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Isolating Diffusive Effects in Asymmetry-Induced Transport[1] D.L. EGGLESTON, F.O. REBASSOO, Occidental College — In our studies of asymmetry-induced transport in a modified Malmberg-Penning trap, a typical data set consists of the radial flux Γ vs radius r for many values of the asymmetry frequency ω. For a given asymmetry frequency, the flux has a complicated radial dependence, presumably because contributions from diffusion, mobility, and resonant particle effects all depend on r in different ways. To build an empirical model of this transport, we would like to study each of these contributions in isolation. According to the theory[2] both the mobility and the resonant particle factor contain the quantity $\omega - l\omega_R$, where $\omega_R(r)$ is the $E \times B$ rotation frequency and l is the azimuthal mode number of the asymmetry. In an attempt to isolate the diffusive transport, we have thus selected from our Γ vs r vs ω data set those points where ω matches $l\omega_R$. The resulting plots of Γ vs density gradient ∇n show a simple relationship which is largely independent of center wire bias (as expected), but which exhibits significant deviations from linearity. This may indicate that other effects (e.g. radial temperature gradients) play an important role in the transport.

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[2]D.L. Eggleston and T.M. O'Neil, Phys. Plasmas 6, 2699 (1999).

☐ Prefer Oral Session
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