Abstract Submitted
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Scaling Laws for Magnetic Reconnection when Electron Pressure Anisotropy is near the Firehose Threshold OBIOMA OHIA, U. Maryland, JAN EGEDAL, UW-Madison, VYACHESLAV S. LUKIN[1], NSF, WILLIAM DAUGHTON, ARI LE, LANL — Magnetic reconnection in weakly-collisional, a process linked to solar flares, coronal mass ejections, and magnetic substorms, has been widely studied through fluid and kinetic simulations. While two-fluid models often reproduce the fast reconnection rate of kinetic simulations, significant differences are observed in the structure of the reconnection regions [1]. Recently, new equations of state that accurately account for the development of anisotropic electron pressure due to the electric and magnetic trapping of electrons have been developed [2]. Guide-field, fluid simulations using these equations of state have been shown to reproduce the detailed reconnection region observed in kinetic simulations [3]. Implementing this two-fluid simulation using the HiFi framework [4], we describe a mechanism for regulation of electron pressure anisotropy as well as study force balance of the electron layers in guide-field reconnection. Scaling laws for the heating observed in these layers based on upstream conditions are derived.

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