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Effect of Realistic End Boundaries on Particle Dynamics in Asymmetry-Induced Transport[1] D.L. EGGLESTON, Occidental College — We have added realistic end boundaries to a simple computer code[2] developed as an aid to understanding asymmetry-induced transport. For the typical experimental case of a standing wave asymmetry, the code reveals dynamical behaviors not included in the analytical theory[3] of this transport. The resonances associated with the two constituent helical waves typically overlap and produce a region of stochastic motion. In addition, particles near the radius where the asymmetry frequency matches the $E \times B$ rotation frequency ω_R can be trapped in the potential of the applied asymmetry and confined to one end of the device. Both behaviors are associated with large radial excursions and mainly affect particles with low velocities $v_z < \sqrt{e\phi_1/m}$, where ϕ_1 is the asymmetry amplitude. With realistic ends, the plasma length is no longer the same as the applied asymmetry wavelength and is a function of radius, and ω_R is a function of radius and axial position. For conditions matching our experiment, these end effects cause a small shift in the resonant velocity and produce minor secondary resonances. The two new dynamical particle behaviors are not significantly altered by these modifications.

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[2]D.L. Eggleston, Bull. Am. Phys. Soc. **50**, 125 (2005).
[3]D.L. Eggleston and T.M. O'Neil, Phys. Plasmas **6**, 2699 (1999).

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