Abstract Submitted
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Flux-driven algebraic damping of m=2 diocotron mode[1] C.Y. CHIM, T.M. O'NEIL, University of California San Diego — Recent experiments with pure electron plasmas in a Malmberg-Penning trap have observed the algebraic damping of $m = 2$ diocotron modes.[2] Due to small field asymmetries a low density halo of electrons is transported radially outward from the plasma core, and the mode damping begins when the halo reaches the resonant radius r_{res}, where $f = mf_{E\times B}(r_{res})$. The damping rate is proportional to the flux of halo particles through the resonant layer. The damping is related to, but distinct from the exponential spatial Landau damping in a linear wave-particle resonance. This poster uses analytic theory and simulations to explain the new flux-driven algebraic damping of the mode. As electrons are swept around the nonlinear "cat's eye" orbits of the resonant wave-particle interaction, they form a quadrupole ($m = 2$) density distribution, which sets up an electric field that acts back on the plasma core. The field causes an $E \times B$ drift motion that symmetrizes the core, i.e. damps the $m = 2$ mode.

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

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