Abstract Submitted
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Magnetic Spring Experiment R. REID, A. HASSAM, J.C. RODGERS, University of Maryland — A novel fusion concept, the Thermoelectric Rotating Torus [Hassam et al, this meeting], consists of a supersonic, toroidally rotating toroidal Z-pinch. This concept requires momentum sources that can drive supersonic rotation at high beta with a strong field. Marshall guns work by simultaneously creating a plasma and a magnetic field such that the magnetic pressure accelerates the plasma. The maximum magnetic field is, however, limited by the increased plasma resistance at high B when the electrons become magnetized. The Magnetic Spring Experiment seeks to overcome this limitation by creating a strong magnetic field before plasma formation. This is done using a thin metallic foil to carry the initial current. The foil breaks at high magnetic pressure and a plasma is formed; the device then acts as a Marshall gun but with a pre-established magnetic field. A prototype device has been constructed, and preliminary results demonstrate mechanical breaking of the foil and delayed plasma formation. Data will be presented from arrays of magnetic pickup coils and photodiodes. Numerical simulations will also be presented. Work supported in part by the CMPD and the USDOE.

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