

Abstract Submitted
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X-Ray Pulse Compression using Stimulated Brillouin Scattering in Plasma¹ MATTHEW EDWARDS, JULIA MIKHAILOVA, NATHANIEL FISCH, Princeton Univ — Stimulated Brillouin scattering may allow cleaning and compression of the output from x-ray free-electron lasers, producing coherent sub-femtosecond pulses with intensities orders-of-magnitude beyond current sources. In contrast to stimulated Raman scattering, which is limited by damping at short wavelengths, particle-in-cell simulations and analytic models suggest that amplification by Brillouin scattering is possible in solid-density plasma at the wavelengths and intensities of free-electron lasers. The nonlinear amplification process is robust to quasi-incoherence in the pump beam, permitting beam cleaning in addition to compression.²

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²M. R. Edwards, J. M. Mikhailova, and N. J. Fisch, “X-ray amplification by stimulated Brillouin scattering,” arXiv:1705.08599, to appear in Phys. Rev. E (2017).

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