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Simulations of Relativistic Electron Beam Instabilities for Applications to Fast Ignition L.A. COTTRILL, K. MOLVIG, MIT, A.B. LANGDON, B.F. LASINSKI, M. TABAK, R.P.J. TOWN, LLNL, S. LUND, A. FRIEDMAN, LBL, MASSACHUSETTS INSTITUTE OF TECHNOLOGY COLLABORATION, LAWERENCE LIVERMORE NATIONAL LABORATORY COLLABORATION, LAWERENCE BERKELEY NATIONAL LABORATORY COLLABORATION —
Central to the feasibility of the fast ignition concept is the ability to transport an intense, well-collimated relativistic electron beam through a plasma to a high-density, pre-compressed core. It is well known that this electron beam is subject to a number of instabilities, such as the Weibel and filamentary instabilities, which might prevent efficient energy transport. A number of research groups are using the LSP [1] code to model relativistic electron beam transport for fast ignition. We have performed LSP simulations to benchmark the code against analytical theories of the critical beam-plasma instabilities relevant to fast ignition. In particular, we have explored the range of applicability of the implicit numerical model used in LSP. This work was performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under contract W-7405-ENG-48. [1] D.R. Welch, et al, Nucl. Inst. Meth. Phys. Res. A 242, 134 (2001).

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