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Quasi-isentropic compression of materials using the magnetic loading technique[1]

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The Isentropic Compression Experiment (ICE) technique has proven to be a valuable complement to the well-established method of shock compression of condensed matter. The magnetic loading technique using pulsed power generators was first developed about a decade ago on the Z Accelerator, and has matured significantly. The recent development of small pulsed power generators have enabled several key issues in ICE, such as panel & sample preparation, uniformity of loading, and edge effects to be studied. Veloce is a medium-voltage, high-current, compact pulsed power generator developed for cost effective isentropic experiments. The machine delivers up to 3 MA of current rapidly ($\sim$ 440-530 ns) into an inductive load where significant magnetic pressures are produced. Examples of recent material strength measurements from quasi-isentropic loading and unloading of materials will be presented. In particular, the influence that the strength of interferometer windows has on wave profile analyses and thus the inferred strength of materials is examined. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the U.S. Department of Energy's National Nuclear Security Administration under Contract No. DE-AC04-94AL85000.

[1]In collaboration with James R. Asay and Marcus D. Knudson, Sandia National Laboratories.