

Abstract Submitted
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Design considerations for collisionless shock experiments using expanding laser plasmas¹ R. PAUL DRAKE, University of Michigan — Collisionless shocks are systems in which the properties of colliding plasmas change on spatial scales that are small by comparison with collision lengths, in consequence of particle interactions with electromagnetic fields. Such shocks abound in astrophysical systems, but remain elusive in the laboratory. Producing them in the laboratory would be of value, as these are complex, three-dimensional systems whose behavior involves the kinetic nature of the particles that are involved. In addition, the opportunities to observe their details are limited, even in the near-Earth space environment. The control offered by laboratory experiments could be essential to developing a clear understanding of their behavior. We consider here the problem of how to produce counterstreaming plasmas that meet the requirements for the generation of well developed collisionless shocks from initially unmagnetized plasmas, working with the homologous expanding plasmas naturally produced by laser irradiation.

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