Abstract Submitted
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Current Transients in Laser-Driven Coils JONATHAN DAVIES, University of Rochester — The familiar isothermal plasma expansion model is applied to gain some insights into laser-driven coils, where a laser is used to eject electrons from one end of a metal coil to produce a magnetic field. The initial formation of the electron sheath draws a current from the target in the form of an electron rarefaction wave traveling at the electron thermal velocity. A circuit model should be applicable only following the passage of the electron rarefaction wave around the coil. The outward acceleration of the ions by the electrons then leads to an ion rarefaction wave that produces a second transient current pulse traveling at the ion sound speed. For parameters typical of published laser-driven coil experiments, these transient current pulses could be significant and could explain the disagreement between different diagnostics of the magnetic field. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856.

Jonathan Davies
University of Rochester

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