Progress on the MHD closure with kinetic ions and drift kinetic electrons JIANHUA CHENG, YANG CHEN, SCOTT PARKER, DMITRI UZDENSKY, University of Colorado-Boulder — We have developed a Lorentz force ion, fluid electron kinetic MHD hybrid model [1]. Based on the GEM turbulence code, a second-order accurate implicit scheme that generalizes the previous implicit scheme for Lorentz force ion and drift kinetic electron [2] has been implemented. We have benchmarked the simulation on Alfvén waves, ion sound waves and whistler waves using analytical results for a uniform plasma. For the Harris sheet equilibrium with a guide field, we investigated the full evolution of the resistive tearing mode. The linear growth rate and mode structure agree well with the resistive MHD theory. In the nonlinear regime, several stages are identified including the secondary island formation, its coalescence with the main island and the nonlinear saturation. Also presented will be some preliminary results on magnetic reconnection with a finite guide field.

[1] D. Barnes, J. Cheng, and S. E. Parker, Phys. Plasmas **15**, 055702 (2008).
[2] Yang Chen, Scott E. Parker, Phys. Plasmas **16**, 052305 (2009).

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