

Abstract Submitted
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Finite-size particle simulations in the drift-kinetic approximation¹

EVSTATI EVSTATIEV, ANDY SPENCER, JIN-SOO KIM, FAR-TECH, Inc.,
BRADLEY SHADWICK, University of Nebraska - Lincoln — We extend previous variational formulations of finite-size particle plasma simulation methods to the drift-kinetic approximation. Such approximation is applicable to strongly magnetized plasmas, e.g., in tokamacs and magnetic mirrors. In our numerical examples we apply the drift-kinetic approximation to the electron population of the plasma in an electron cyclotron heating ion source (ECRIS) device. The electrons in an ECRIS device are strongly non-Maxwellian (due to the radio-frequency heating) and require kinetic treatment. The drift-kinetic approximation has allowed us to reduce the computational load associated with resolving the electron motion by about two orders of magnitude and to extend the simulation time to hundreds of microseconds. Details of the algorithms and some numerical results will be presented. Simulations are done with FAR-TECH's SIMulation of PLAsmas code, SIMPL.

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Evstati Evstatiev
FAR-TECH, Inc.

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