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Magnetic fields due to Weibel modes in the downstream of electrostatic shocks ANNE STOCKEM, THOMAS GRISMAYER, GoLP/IPFN, Instituto Superior Tecnico, Lisboa, Portugal, FREDERICO FIUZA, Lawrence Livermore National Laboratory (LLNL), California, ELISABETTA BOELLA, GoLP/IPFN, Instituto Superior Tecnico, Lisboa, Portugal;Dipartimento Energia, Politecnico di Torino, Torino, Italy, RICARDO A. FONSECA, GoLP/IPFN, Instituto Superior Tecnico, Lisboa, Portugal; DCTI, ISCTE - Lisbon University Institute Portugal, LUIS O. SILVA, GoLP/IPFN, Instituto Superior Tecnico, Lisboa, Portugal — Collisionless shocks are ubiquitous in astrophysics and are important to understand the acceleration of cosmic rays. The shock properties are determined by the microphysics of these shocks and laboratory experiments with intense lasers can help understanding these. For a wide range of conditions the laser produced shocks the shock front formation is determined by electrostatic fields. We show that during electrostatic shock formation, particle trapping in the downstream of the shock creates a strong temperature anisotropy which gives rise to Weibel modes and the generation of a magnetic field in that region. We provide analytical predictions for the generation of these fields and we compare our analytical results with particle-in-cell simulations. Moreover, we show that this regime can already be explored with state-of-the-art laser systems.

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