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Harmonics Generation in the Reflection of a Linearly Polarized Laser Beam Normally Incident on an Overdense Plasma[1] MAGDI SHOUCRI, IREQ, Quebec, Canada, BEDROS AFEYAN, Polymath Research Inc. — We study the harmonics generation in the reflection of a high intensity linearly polarized laser wave normally incident on an overdense plasma. We use an Eulerian Vlasov code for the numerical solution of the one-dimensional relativistic Vlasov-Maxwell equations for both electrons and ions. The oscillation of the laser wave at the plasma edge creates an oscillating space-charge, giving rise to an oscillating electric field. If the intensity of the wave is sufficiently high to make the oscillation of the electrons relativistic, then the plasma edge oscillates nonlinearly in the field of the high intensity laser beam (similar to the relativistic oscillating mirror ROM), which results in an important distortion in the reflected wave associated with the generation of harmonics. The combined effects of the edge electric field with the incident ponderomotive pressure have also important consequences on the ion dynamics, with the ion density profile forming a solitary-like structure close to the plasma edge. We consider the case when the laser beam wavelength is much greater than the scale length of the jump in the plasma density at the edge.

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