

Abstract Submitted
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Density Limit for Plasma Space-Charge Based Electrostatic Ion Confinement KELLY WOOD, CARLOS ORDONEZ, University of North Texas —
A numerical study is reported on the ion density limit for ions electrically confined by the space charge of an electron plasma. A self-consistent finite-difference evaluation of the electrostatic potential is carried out for a non-neutral plasma that follows a Boltzmann density distribution. The ion density is expected to be limited by a limitation on the maximum electric field at the plasma's boundary. A parameter study is carried out to find the functional dependence that the normalized electric field at the boundary has on the following parameters: the positive plasma charge density at the center of the configuration normalized by the magnitude of the electron charge density at the edge, the average charge state of the positive plasma particles multiplied by the ratio of the electron temperature to the temperature of the positive species, and the distance from the plasma's edge to the center of the configuration. The normalized dependence is fit with a function and the function is used to find the conditions for the highest ion density.

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