

Abstract Submitted
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On electron pre-energization by magnetized collisionless shocks in expanding laboratory plasmas¹ KIRILL LEZHININ, Princeton University, WILL FOX, Princeton Plasma Physics Laboratory, DEREK SCHAEFFER, JACK MATTEUCCI, AMITAVA BHATTACHARJEE, ANATOLY SPITKOVSKY, Princeton University, KAI GERMASCHEWSKI, University of New Hampshire — Magnetized collisionless shocks are common features in space and astrophysical systems where supersonic plasma flows interact, such as in the solar wind, the heliopause, and supernova remnants. Recent experimental capabilities and diagnostics allow detailed laboratory investigations of high-Mach number shocks. Using particle-in-cell simulations, we demonstrate the mechanism and the associated requirements of experiments for generation of energetic electron populations in laboratory high-Mach number collisionless shocks. We show through a parameter study that electron acceleration by magnetized collisionless shocks is feasible in laboratory experiments. Conditions for experimental observation of pre-accelerated electrons are formulated.

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