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Three-Dimensional Full-Beam Simulation of Ultrashort Laser Pulse Amplification by Brillouin Backscattering in the Strong Coupling Regime KATHLEEN WEICHMAN, RICHARD BERGER, THOMAS CHAPMAN, STEVEN LANGER, Lawrence Livermore National Laboratory, Livermore, CA 94551, USA, CATERINA RICONDA, Laboratoire pour l'Utilisation des Lasers Intenses/Université Pierre et Marie Curie, 75005 Paris, France — Laser amplification by stimulated Brillouin scattering (SBS) has been previously proposed as a method of achieving high intensity sub-picosecond laser pulses. The 3D fluid simulation code pF3D is used to simulate the SBS interaction of two counterpropagating laser pulses in parameter regimes similar to current experiments [1,2]. The optimal operating regime is explored by variation of the pump and seed intensity, pulse duration, and plasma properties. The sensitivity of seed intensity amplification, pulse compression, and wavefront quality are investigated with regards to spontaneous laser beam instabilities such as filamentation and amplified spontaneous emission. The influence of the spatial and temporal coherence of the pump and seed on the amplification process is presented.

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[1] L. Lancia *et al.*, Phys. Rev. Lett. **104**, 025001 (2010).
[2] L. Lancia *et al.*, Oral presentation at the 44$^{\text{th}}$ annual Anomalous Absorption Conference, Estes Park, 2014.

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