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Distinguishing Bounce-Resonant from Bounce-Averaged Neo-Classical Transport[1] C.F. DRISCOLL, A.A. KABANTSEV, D.H.E. DUBIN, UCSD — Experiments, theory, and simulation for single-species plasmas now show quantitative agreement for both Bounce-Resonant (BR) and Bounce-Averaged (BA) Neo-Classical Transport, with distinct magnetic field scalings over $0.5 < B < 12$.kG. Here, we consider cylindrical pure electron plasmas, with particle orbit excursions caused by a global "field error" such as magnetic tilt (analogous to global toroidal curvature); and with controlled electrostatic separatrices producing populations of trapped and un-trapped particles. With distinct trapped-particle populations, BA theory correctly describes both *collisional* NCT scaling as $\nu^{1/2}B^{-1/2}$, and the novel *chaotic* NCT scaling as $\nu^0 B^{-1}$ which occurs when the separatrix is "ruffled" in the $E \times B$ drift direction.[2] For weak magnetic fields, BR transport dominates, typically scaling as B^{-2} to B^{-3}, with different scalings observed for z-extended and z-localized field errors. Also, we are able to observe the transition from banana regime to plateau regime, with dependence on applied error field strength ϵ changing from ϵ^2 to $\epsilon^{1/2}$.

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[2]A.A. Kabantsev *et al.*, Phys. Rev. Lett. **105**, 205001 (2010); D.H.E. Dubin and Yu.A. Tsidulko, Phys. Plasmas **18**, 062114 (2011).

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