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Relativistic Electron Beam Microinstabilities in the Fast-Ignition Regime R.W. SHORT, J. MYATT, Laboratory for Laser Energetics, U. of Rochester — Relativistic electron beams for fast ignition can be disrupted by the growth of small-scale instabilities such as filamentation and the two-stream instability, which tend to develop faster than macroinstabilities such as kink and pinch instabilities. In this talk a comprehensive dispersion relation for these microinstabilities is presented and its consequences explored for various ranges of plasma and beam parameters. The dispersion relation includes both electrostatic and electromagnetic terms, allows arbitrary directions and complex values for the perturbation wave vector, and can incorporate fully relativistic Maxwell–Boltzman–Juttner distribution functions or approximations thereto. It can therefore be used to calculate spatial as well as temporal growth rates, to investigate both absolute and convective forms of the instabilities, and to determine the relative importance of electromagnetic (filamentation) and electrostatic (two-stream) instabilities, as well as mixed forms. The results should be useful in benchmarking and optimizing FI simulations using codes such as LSP. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under the Cooperative Agreement No. DE-FC52-92SF19460.

R.W. Short
Laboratory for Laser Energetics, U. of Rochester

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