

Abstract Submitted
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Large amplitude electric fields in inertial confinement fusion capsules ROBERT BINGHAM, STFC, Rutherford Appleton Laboratory, University of Strathclyde, R.A. CAIRNS, University of St Andrews, P.A. NORREYS, None, R.M.G.M. TRINES, STFC, Rutherford Appleton Laboratory — Experiments on the interaction of high power lasers with inertial fusion capsules have shown evidence of shock like structures with very high electric fields existing over very short distances [1]. Data from proton radiography in inertial confinement fusion capsules suggest the existence of fields of more than 10 GV/m over distances of the order of 10-100 nm [2]. It has been suggested that barodiffusion (i.e. pressure-driven diffusion) may be a possible explanation, but this does not seem to produce very short length scales. Here we show that a collisionless shock structure can be produced by having a finite ion temperature so that some ions are reflected by the potential maximum at the shock. This produces the asymmetry between the upstream and downstream sides which destroys the familiar symmetrical ion sound solitary wave. The consequences for inertial fusion will be discussed.

[1] J.R. Rygg et al, Science 319, 1223 (2008)

[2] P Amendt et al. Phys. Plasmas 18, 056308 (2011).

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