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Investigation of Stimulated Raman Scattering Using a Short-Pulse Single-Hot-Spot at the Trident Laser Facility[1] J.L. KLINE, D.S. MONTGOMERY, L. YIN, K.A. FLIPPO, B.J. ALBRIGHT, T. SHIMADA, R.P. JOHNSON, H.A. ROSE, LANL, E.A. WILLIAMS, LLNL, R.A. HARDIN, WVU —
A new short-pulse version of the single-hot-spot configuration has been implemented to enhance the performance of experiments to understand Stimulated Raman Scattering. The laser pulse length was reduced from ∼200 to ∼4 ps. The reduced pulse length improves the experiment by minimizing effects such as plasma hydrodynamics and ponderomotive filamentation of the interaction beam. In addition, the shortened laser pulses allow full length 2D particle-in-cell simulations of the experiments. Using the improved single-hot-spot configuration, a series of experiments to investigate $k\lambda_D$ scaling of SRS has been performed. Quantitative comparisons of the experiments have been made with the VPIC[†] particle-in-cell code with favorable agreement. In addition, the measurements of the backscatter SRS spectra possibly show evidence of a direct observation of a nonlinear frequency shift due to electron trapping. Details of the experimental setup and initial results will be presented.

[1]Work performed under the auspices of the DOE/NNSA by LANS, LLC., operator of LANL under Contract No. DE-AC52-06NA25396 with the U.S. DOE. [†]VPIC was developed at LANL by Kevin J. Bowers

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