

Abstract Submitted
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Self-generated electric fields in imploding capsules due to shock-front polarization¹ PETER AMENDT, JOSE MILOVICH, SCOTT WILKS, LLNL, CHIKANG LI, RICH PETRASSO, FREDRICK SEGUIN, PSFC MIT — The generation of strong, self-generated electric fields in direct-drive, inertial-confinement-fusion capsules has been reported using 15 MeV proton radiography [1]. A model incorporating charge separation at a shock front [2] is shown to provide good agreement with the measured proton deflections. A simple proton deflectometry model is developed to further assess the origin of the fields and the sensitivity to thickness of the annular field-generating region in an imploding capsule. The strength of the field in a polarized shock front is calculated to be $\approx 10^{10}$ V/m or higher, and is competitive with the criterion for runaway electron generation. Collisional particle-in-cell simulations of a shock front are performed to gauge such kinetic effects and their potential role on shock-front broadening.

[1] J.R. Rygg *et al.*, *Science* **319**, 1223 (2008); C.K. Li *et al.*, *PRL* **100**, 225001 (2008).

[2] Ya. Zel'dovich and Yu. Raizer, *Physics of Shock Waves* (Dover, Mineola NY, 2002), p. 522.

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