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Large Magnetic Reconnection Simulations with Anisotropic Fluid Closure OBIOMA OHIA, Massachusetts Institute of Technology, JAN EGEDAL, University of Wisconsin-Madison, VYACHESLAV S. LUKIN, Naval Research Laboratory, WILLIAM S. DAUGHTON, Los Alamos National Laboratory, ARI LE, University of California-San Diego — Collisionless magnetic reconnection, a process linked to coronal mass ejections, solar flares, and magnetic substorms, has been widely studied through fluid models and fully kinetic simulations. Though fluid models often reproduce the fast reconnection rate of fully kinetic simulations, significant differences are observed in the structure of the reconnection regions. However, guide-field fluid simulations implementing new equations of state that accurately account for the anisotropic electron pressure [1] reproduce the detailed reconnection region observed in kinetic simulations [2]. Implementing this two-fluid simulation using the HiFi framework [3], we study the large-scale dynamics of the electrons layers as a function of various plasma parameters including the guide magnetic field.

[1] Le A et al., Phys. Rev. Lett. 102, 085001 (2009).
[2] Ohia O, et al., Phys. Rev. Lett. In Press (2012).
[3] Lukin VS, Linton MG, Nonlinear Proc. Geoph. 18, 871 (2011)

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