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Magnetoinductive Particle-In-Cell Simulations of Ion Shell Instabilities¹ MAHA ASHOUR-ABDALLA, JEAN-NOEL LEBOEUF, DAVID SCHRIVER, University of California, Los Angeles, USA, JEAN-MICHEL BOSQUED, CESR/CNRS, Toulouse, France, NICOLE CORNILLEAU-WEHRLIN, CETP/IPSL, Velizy, France, VLADIMIR SOTNIKOV, University of Nevada, Reno, USA — Ion shell distributions have been observed in space by the Cluster satellites within the Earth's plasma sheet boundary layer in a background of thermal electrons and cold ions. The ion shell distributions are isotropically distributed in velocity space on a sphere with drift velocity of the order of the Alfven speed. The ion shells are observed to be associated with intense electrostatic and electromagnetic wave emissions. To examine the properties of the ion shell distributions, electromagnetic PIC simulations have been performed in the magnetoinductive approximation with full dynamics for ions and guiding center electrons. The PIC simulations show that the ion shells are unstable to electrostatic and electromagnetic waves with common frequencies at harmonics of the ion cyclotron frequency in agreement with Cluster observations. Details of phase space, distribution function, and wave mode evolution will be presented.

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