1067-35-999 **X.J. Wang*** (xjwang08@vt.edu) and **Michael Renardy** (mrenardy@math.vt.edu). *Ideal Magnetohydrodynamics, Non-Newtonian fluids with infinite Weissenberg number and related issues.*

Magnetohydrodynamics(MHD) finds a wide range of industrial applications, from liquid metals to cosmic plasmas. Weak solutions of Ideal MHD, just like weak solutions of Euler equation, have been conjectured to be promising candidates for the rigorous mathematical description of general turbulence.

It is well known that non-Newtonian flows at high Weissenberg number present many challenges for mathematical analysis; even more so than Newtonian fluids at high Reynolds number, including flow instabilities, singular features along walls, separating streamlines, and numerical difficulties. The study of limiting equations, in which the Weissenberg number is formally set to infinity, is a logical first step in gaining a partial understanding of the high Weissenberg number limit, analogous to the study of the Euler equations for the high Reynolds number limit.

Here we present a well-posedness result for the equations arising in the infinite Weissenberg number limit of the upper convected Maxwell fluids. It is interesting to see the obvious structural analogy between Ideal MHD and our problem. (Received September 17, 2010)