Abstract Submitted
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Damping of Diocotron Modes by Chaotic Dissipation on a θ-ruffled Separatrix[1] A.A. KABANTSEV, D.H.E. DUBIN, UCSD, YU.A. TSIDULKO, Budker Inst., C.F. DRISCOLL, UCSD — Diocotron mode damping measurements on pure electron plasma columns clearly distinguish the novel "chaotic" dissipation on a θ-ruffled separatrix from the usual collisional dissipation on a θ-symmetric separatrix. Here, an applied electrostatic "squeeze" barrier $\Phi_0(r)$ makes a separatrix between fast and slow electrons, and separatrix dissipation[2] causes the observed mode damping. We add controlled θ-ruffles $\Phi_m \cos(m\theta)$ to the separatrix by either static wall voltages or by other launched waves, and we quantify the enhanced damping in both cases. The chaotic dissipation results from electrons becoming trapped and untrapped as the plasma $E \times B$ drift rotates; and it is observed to scale as $\Phi_m^1 B^{-1}$. In contrast, the collisional dissipation scales as $B^{-1/2}$, and so tends to dominate at high magnetic fields. The transition from collisional to chaotic is unambiguously observed as the strength of the separatrix ruffle is increased. These experimental results are in quantitative agreement with nascent theory analyses[3] which treat the neoclassical transport and damping from θ-ruffled separatrices.

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[2]A.A. Kabantsev *et al.*, Phys. Rev. Lett. **101**, 065002 (2008).
[3]D.H.E. Dubin, adjacent abstract

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