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Presentation Type: Oral

Sorting Category: 7.00 Inertial confinement

Sub-Category: 07.03 Laser-plasma instabilities

Abstract Title:

Supression of inflationary stimulated Raman scattering (SRS)

by bandwidth on Nd:glass, KrF, and ArF laser systems.

Stimulated Raman Scattering (SRS) is a parametric instability of concern to inertial confinement fusion (ICF) schemes; since it scatters light away from the target, and accelerates hot electrons towards the cold fuel. In directly-driven ICF schemes we are concerned with the convective growth of SRS; which can have very large gain in the ICF corona, leading to pump-depletion of the laser ahead of the quarter critical density surface. Guzdar et al. [1991] showed that random phase

Abstract Body:

modulated bandwidth has no net effect on the gain of convective SRS. Wen et al. [2021] showed that the threshold for inflationary convective SRS can be increased by sinusoidal frequency-modulated bandwidth.

In this work, we consider SRS in shock-ignition ICF driven by

three different laser systems:  $3\omega$  Nd : glass lasers; KrF lasers; and ArF lasers. Each laser has a different frequency and native bandwidth. The maximum bandwidth from smoothing by spectral dispersion (SSD) on  $3\omega$  Nd : glass is 1THz. KrF and ArF lasers have maximum predicted bandwidths of 3THz and 10 THz, respectively [Obenschain et al. 2020]. We use the EPOCH particle-in-cell code to model the shock-ignition coronal plasma in 1D for each of these laser systems. We vary the total bandwidth, and model the light in its realistic functional form.

This work has been carried out within the framework of the

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IFE: Theory, Simulations, Experiments, Diagnostics

development".

Category Type: Computational

"Broadband mitigation of inflationary stimulated Raman

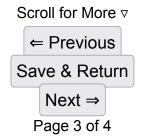
Publications Reference: scattering in shock-ignition on Nd:glass, ArF, and KrF lasers.

SJ Spencer and Tony Arber (in prep.)

Newsworthy Research? No

Speaker is: Early Career Researcher

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