Abstract Submitted
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Flux-driven algebraic damping of m = 1 diocotron mode[1] CHI YUNG CHIM, THOMAS O'NEIL, University of California San Diego — Recent experiments with pure electron plasmas in a Malmberg-Penning trap have observed the algebraic damping of $m = 1$ diocotron modes.[2] Transport due to small field asymmetries produce a low density halo of electrons moving radially outward from the plasma core, and the mode damping begins when the halo reaches the resonant radius $r_{\rm res}$, where $f = mf_{E\times B}(r_{\rm res})$. The damping rate is proportional to the flux of halo particles through the resonant layer. The damping is related to, but distinct from spatial Landau damping, in which a linear wave-particle resonance produces exponential damping. This poster explains with analytic theory and simulations the new algebraic damping due to both mobility and diffusive fluxes. As electrons are swept around the "cat's eye" orbits of resonant wave-particle interaction, they form a dipole ($m = 1$) density distribution, and the electric field from this distribution produces an $E \times B$ drift of the core back to the axis, i.e. damps the $m = 1$ mode.

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[2]A.A. Kabantsev *et. al.*, Phys. Rev. Lett. **112**, 115003, 2014.

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