

Abstract Submitted
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Vlasov Simulation of Ion Acceleration in the Field of an Intense Laser Incident on an Overdense Plasma¹ MAGDI SHOUCRI, Institut de Recherche d'Hydro-Quebec, MATHIEU CHARBONNEAU-LEFORT, BEDROS AFEYAN, Polymath Research Inc. — We study the interaction of a high intensity laser with an overdense plasma. When the intensity of the laser is sufficiently high to make the electrons relativistic, unusual interactions between the EM wave and the surface of the plasma take place. We use an Eulerian Vlasov code for the numerical solution of the one-dimensional two-species relativistic Vlasov-Maxwell equations [1]. The results show that the incident laser steepens the density profile significantly. There is a large build-up of electron density at the plasma edge, and as a consequence a large charge separation that is induced under the action of the intense laser field. This results in an intense quasistatic longitudinal electric field generated at the surface of the plasma which accelerates ions in the forward direction. We will show the details of the formation of the longitudinal edge electric field and of electron and ion phase-space structures. [1] M. Charbonneau-Lefort, M. Shoucri, B. Afeyan, Proc. of the EPS Conference, Greece (2008).

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Mathieu Charbonneau-Lefort
Polymath Research Inc.

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