Abstract Submitted
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Empirical model for low-frequency asymmetry-induced transport[1] D.L. EGGLESTON, Occidental College — We are currently developing an empirical model of asymmetry-induced transport in our non-neutral plasma trap with an eye toward providing guidance for further theoretical development. Our previous efforts[2] have focused on radii where the asymmetry frequency f matches the local $\mathbf{E} \times \mathbf{B}$ plasma rotation frequency f_R. We now study the radial particle flux Γ produced by frequencies below f_R. The flux produced by these frequencies is typically largest at the outer edge of the plasma, $r/R \geq 0.75$, where R is the wall radius. The data support an empirical model $\Gamma(r) \propto \exp\left[-(f_0 - f)/f_*\right]$. Both of the parameters f_0 and f_* are proportional to ϕ_{cw}/B, where ϕ_{cw} is the bias of our central wire electrode and B is the axial magnetic field. This scaling suggests a relation with f_R or its derivatives. If we assume the former, then $f_0 \approx 1.5 f_R$ and $f_* \approx f_R/3$. This model is consistent with empirical constraints obtained[3] near the $f = f_R$ points. The physical basis for this model, however, remains to be found.

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[2]D. L. Eggleston, Phys. Plasmas **17**, 042304 (2010).
[3]Eggleston 042304

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