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Vlasov Simulations of the Lower Boundary of the Upward Current Region DANIEL MAIN, LASP/CU Boulder, DAVID NEWMAN, CIPS/CU Boulder, ROBERT ERGUN, LASP/CU Boulder — The lower boundary of the upward current region has been modeled as a BGK double layer (DL) using FAST data to model the distribution functions on the ionospheric and auroral cavity sides of the DL. The evolution of the DL has been studied using a 1-D open boundary Vlasov simulation. We present results that show that ion holes form only if both H^+ and O^+ are included in the ionospheric ion beam population. If only H^+ is included in the ionospheric ion beam, the DL does not evolve, and the BGK DL is stable. We compare the linear stages of the Vlasov simulation with linear kinetic theory and show that the dominant instability is between the O^+ and H^+ beams. In the 1-D simulation, we show that ion holes form in the H^+ but not the O^+. In addition, we explain how the electrons respond by saturating the growth, thus keeping the ion holes from exploding in size. We also present periodic magnetized 2-D results which shows that ion holes form as well as Berstein modes. However, the Berstein modes form only after the formation of the ion holes. These numerical results are consistent with observations from the FAST spacecraft which has observed ion holes and Berstein waves in the auroral cavity

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