A. Williams, Phys. Plasmas **4**, 3827 (1997).

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