Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Sorting Category: 1.2.6 (Computational)

Two sources of asymmetry-induced transport[1] D. L. EGGLESTON, Occidental College — We have added collisional effects to our single-particle code[2] by applying random velocity steps along with a drag force in the particle equation of motion. By following the time variation of the mean square change in radial position we can obtain a diffusion coefficient D which can be compared with analytical theory and experiment. For asymmetries of the form $\phi_1(r)\cos(kz)\cos(\omega t - l\theta)$ and low collision frequency, there are two contributions to the transport. The first is that given by resonant particle transport theory[3] and is produced by particles with velocity near $\pm(l\omega_R - \omega)/k$, where ω_R is the azimuthal rotation frequency. The second is produced by the low velocity particles identified in Ref. 2 that are axially trapped in the asymmetry potential. These produce a stronger variation of D with ω with a peak near $\omega = l\omega_R$. The width of the peak $\Delta\omega$ increases with center wire bias and decreases with radius, while the height shows the opposite behavior. Diffusion due to axially trapped particles is typically comparable to or larger than that from resonant particles. This may explain the discrepancies between experiments and resonant particle theory.[4]

[1]Supported by U.S. Department of Energy grant DE-FG02-06ER54882.
[2]D. L. Eggleston, Phys. Plasmas **14**, 012302 (2007).
[3]D. L. Eggleston and T. M. O'Neil, Phys. Plasmas **6**, 2699 (1999).
[4]D. L. Eggleston and B. Carrillo, Phys. Plasmas **10**, 1308 (2003).

☐ Prefer Oral Session
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Dennis L. Eggleston
dleggles@oxy.edu
Occidental College

Date submitted: July 15, 2010 Electronic form version 1.4