

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Sorting Category: 1.2.6 (Computational)

Dependence of enhanced asymmetry-induced transport on collision frequency¹ D.L. EGGLESTON, Occidental College
— Our previous studies² of asymmetry-induced radial transport using a single-particle code with collisional effects have identified, for asymmetries of the form $\phi_1(r) \cos(kz) \cos(\omega t - l\theta)$, two sources for the transport: resonant particles (RPs) and axially trapped particles (ATPs). We observe that this latter type, which occurs near the radius where ω matches the azimuthal rotation frequency ω_R , is often dominant at low collision frequency ν but becomes negligible at higher ν . This can be understood by noting that ATPs have a lower trapping frequency $\omega_T^2 = (l^2 \phi_1 / r B) |d\omega_R / dr|$ than RPs. In the low ν (banana) regime, the radial oscillations have amplitude $\Delta r = v_r / \omega_T$, so ATPs dominate, and the transport may even exceed the RP plateau regime level. As ν increases, collisions start to interrupt the slower ATP oscillations while the RPs are still in the banana regime, so the ATP contribution to the transport decreases. At the largest ν values, ATP transport is negligible and the observed diffusion coefficient matches that given by plateau regime RP theory.³

¹Supported by U.S. Department of Energy grant DE-FG02-06ER54882 and National Science Foundation grant PHY-1003952.

²D. L. Eggleston, Phys. Plasmas **19**, 042307 (2012).

³D. L. Eggleston and T. M. O'Neil, Phys. Plasmas **6**, 2699 (1999).

☐ Prefer Oral Session
☒ Prefer Poster Session

Dennis L. Eggleston
dleggles@oxy.edu
Occidental College

Date submitted: July 11, 2012

Electronic form version 1.4