Abstract Submitted
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**Parallel Slowing from Long-Range Collisions in a Magnetized Plasma**[1] DANIEL H.E. DUBIN, U. C. San Diego — This poster presents a new theory of the collisional drag rate $\nu$ parallel to the magnetic field in a plasma for which $r_c < \lambda_D$, where $r_c$ is the thermal cyclotron radius and $\lambda_D$ is the Debye length.[2] In such a plasma, long-range collisions with impact parameters $\rho > r_c$ make a dominant contribution to the drag. Such collisions are described by guiding centers moving in one dimension (1D) along the magnetic field. These 1D long-range collisions are not included in the classical collision rates. We show that such collisions separate into two classes: Boltzmann collisions where colliding particles can be treated as an isolated pair, and Fokker-Planck (FP) collisions where many weak interactions are occurring simultaneously. These collision classes are separated by a new fundamental length scale $d$ where $d^5 \equiv (e^2/T)^3(T/m)\nu^{-2}$ : FP or Boltzmann collisions dominate for $\rho > d$ or $\rho < d$ respectively. Furthermore, the drag due to Boltzmann collisions is enhanced by "collisional caging": colliding charges are influenced by surrounding charges to diffuse in relative velocity, reversing their 1D motion and colliding several times while remaining correlated.

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[2]D. Dubin, Phys. Plasmas **21**, 052108 (2014)

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