Abstract Submitted
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Trapped-Particle-Mediated Asymmetry Induced Transport and Damping[1] C.F. DRISCOLL, A.A. KABANTSEV, T.M. O'NEIL, D.H.E. DUBIN, UCSD, YU.A. TSIDULKO, Budker Inst. — Recent experiments have characterized 6 transport and damping effects caused by trapping separatrices. Here, pure electron plasma columns have a trapping separatrix created by an applied "squeeze" voltage. The experiments have now established that this separatrix 1) damps the novel "Trapped Particle Diocotron Mode"; 2) damps $m_\theta > 0$, $k_z > 0$ Langmuir (plasma) modes; and 3) adds a new dissipative term in resonant 3-wave couplings.[2] When external confinement asymmetries such as magnetic tilt are added, the separatrix 4) damps $m_\theta > 0$, $k_z = 0$ diocotron modes; 5) damps $m_\theta = 0$, $k_z > 0$ Langmuir modes; and 6) causes bulk plasma expansion and loss. Initial theory analyzed "collisional" separatrix transport scaling as $\sqrt{\nu_{ee}}$; but recent theory and experiments characterize "chaotic" separatrix transport when the separatrix is not θ-symmetric. The experimental scalings for all 6 effects are unambiguous; and the different B-scalings for collisional and chaotic separatrix transport may explain the commonly observed bulk expansion rate $\nu_P \propto B^{-1.4}$.

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[2]A.A. Kabantsev *et al.*, Phys. Rev. Lett. (Aug. 2008).

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