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Prospects for achieving high dynamic compression with low energy MICHAEL ARMSTRONG, JONATHAN CROWHURST, JOSEPH ZAUG, SORIN BASTEA, LLNL, ALEXANDER GONCHAROV, Carnegie Institution of Washington — Laser driven dynamic compression experiments may, in materials with picosecond equilibration times, be possible with orders of magnitude less drive energy than currently used. As we show, the compression energy for geometrically similar experiments varies as the third power of the time scale of compression. For materials which equilibrate and can be characterized on picosecond time scales, the compression energy can be orders of magnitude smaller than the 1–100 ns scale time scale of many current experiments. The use of substantially lower compression energy is a great practical advantage in such experiments, potentially enabling the observation of extreme states of matter with table top scale laser systems. We discuss prospects for realizing this scheme in practice. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract No. DE-AC52-07NA27344 with Laboratory directed Research and Development funding (11ERD039), as well as being based on work supported as part of the EFree, an Energy Frontier Research Center funded by the U.S. Department of Energy, Office of Science, Office of Basic Energy Sciences under Grant No. DESC0001057.

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