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Vlasov Simulation of Mixing in Antihydrogen Formation CHUKMAN SO, JOEL FAJANS, U.C. Berkeley, LAZAR FRIEDLAND, Hebrew university, JONATHAN WURTELE, U.C. Berkeley, ALPHA COLLABORATION — In the ALPHA apparatus, low temperature antiprotons ($\bar{\mathrm{p}}$) and positrons (e^+) are prepared adjacent to each other in a nested Penning trap. To create trappable antihydrogen ($\bar{\mathrm{H}}$), the two species must be mixed such that some resultant $\bar{\mathrm{H}}$ atoms have sub-Kelvin kinetic energy. A new simulation has been developed to study and optimize the autoresonant mixing [1,2] in ALPHA. The $\bar{\mathrm{p}}$ dynamics are governed by their own self- field, the e^+ plasma field, and the external fields. The e^+'s are handled quasi-statically with a Poisson-Boltzmann solver. $\bar{\mathrm{p}}$'s are handled by multiple time dependent 1D Vlasov-Poisson solvers, each representing a radial slice of the plasma. The 1D simulatiuons couple through the 2D Poisson equation. We neglect radial transport due to the strong solenoidal field. The advantages and disadvantages of different descretization schemes, comparisons of simulation with experiment, and techniques for optimizing mixing, will be presented

[1] Andresen, G. B., *et al* (ALPHA), Phys. Rev. Lett. **106**, 025002 (2011).
[2] Andresen, G. B., *et al* (ALPHA), Phys. Lett. B **695**, 95-104 (2011).

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