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Solitons in the Auroral Upward Current Region DANIEL MAIN, LASP/CU Boulder, DAVID NEWMAN, CIPS/CU Boulder, ROBERT ERGUN, LASP/CU Boulder, MARTIN GOLDMAN, CIPS/CU Boulder — We have studied the evolution of auroral plasmas — specifically the boundary between the auroral cavity and ionosphere — using 1-D and 2-D dynamic Vlasov simulations. These simulations are initialized with a strong observation-based double layer and result in many features observed with FAST such as a persistent density cavity, an anti-earthward ion beam, a quasi-stable parallel electric field, and ion phase space holes. However, a suprising new result from the simulation is the formation of an ion-acoustic soliton that forms in the auroral cavity and is associated with a population of earthward-traveling ions. I will show FAST observations of solitons and earthward-traveling ions, which compare favorably with the simulation. I will also show how solitons and phase space holes differ both theoretically and observationally. Using a pseudo-potential model [Goldman et al., this meeting], I will show that the term "soliton" is appropriate for the structures that are seen in the simulation. Finally, kinetic simulations with a model soliton will be presented in order to better understand the evolution of the soliton in the more realistic auroral simulations.

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