Abstract Submitted
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Finite-Length Diocotron Modes in a Non-neutral Plasma Column[1] DANIEL WALSH, DANIEL DUBIN, Univ of California - San Diego — Diocotron modes are 2D distortions of a non-neutral plasma column that propagate azimuthally via $E \times B$ drifts. While the infinite-length theory of diocotron modes is well-understood for arbitrary azimuthal mode number ℓ, the finite-length mode frequency is less developed (with some exceptions[2] [3]), and is naturally of relevance to experiments. In this poster, we present an approach to address finite length effects, such as temperature dependence of the mode frequency. We use a bounce-averaged solution to the Vlasov Equation, in which the Vlasov Equation is solved using action-angle variables of the unperturbed Hamiltonian. We write the distribution function as a Fourier series in the bounce-angle variable ψ, keeping only the bounce-averaged term. We demonstrate a numerical solution to this equation for a realistic plasma with a finite Debye Length, compare to the existing $\ell = 1$ theory, and discuss possible extensions of the existing theory to $\ell \neq 1$.

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[2]T. J. Hilsabeck and T. M. O'Neil, Phys. Plasmas **8**, 407 (2001).
[3]K. S. Fine and C. F. Driscoll, Phys. Plasmas **5**, 601 (1998).

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