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Enhanced Neoclassical Transport Caused by Chaos Near an Asymmetric Separatrix[1] D.H.E. DUBIN, UCSD, YU.A. TSIDULKO, Budker Inst. — Plasma loss due to apparatus asymmetries is a ubiquitous phenomenon in magnetic plasma confinement. Recent experiments have investigated the loss rate when a central squeeze potential is applied to a magnetized plasma column, creating two trapped particle populations separated by a separatrix.[2] These populations react differently to the asymmetries, leading to a collisional boundary layer at the separatrix. A loss rate scaling as $\sqrt{\nu/B}$ due to the boundary layer is expected theoretically,[3] provided that the separatrix itself is axisymmetric. However, when the separatrix is *asymmetric*, particles become trapped and detrapped as they follow collisionless orbits. This can lead to single-particle resonances and/or a chaotic region around the separatrix, giving enhanced transport. This effect may help explain a long-standing discrepancy between experiment and neoclassical theory, and could play an important role in tokamak and stellerator confinement. Theory and simulations of this collisionless chaotic transport will be presented.

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[2]A.A. Kabantsev, adjacent poster.
[3]D.H.E. Dubin, Phys. Plasmas **15**, 072112 (2008).

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