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Electron heating in collisionless magnetic reconnection NUNO LOUREIRO, Instituto de Plasmas e Fusao Nuclear, ALEXANDER SCHEKOCHIHIN, University of Oxford, ALESSANDRO ZOCCO, University of Oxford & Culham Centre for Fusion Studies — A reduced gyrokinetic model [1] is used to numerically investigate magnetic reconnection in the strong guide field, weakly collisional regime. The model retains fully gyrokinetic ions (finite T_i), and electrons are described by a reduced drift-kinetic equation (i.e., are *not* assumed isothermal). The reconnection rate is found to depend on the system size, asymptoting to the usual value of $E \sim 0.1 V_A B_0$ when the system is large enough. Small scales in velocity space are shown to form during the nonlinear evolution of the reconnection process. Though our simulations are conducted in the so-called collisionless regime, it is found that weak collisions are sufficient to convert energy into electron heating via the formation of small scales in velocity space. As theoretically predicted in [1], we demonstrate that electron heating during reconnection is independent of the collision frequency, and represents a substantial fraction of the available energy.

[1] A. Zocco & A. Schekochihin, ArXiv:1104.4622

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