

Abstract Submitted
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The creation of electric fields within plasma shock fronts¹ S.C. WILKS, P.A. AMENDT, LLNL, M.G. HAINES, Imperial College, UK, W.L. KRUER, UC Davis, C.K. LI, R.D. PETRASSO, MIT — The propagation of shocks in high temperature plasmas is, in general, a well understood phenomena in high energy density science. Although the creation of a self-consistent electric field that develops at the shock front was predicted decades ago, it has not been investigated in detail, since in most cases of interest this effect was deemed small and therefore is always ignored in hydrodynamic calculations of shocks. However, certain parameter regimes exist in which the strength of this electric field is sufficiently large that it can affect the shock width, owing to excessive diffusion of electrons across the shock interface. For example, in strong shocks a precursor electric field ahead of the shock is observed which can then give rise to a precursor electric shock. We present a number of examples from a variety of parameter regimes, and then compare theoretical predictions with results obtained from collisional particle-based plasma simulations (LSP) that include this self-consistent electric field.

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